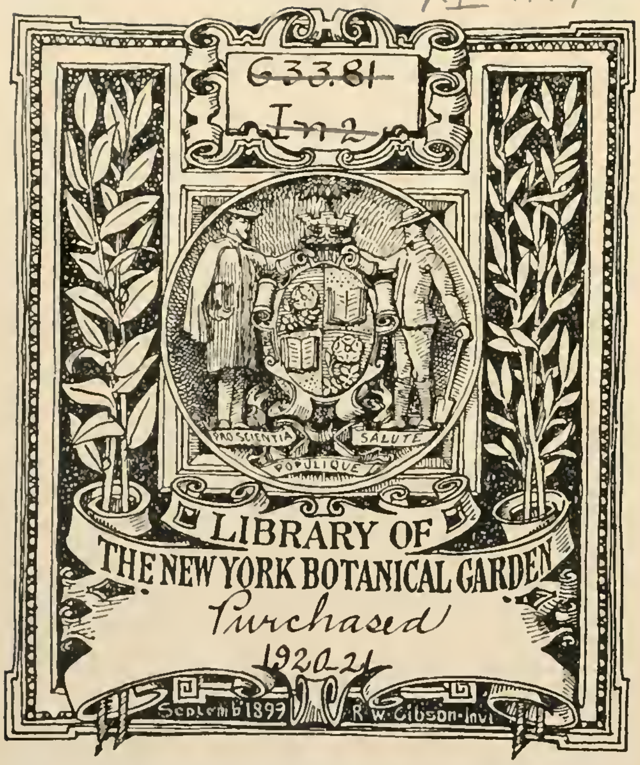
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TRUCKPORTATION AND TRUCK TIRES

While the public imagination has been profoundly stirred by the wonderful development of the passenger automobile industry, the less spectacular production of motor trucks is just as remarkable. So valuable have motor trucks proved themselves that their manufacture rose from 25,375 in 1914 to 316,364 in 1919. Indeed, it is stated that the total registry of motor trucks in the United States for 1919 was 750,000, and that fully 600 auto truck transportation companies are now operating in the country. To the rubber industry this rapid and considerable expansion in the motor truck trade has direct and pecuniary interest. It means greatly increased tire production as the advantages of truckportation (to use a newly-coined and rather suitable term) become better appreciated.

It has been well said that never yet has a crisis loomed in our national history but that a great leader has always providentially appeared to meet and cope successfully with the impending difficulty. So, too, just as it was generally feared that our industrial establishments, reviving from the severe dislocation due to the Great War, would be acutely handicapped in the distribution of their products and perhaps forced to curtail their output at great loss to employers and employed because of the palpably inadequate service given by the railroads of the country, tire and motor truck manufacturers, by their alertness in providing supplemental transportation, actually averted an imminent peril to interurban and interstate commerce. Not only have they aided the seriously embarrassed railroads, but they have developed on a huge scale a new hauling business, a boon to all classes of producers and consumers.

That freight and express automobile service is here to stay, and that it is destined to have a far-reaching field of usefulness is forecasted in an article in this issue on "The Economics of Truckportation," in which the writer, with impressive statistics, deduces the conclusion that for comparatively short hauls (now averaging up to fifty miles, and which may soon be much more) the railroad cannot function as efficiently as the motor truck. For instance, while railroads would require 20 cents for terminal charges and 30 cents for delivery on 100 pounds carried fifty miles (apart from the freight rate), auto trucks collect, carry, and deliver the same weight of goods quite as swiftly, and with none of the rail line delays, over the same distance for a total of 50 cents, or an average of one cent per hundredweight for each mile. Indeed, a motor rate of $0.008 a mile on 100 pounds is quoted on a 100-mile run between New York and Philadelphia, in contrast with the $0.0115 rail express rate, with a 200-pound limit on packages.

While it is self-evident that the old rail freight and express lines will long continue immensely helpful, it requires no second sight to see that the lusty infant, "Truckportation," is bound to develop into a vigorous auxiliary, if not a powerful rival, of the old rail lines. Wasteful methods will be corrected by efficiency experts and rational cooperation encouraged among the carriers; legislation will be framed to standardize rates on a fair basis as in railroad practice; and measures will be taken to check destructive competition. As truckportation thus gains in stability it will attract even greater volume of trade and ample financial support for its expansion, —all of which also spells largely increased business for the rubber mills, which must provide tires for the mighty fleets of motor vans ceaselessly coursing the ever-improving commercial arteries of the nation.

RUBBER MEN AND COTTON

Secretary of Agriculture Meredith in a recent address predicted a great future for American Pima long-staple cotton grown on the irrigated deserts of southern California, Arizona and Mexico. This cotton, developed by careful breeding and selection, is regarded by the Secretary as the best in the world. Even during the war, as he pointed out, when it was discovered that the Germans had practically cornered the world's supply

of flax, an excellent substitute for linen was woven from it and with it nearly all American and a great number of Allied airplanes flew to victory.

The value of the Southwest long-staple crop last year was over $20,000,000. For this year the gross returns are estimated at fully $100,000,000. The industry is but eight years old, and so far has not had to contend with the boll-weevil, which for years has ravaged the cotton plantations along the Atlantic seaboard and the Gulf of Mexico. The development of this great planting industry is largely due to the foresight and enterprise of a number of the big manufacturers who financed planters, erected gins and themselves planted thousands of acres. If given a fair chance they would do the same in Cuba, in the Philippines, for example.

SOLVENT NAPHTHA FROM OIL SHALE

THE UNITED STATES is facing a crisis in its oil supply. Already we are importing petroleum. Nearly 40,000,000 barrels came from abroad during the fiscal year ended June 30, 1919, and these importations must increase year by year as we invent and build more machines which depend upon crude oil or its derivatives as fuel. Motor vehicles continue to multiply and so do ships, locomotives and factory power plants burning oil instead of coal. Industrial uses of gasoline, notably as the principal rubber solvent, call for larger quantities every year.

Geologists, engineers and economists are agreed that if a new demand for petroleum should develop, amounting to 100,000,000 barrels a year, it could not be met from domestic sources of supply. A permanent governmental petroleum administration to assist and participate in the commercial development of foreign and Philippine oils would be necessary. Already the limited supply and increasing demand, together with greater production costs, are being reflected in a rapidly increasing price, which is now more than double the pre-war average.

The situation calls for a prompt, determined national policy looking many years ahead. Either we must take positive steps to secure our share of the supply from the fields of the world, or else we must develop and use shale oil for all purposes to which it is adaptable—probably both.

Shale naphtha is an excellent solvent of rubber, having physical properties analogous to the solvent naphtha obtained from coal tar, of which more might well be used for spreading in America. While shale naphtha has found very little application in America, it is used extensively in Scotland and Germany for purposes where the odor does not matter, especially with asphaltum in certain insulating compounds. In America its wider application to various lines of rubber manufacture should help to meet a national emergency.

The time has come when the American supply of oil shale must be utilized. The position of the shale industry has changed materially in recent years with the advance in petroleum. At present prices it is possible for oil from shale to compete profitably with oil from wells. Crude oil can be produced from shale at $1.85 a barrel in Colorado and Utah. Crude petroleum oil is selling at $3.10 a barrel in Wyoming, while Pennsylvania oil is quoted at $6.10. The Scottish shale industry has been profitable for many years, and its record should be bettered in this country because of the greater richness of shale strata and their more easily workable surface location.

President Alderson, of the Colorado School of Mines, states that the American oil shale supply is practically unlimited. He points to the fact that the petroleum production from wells in this country to date has been obtained from 4,109 square miles with an estimated yield of 2,280,000 barrels per square mile, and asserts that one ten-foot seam of shale, yielding one barrel of oil per ton, will give 15,488,000 barrels of oil, or seven times the square mile output from wells. The 5,500 square miles of oil shale in Colorado and Utah will produce 255,000,000,000 barrels.

An oil shale refining plant can be put in successful operation for an investment of $500,000 on which there would be a substantial return. Some of the large and progressive rubber companies are producing their own crude rubber and long-staple cotton. Why not their solvents also?

AVOIDANCE OF BUSINESS LAWSUITS IN FAVOR OF arbitration is urged on local business men by the Chicago Association of Commerce. The association has arranged for commercial arbitration under the State law and has designated a committee to promote it.

Commercial arbitration combines an ideal method of determining questions of fact with a standard procedure for deciding points of law. It does not involve any surrender or impairment of legal rights, but provides for the determination of facts before an arbitrator having ample power and confidence, and if points of law arise in the evidence these alone are submitted to a court. That necessity seldom arises.

PURCHASING AGENTS IN BUYING RUBBER GOODS AT first are prone to outline minutely the kind and percentage of rubber, the character and quantity of compounding ingredients, and even the time of cure. In time they learn that the use of hard and fast specification is the exception rather than the rule, a much safer guide being found in the representations of reliable rubber manufacturers. This is because compounds and processes vary widely, so that a buyer's carefully detailed specifications of today may be much out of date tomorrow. Moreover, research workers and experts are bringing about daily changes in the rubber industry, that result not merely in increased production but in decided betterment in the quality of the output.

The Economics of Truckportation

By Richard Hoadley Tingley

The advent of the motor truck to the business of transporting freight and express matter in competition with such old-time carriers as the railroads and express companies isn't expected to bankrupt the business of either, nor is it expected to embarrass them in any way. The rapid manner in which the country's growth exceeds every system of transportation almost as soon as inaugurated, and the congestion one meets with on all hands where transportation of any kind figures, clearly indicates that there is a field of service for all—that the motor truck has its own well-defined sphere of usefulness, and that, instead of being a competitor to the older-established methods of transportation, it is a feeder to them—an adjunct to their business. This fact is emphasized by the present predicament of the railroads with a shortage amounting to three-quarters of a million freight cars, and a locomotive efficiency of scarcely more than fifty per cent of normal quota. Add to this the woeful lack of terminal facilities at all points and it will be evident that the rail carriers should welcome any relief that will enable them to properly function in their field.

RAIL FREIGHT RATES NEED ADJUSTING FOR COMPARATIVE PURPOSES

It is the short haul business that puzzles the railroads, particularly when moving in less than car lots. It is generally conceded that this class of business is unprofitable to handle. It has been considered by railroad operators for years that there was no money in freight haulage until a distance of forty miles had been covered. Today, the modern generation of operators place the limit at double that distance.

It will be seen, then, that the motor truck in the handling of freights—"Truckportation," as the new business is called—should not interfere with the business of the rail carriers even though operating in parallel lines, for the average truck line is less than eighty miles, although many now doing a good business operate over much greater distances.

Let us take the case of a wholesale merchant in a large city shipping goods by freight to a retail merchant in a town, say, fifty miles away. From the best figures I am able to obtain, the terminal charges of such a shipment amount to ten cents per one hundred pounds at each end. These charges include switching and placing the car, loading and unloading, and clerical work. The twenty cents does not cover the rail haul. The average charge per hundredweight for truck delivery at each end is approximately fifteen cents. It will be seen therefore that a cost to the shipper of fifty cents is reached, which is exclusive of the line haul charge made by the railway company, and that a truckportation company that can make money at fifty cents per hundredweight on a fifty-mile haul is in a fair way to get business. This rate figures out just a cent a hundredweight a mile. An added advantage to the truck man, also, is that his delivery is made within a few hours, or over night, while it may take freight in less-than-car lots days and often weeks to reach its destination.

In competition with the railway express, some of the same conditions obtain, though the disparity of the comparison is much less marked. Being dependent upon railway service and upon railway cars for a portion of its usefulness, delays are sure to creep in to such service that will not be applicable in the case of merchandise hauled all the way by truck. But the express business of the country is now, practically, in the hands of one organization, the American Railway Express Company, to which I shall refer later.

It would not be fair to truckportation as a business to compare its rates of charge for service with either rail freight or express rates without taking into account many modifying factors. In the first place the freight trucking business is so new that it has not yet found itself. There is little cooperation among the carriers of such freight, although the National Automobile Chamber of Commerce, through the secretary of the Motor Truck Committee, F. W. Fenn, is working hard to bring order and standardization into the ranks. Although occupying the public highways in the conduct of their business, these companies have been brought under the supervision of state or municipal regulation in but a few instances. Nebraska is the only state, so far as I am now informed, where the Public Service Commission has taken a hand in the regulation of rates of charges for such service. There are other states which, I believe, are soon to follow. Each truckportation company charges a rate it sees fit, always higher on a straight comparative basis than the rail freight between given points, and often somewhat lower than the rail express rate; often higher, too, for, with the prompt delivery guaranteed as against an often uncertain delivery of the railway express, it is considered that a charge for a "super-service" is reasonable. Motor truck companies claim that shippers want service first and are willing to pay for it, even at a slight advance over something less dependable.

Pneumatic Tired Motor Trucks with Double-Deck Bodies, Operated by the Interurban Motor Express Out of Sioux City, Iowa, Through Western Iowa and Eastern Nebraska, Have Made an Enviable Record in the Haulage of Livestock. They Serve 150 Farms, Hauling Their Product to the Stockyards and Bringing Back Goods from the City

It has often been stated that the charges for truckportation service amounts, on an average, to a cent a hundredweight a mile. This, although true in some cases, is but a figure of speech, even as an average, as will be seen.

NEW YORK-PHILADELPHIA RATES

Take the case of the American Motor Freight Corporation operating a through daily over-night express service with twenty-two or more trucks between New York and Philadelphia. The distance travelled is almost exactly 100 miles by the highways and its schedule of charges is as follows:

1 to 25 pounds	$0.50
25 to 50 pounds	0.70
50 to 75 pounds	0.90
75 to 100 pounds	1.00 per hundred
100 to 2,000 pounds	0.90 per hundred
4,000 to 8,000 pounds	0.85 per hundred
8,000 to 10,000 pounds	0.80 per hundred

From this it will be seen that for merchandise weighing from seventy-five to one hundred pounds the rate of charge is exactly a cent ($0.01) a mile a hundred pounds, but for a consignment weighing 2,000 pounds the rate figures but nine-tenths of a cent, ($.009) a hundred pounds a mile, and a consignment weighing 10,000 pounds (a full load) would cost $80, or eight-tenths of a cent, ($0.008) per 100 pounds per mile.

Placed in contrast with the first-class railway freight service between these points, the rate, as of March 1, 1920, was 33 cents per 100 pounds, which was increased by the recent rulings of the Interstate Commerce Commission to 46 cents, (or $0.0046) per 100 pounds per mile, assuming the same distance is travelled by the railway freight car as by the motor truck.

Again, by comparison with a similar service by the American Railway Express Company, the first-class express rate was raised from ninety cents per hundredweight to $1.15 by order of the Interstate Commerce Commission, which amounts to $0.0115 per 100 pounds per mile, which practically equals the conventional average quoted for truck service. It must be remembered, however, that there is pending before the Interstate Commerce Commission an application by the American Railway Express Company for an additional increase in rates which may, indeed, be granted before this article is published. In that event the disparity in rates will be still more marked.

Owing to the general shortage in railway equipment and congestion at terminals, the American Railway Express is now declining to accept matter weighing more than 200 pounds per package. This, however, is considered as a temporary measure only but, since the motor truck companies are prepared to accept shipments up to two tons, it gives them, for the present at least, an advantage they are not slow to follow up.

A friend of mine has recently contracted with a truckportation company to move his household furniture from New York to Boston. The rate quoted is 75 cents a 100 pounds, and, as the distance to Boston is practically 250 miles, the rate per 100 pounds per mile is three-tenths of a cent ($0.003).

BAUHAM'S RATE COMPARISONS

In calculating the comparative cost of a shipment of merchandise by one method or another, it is proper to take into consideration all items of expense involved in the delivery of the goods from the door of the consignor to that of the consignee. If, by one method of transportation, additional expense is made necessary by boxing or crating requirements, this should be taken into consideration. If, by such boxing or crating, additional weight is given to the consignment, this, also, should be noted. W. J. L. Bauham, traffic manager of the Otis Elevator Co., has made some interesting studies of rate comparisons, on merchandise moving by rail freight and by motor truck, after taking these items into account. I shall quote some of his findings in substance. He includes in the freight cost the first-class rate, plus fifteen cents per 100 pounds teaming charges from shipper's warehouse to freight house, plus fifteen cents per 100 pounds against teaming charges from freight house to receiver's warehouse, plus 24 cents per 100 pounds increased cost of boxing to cover shipment made via rail freight, plus 17 cents per 100 pounds increased weight caused by increased boxing. The rate via motor truck he figures out covers delivery from shipper's warehouse to receiver's warehouse; and he tabulates his results as follows:

The American Railway Express Company Uses Many Electric Trucks on Solid Tires for Short Urban Business

Rate Comparisons—Per 100 Pounds

From New York, to—	Rail Freight	Motor Truck
Newark, New Jersey	$0.91	$0.15
Paterson, New Jersey	0.91	0.20
New Brunswick, New Jersey	0.91	0.40
Trenton, New Jersey	0.98	0.60
Philadelphia, Pennsylvania	1.02	0.80
Wilmington, Delaware	1.13	1.20
Bridgeport, Connecticut	1.10	0.70
New Haven, Connecticut	1.13	0.73
Waterbury, Connecticut	1.16	0.75
Hartford, Connecticut	1.21	0.90
Springfield, Massachusetts	1.25	1.00
Worcester, Massachusetts	1.31	1.50
Providence, Rhode Island	1.32	1.10
Boston, Massachusetts	1.36	1.50

It will be noted from the above that the motor rate between New York and Boston is double that which I previously quoted in the case of transporting household furniture. It will be further noted that the motor rate between New York and sev-

eral of the points mentioned, as to Newark, Paterson, New Haven, etc., practically amounts to the conventional and oft-quoted average of a cent a hundredweight a mile, while the rate to Providence is little more than a half this theoretical figure.

MOTOR FREIGHT RATES IN MINNESOTA

The Rural Motor Truck Terminals, Inc., of Minneapolis, whose motto is "Safe Speed Service with Every Shipment Insured," operates seventeen lines out of that city and St. Paul in all directions. Its published schedule throws some light on motor freight rates in the Middle West.

Rural Motor Truck Terminals, Inc.

Distance from Minneapolis, Miles	1 to 500 lbs. First Class	501 to 1,500 lbs. Second Class	Over 1,501 lbs. Third Class
1 to 15	$0.34	$0.29	$0.24
16 to 20	.40	.34	.28
21 to 25	.46	.39	.32
26 to 30	.53	.45	.37
31 to 35	.59	.50	.41
36 to 40	.65	.55	.46
41 to 45	.71	.61	.50
46 to 50	.78	.66	.55
51 to 55	.84	.72	.59
56 to 60	.90	.73	.63
61 to 65	.96	.82	.67
66 to 70	1.03	.88	.72
71 to 75	1.09	.93	.77
76 to 80	1.15	.98	.81
81 to 85	1.21	1.03	.85
86 to 90	1.28	1.09	.90
91 to 95	1.34	1.14	.94
96 to 125	1.40	1.19	.98
126 to 130	1.45	1.23	1.02
131 to 135	1.50	1.28	1.05
136 to 140	1.55	1.32	1.09
141 to 145	1.60	1.36	1.12
146 to 150	1.65	1.40	1.16
151 to 171	1.86	1.58	1.30

It will be noted from these schedules that for first-class shipments of 1 to 500 pounds the rate per hundred miles of haul amounts to one and four-tenths of a cent a mile ($0.014), for second-class $0.012, and for third class $0.0098.

SOME IOWA MOTOR TRUCKPORTATION RATES

The Interurban Motor Express Company operates a daily service over five routes out of Sioux City, Iowa, to small towns in that state and publishes a schedule of freight rates in four classes in which merchandise is rated according to the Official Western Classification: The figures below represent rates in cents per 100 pounds, for classes 1, 2, 3 and 4:

From Sioux City to—	Miles	1	2	3	4
James City	6	30	28	23	20
Henton	11	30	28	23	20
Merrill	18	30	28	23	20
Lemars	25	30	28	23	20
Lawton	11	30	28	23	20
Moville	17	30	28	23	20
Kingsley	27	30	28	23	20
Bronson	11	30	28	23	20
Climbing Hill	15	30	28	23	20
Holly Springs	16	30	28	23	20
Horlick	26	30	28	23	20
Sargent's Bluff	8	30	28	23	20
Salix	16	30	28	23	20
Sloan	21	30	28	23	20
Neptune	20	35	30	28	23
O'Leary	24	37	32	29	24

I have reproduced this schedule as a whole in order to illustrate the fact that rates of charge by truckportation companies do not always follow the mileage basis. This company makes the same charge for hauling 100 pounds 6 miles to James City as to Kingsley, which is 27 miles away. But for some reason not known, perhaps owing to highway conditions, its charges are increased on all classes of goods for hauling the 20 and 24 miles to Neptune and O'Leary. Taking the first-class rate from Sioux City to James City, 6 miles, the rate per 100 pounds per mile is five cents, while the 100-pound mile rate to Kingsley, 27 miles, is 1.11 cents. The Iowa company makes special rates on cream, eggs and live stock which I will not quote. Its minimum charge for any shipment is 50 cents, which rule is generally adopted by all truckportation companies.

THE NEBRASKA RAILROAD COMMISSION FIXES MOTOR RATES

On the other hand, the Nebraska State Railway Commission, the only state that has so far prescribed rates of charge that motor freight companies shall use, has followed strict railroad practice and adhered closely to the graduated mileage basis. Its published schedules cover from one to 150 miles of haul, taking the four classifications into account. Its rate on first-class matter carries an initial charge of 20 cents, plus one and one-half cents a mile for second-class, 85 per cent of the first-class rate. Taking the first-class rate on a 25-mile haul, this amounts to 57½ cents per 100 pounds, or 2.3 cents a mile; for a 100-mile haul, $1.70, or 1.7 cents, and for a 150-mile haul, $2.45, or 1.64 cents a hundredweight a mile.

TRUCK COMPANIES THE COUNTRY OVER

It is stated by some authorities that there are 600 different truckportation companies now in operation as common carriers. It is impossible, however, to accurately estimate their number. Statistics of this kind are difficult to obtain and the business is growing so rapidly that they would be worthless in a short time if available. We do know, however, that there were 316,364 commercial trucks manufactured in the United States in 1919, as against 25,375 in 1914 and that there were 750,000 such vehicles registered in this country last year. There are twenty different motor freight lines running out of Baltimore and Washington to nearby and distant Maryland towns covering 500 miles of highways and making a daily average of 1,500 miles. California is said to have 150 separate lines. There are no less than 138 trucking companies doing business in and around New York, if the advertisements in the motor magazines may be credited. In ten months, motor trucks carried from Council Bluffs to Omaha 18,498 head of cattle, 158,019 hogs and 37,130 sheep. In Cincinnati, much the same thing is happening. A line from Adrian to Detroit carries everything from butter to buttons and from castings to calves. There are lines all over Ohio, Missouri and Kansas. A trucking company that operates from Deadwood, South Dakota to Sundance, Wyoming, 45 miles, makes delivery of goods in six hours, where it is claimed the railroads take four or five days. From Chattanooga, Tennessee, to Atlanta, Georgia, is a long haul, but the motor truck is doing it regularly, serving the farming communities on the way.

Perhaps the best-known people in long-distance trucking is The Goodyear Tire & Rubber Co., Akron, Ohio. This company has five trucks that operate between Akron and Boston. The distance is figured at 1,500 miles and the round trip is made in five and a half days. It also operates six 3½ to 5-ton trucks between Akron and Cleveland. The Goodyear company, however, does not operate as a common carrier but confines itself to transporting its own finished products to the Eastern markets, returning with raw materials and supplies.

LOOKING AHEAD

What is the future of truckportation? It is more than evident that, as an adjunct and feeder to the railroad, it has a distinct field of operation. In paralleling a railroad for short hauls it can, no doubt, successfully compete with it even at much higher rates of charge because its service is so markedly superior. What will happen at some future time when the railroads have emerged from the difficulties and embarrassments that have so

long hampered their activities and are once more on a properly functioning basis, is a matter that time only can decide. It is fair to presume, however, that, in the meantime, the business of truckportation will have become a recognized, standardized institution, fulfilling a field of usefulness from which it will be difficult to dislodge it.

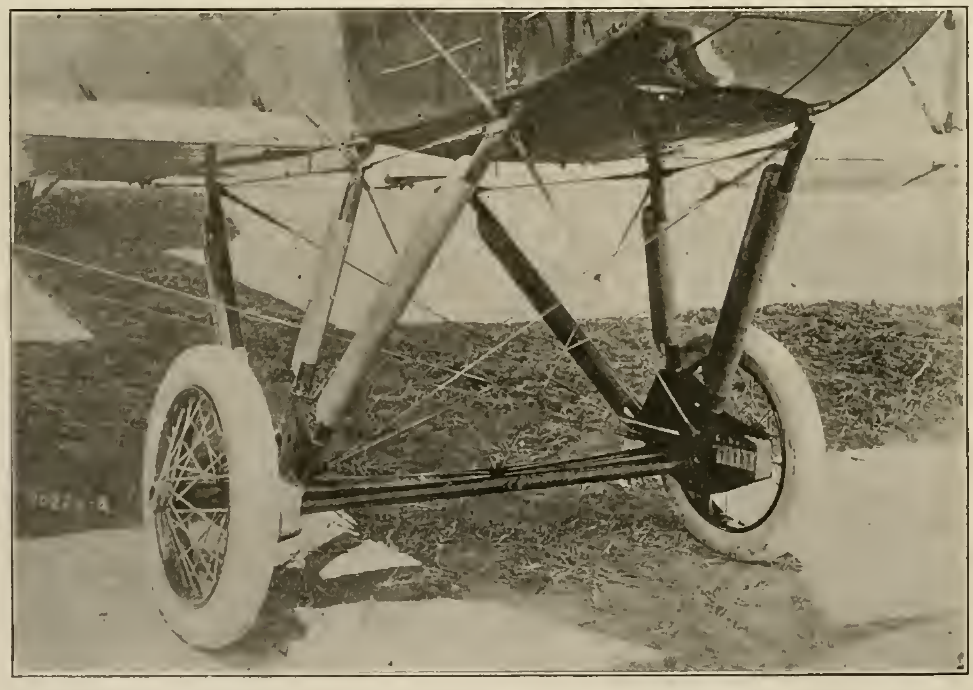
THE AMERICAN RAILWAY EXPRESS COMPANY IN TRUCKPORTATION

The status of truckportation with respect to the American Railway Express is a different matter. This company, by reason of the forced consolidation of all the express companies of the country into its one organization in 1918, operates on every railroad in the country. It handles a million shipments a day. It has a working force of 135,000 people. It is equipped to do a big business, and it is going to do it, truckportation or no. It has fleets upon fleets of motor trucks of its own operation at terminals for delivery of goods to its express cars.

Competing with itself, and in order to try out the possibilities of all motor express transportation, the American Railway Express Company has been experimenting with a line of its own between New York and Passaic and Paterson, New Jersey, respectively 16 and 22 miles away. A fleet of 10 new 3½-ton trucks with "Van" bodies was assigned to this service; and, when operations have been conducted for a sufficiently long period this organization will know something about truckportation, its costs and its usefulness.

ELASTIC CORD FOR AIRPLANE SHOCK ABSORBERS

Anyone who has experienced the thrill of landing in an airplane recalls the swift upward rush of the earth to meet the craft and the disproportionately slight shock of the actual contact of earth and plane. One invariably feels braced for a more racking shock and the absence of jolting is a matter of wonder. Almost the first conclusion reached about the science of aviation was that the safety of an aviator depends in great measure on the landing. This fact was unscientifically stated long ago by the small boy who observed that falling did not hurt him but it hurt when he stopped, and in order that Uncle Sam's aviators shall not be hurt when they "stop," much careful study has been given by manufacturers of aircraft to the problem of lessening the shock of landing. The result has been the rubber shock absorbers with which the landing wheels of all Government airplanes are now fitted. Ordinary automobile springs and shock absorbers were out of the question because of their weight, and an ingenious contrivance utilizing rubber cord was used instead.



Airplane Equipped with Rubber Shock Absorbers

It is due to the remarkable quality of india rubber that specially constructed elastic cords are successful in heavy airplane construction to secure the cushioning effect when landing. The wheel supports, at both front and rear of the machine, are provided with steel tubes that slide within each other. The rubber cords supply the necessary tension to the sliding supports, so that when the machine is on the ground the weight is cushioned by the tension of the rubber cords, and when flying they are relaxed. Sixteen of these cords to a machine are generally used, but that depends, however, on the weight and style of the airplane.

Great care is given to the quality of the rubber cords used in shock absorbers on all government planes. The rubber used is a compound containing at least 90 per cent by weight of the best quality wild or plantation rubber. This gives a very "lively" compound, which is also free from ingredients known as "oil substitute." The organic acetone extract does not exceed 3½ per cent of the weight of the rubber and the free sulphur content does not exceed one-half per cent of the total compound. The weight of the non-volatile ash does not exceed 5 per cent of the compound.

The elastic cord varies in width according to its use, but the appearance and construction are the same for all sizes. It is composed of multiple strands of rubber tightly encased within two layers of cotton braid. The rubber strands are square, of equal size (0.05—0.035-inch), and are thoroughly treated with soapstone or talc to prevent them from adhering to each other in the finished cord. The number of strands varies according to the diameter specified, which always means the over-all diameter of the braid with rubber strands enclosed. A tolerance of plus ¾-inch is allowed in the over-all diameter but there must be no minus variation. The double covering of braid is very strong, each thread of it having a tensile strength of from 4 to 5¼ pounds by test. Both the inner and outer braids are wrapped over and under with three or four threads.

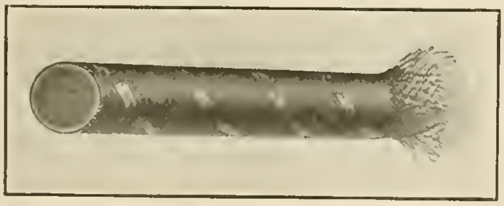
In consequence of the care used in material and manufacture an elastic cord of great durability and tensile strength is produced, which is well fitted to endure the strain of use in airplane shock absorbers. Two inches of the rubber cord used by the Government will stretch to 16 inches before breaking, over 700 per cent extension. After aging in dry heat for seven days at a temperature of 160 degrees F., a two-inch specimen will still stretch to 9 inches, an extension of 350 per cent.

In order to test its fitness a 6-inch sample of cord is stretched to double its normal length and the weight of the load measured. To give this 100 per cent extension in a cord of ½-inch diameter a load of from 145 to 180 pounds should be required. If the

cord cannot stand the minimum pull it is not fit for Uncle Sam's use.

In order to test the cord thoroughly, samples are cut from each 500 feet of the product unless the inspector judges that the uniformity of the cord can be ascertained with fewer samples.

As almost all resilient material deteriorates with age, great care is taken to use new elastic cord, no cord being used if more than



Elastic Cord for Airplanes

six months from the factory. To eliminate any old material, each factory making elastic cord for Government airplanes is required to use an identification system by means of two colored threads woven in the entire length of the cord. These colors are designated by the Government for use in a specified period. For instance, all elastic cord woven for the Government in January, February, and March, 1920, contained threads of black and maroon in its outer covering.

In addition to this color system each roll of finished cord is plainly marked with the date of manufacture on a tag of permanent nature fixed to the cord.

The Air Service reserves the right of free access to all parts of the plants in which elastic cord is manufactured for the Government, and also the right to inspect all materials entering into its construction.

We are indebted for the information used in this article to the Specifications and Standards Section, Engineering Division, Air Service, United States Army, Dayton, Ohio.

MEETING OF THE RUBBER DIVISION OF THE AMERICAN CHEMICAL SOCIETY

At the recent Chicago convention of the American Chemical Society, held September 7-10, the Rubber Division had a most interesting meeting. The various divisional meetings convened at the University of Chicago and were very well attended, attendance varying between 75 and 100. The following is an outline of the proceedings.

ACCELERATORS

Concerning accelerators, the secretary reported that following the discussion at the spring meeting in St. Louis he had given the announcement to the trade journals that the division did not object to the proper use of trade names for accelerators, but that it did most strenuously object to the marketing of unknown products which are sold under trade names and whose true constituents are supposed to be kept secret. This objection is twofold; the Division believes that the advancement of the industry is retarded by the use of unknown materials and that the public often suffers by the indiscreet use of unknown accelerators.

Discussion followed as to the best means of ridding the market of vague accelerators, and a committee was appointed consisting of J. B. Tuttle, W. F. Zimmerli, C. W. Bedford and A. H. Smith to index all available information concerning the analysis of accelerators on the market and to keep this file complete as new accelerators appear. The information in this file will be available to members of the Division.

PHYSICAL TESTING

Professor H. E. Simmons reported that the committee on physical testing was endeavoring to obtain specifications for the physical testing of rubber which would be satisfactory to all of the various interested societies and organizations.

Two papers were read by Mr. De Pew, presented by the research laboratories of the New Jersey Zinc Co. The abstracts follow:

The Aging of Some Rubber Compounds.—Comparative results on accelerated aging tests on zinc oxide stocks as compared with some carbon black stocks. Considerable checking and cracking was observed on the surface of the stocks, the zinc oxide stock showing up by far the more favorable of the two. It was pointed out by Mr. North that the high percentage of hexamethylene tetramine would cause very bad aging and might be held accountable for some of the bad aging of the black stock.

Some Micro-Sections Cut From Vulcanized Rubber Articles.—Mr. De Pew gave a very interesting description of the difficulties encountered in making microphotographs of rubber articles and told of the methods with which they had been most successful. He had prepared slides from a good many sections, which proved quite instructive on the screen.

PEACHEY'S VULCANIZATION PROCESS

The round table discussion largely concerned the method of vulcanization recently proposed by Mr. Peachey. Samples were shown of various types of rubber goods vulcanized by the new process. The discussion brought out the following points:

Scientifically the method is correct; the action of hydrogen-sulphide and sulphur dioxide in the rubber reacting to produce active sulphur, which in turn vulcanizes the rubber almost instantaneously at ordinary temperatures. This vulcanization permits the use in rubber goods of many dyes which will not stand the present conditions of manufacture.

The reaction between hydrogen sulphide and sulphur dioxide does not produce all active sulphur, however, a considerable portion of sulphur *mu* being formed. Extraction of goods cured by this process will often show more uncombined than combined sulphur and the free sulphur content is usually as high as in goods cured in the ordinary way.

The practical operation of the method is the insurmountable difficulty of the process. The degree of vulcanization must be regulated by a very careful measure of the quantity of gases absorbed, the production of a uniform state of vulcanization through an article of appreciable thickness being impossible.

Because of the impossibility of obtaining a uniform state of vulcanization and of the difficulty of controlling the quantity of the different gases, American chemists have not grown enthusiastic over the process as have their English brothers.

RUBBER ENERGY

W. B. Wiegand brought out many interesting facts concerning the resultant energy storage capacity of rubber compounds, their hysteresis losses and other physical properties due to the introduction of different fillers into the compound. The particle sizes of ordinary compounding ingredients were shown by slides and the properties they impart to rubber were shown by stress-strain curves.

The quality of the tire which enables it to stand the rough usage of thousands of miles of travel, as Dr. Wiegand outlined, is due to the fact that well-vulcanized rubber has several hundred times greater energy storage capacity than any other structural material. This property renders it of the greatest value in the absorption of the shocks of the main traveled road. Its energy can be changed into frictional heat, and it can also be increased by adding to it certain substances.

"In a pneumatic tire," said Dr. Wiegand, "the most important energy losses are those due to fabric chafing. For the measurement of these and also for the analysis of the casing from the standpoint of determining the effect of various physical changes upon the substance, the tire pendulum is described. It shows that the lessening of energy by the complete tread and breaker of a pneumatic tire is no greater than that caused by a single ply

of carcass fabric. The tire pendulum also shows that cord fabric is three times as efficient as square woven fabric from the standpoint of energy dissipation."

Dr. Wiegand maintained that energy storage capacity was the only accurate measure of the ability of a tire to withstand the grinding wear of the highway. He told of the effect of various pigments used in the coloring of the rubber, and classified them as active, or inert, in accordance with their influence in increasing or decreasing the total energy capacity of the compounds employed.

The speaker also made brief reference to the probable special arrangement of ingredients, when added in various proportions to the elastic gum.

SYMPOSIUM ON RUBBER ANALYSIS

The symposium on rubber analysis was primarily intended to review the work that has been done and to correlate it with any work that might be attempted by the Division. W. W. Evans has prepared a compilation of the literature on rubber analysis which is undoubtedly as complete as anything published. Not only are the references given but comprehensive abstracts are included. The members of the Division received these before the meeting so that they could be reviewed.

Discussion on various determinations was led largely by men who have been active in developing or improving these methods. The various direct methods for the determination of rubber were discussed and also the methods for the determination of the various extracts, free and total sulphur, fillers, etc. The point was brought out very clearly that since compounded rubber goods contain almost anything, the production of a uniform procedure for the analysis of all goods was out of question. After all, the important part of rubber analysis is not to get the analytical results, but to interpret properly the figures obtained, taking into consideration the methods that were employed. The division decided that for the present no work on analysis should be undertaken by the Division.

RUBBER DIVISION OFFICERS

The election of officers for the coming year resulted as follows: W. W. Evans, chairman; C. W. Sanderson, vice chairman; Arnold H. Smith, secretary, the Research Laboratory, Goodyear Tire & Rubber Co., Akron, Ohio.

Executive Committee—G. D. Kratz, J. B. Tuttle, C. W. Bedford, J. R. MacGregor and H. E. Simmons.

ABSTRACTS OF PAPERS READ AT THE MEETING

A Theory of Vulcanization Based on the Formation of Polysulphides During Vulcanization

All organic accelerators and a number of inorganic accelerators function as catalysts of vulcanization through the formation of polysulphides. These accelerators may be placed in two classes:

1. Hydrogen sulphide polysulphide accelerators.
   Organic bases are believed to form polysulphides by the aid of hydrogen sulphide. Examples are piperidene and dimethylamine, which form polysulphides in the presence of hydrogen sulphide and sulphur. Inorganic bases such as sodium hydroxide, calcium hydrate, magnesium oxide and basic magnesium carbonate function in the same manner as the above.
2. Carbo-sulph-hydrol polysulphide accelerators.
   Thioureas and dithiocarbamates are believed to form some type of polysulphides through the grouping C-SH.

Differentiated from the above two classes of accelerators are such accelerators as zinc oxide and litharge, which do not form polysulphides. These are termed "secondary accelerators" owing to the fact that they decompose polysulphides to give active sulphur.—Winfield Scott and C. W. Bedford.

The Action of Heat and Light on Vulcanized Rubber

The action of heat and light on vulcanized rubber is frequently spoken of as being identical, and oxidation is said to be the cause of the deterioration. From published and unpublished tests it is shown that the action of heat is one of change in the rate of the chemical reaction between rubber and sulphur and goes on throughout the entire mass, whereas the action of light is one of oxidation, taking place on the surface. Heat produces no change in the solubility of the rubber substance in solvents such as acetone and alcohol, whereas light breaks up the rubber molecule, forming decomposition products which are readily soluble in acetone.—J. B. Tuttle.

The Action of Certain Organic Accelerators in the Vulcanization of Rubber (II)[1]

The activities of certain synthetic, nitrogenous organic accelerators, in a mixture of rubber and sulphur, were compared with the dissociation constants of the original substances. With the exception of members of a closely related series, no definite relation was found to exist between the activities of the substances as accelerators and their dissociation constants. Substances which decompose or react with other components of the mixture to form substances of acid character do not accelerate unless a neutralizing base or salt is present. The results obtained and the conclusions drawn from them compare favorably with other results obtained with ammonium salts.—G. D. Kratz, A. H. Flower and B. J. Shapiro.

The Action of Certain Organic Accelerators in the Vulcanization of Rubber (III)[1]

The relative activities of molecularly equivalent amounts of aniline and diphenylthiourea in the acceleration of vulcanization were compared in rubber-sulphur mixtures and in mixtures which contained zinc oxide. In a rubber-sulphur mixture, the activity of aniline was found to be much greater than that of diphenylthiourea. In mixtures which contained zinc oxide, the reverse was true. With aniline as the accelerator, either in the presence or absence of zinc oxide, the same maximum tensile strength was obtained, accompanied by a higher sulphur coefficient in the absence of zinc oxide than when this substance was present. The mixture which contained zinc oxide attained the same maximum tensile strengths at approximately the same sulphur coefficients, irrespective of whether aniline or diphenylthiourea was employed as the accelerator. It is evident that there is apparently no general relation between the physical properties and sulphur coefficients of accelerated mixtures.—G. D. Kratz, A. H. Flower and B. J. Shapiro.

The Organization of an Information Service in Connection With Industrial Research Organizations

The expansion of industrial research justifies a study of its organization and its relation to the parent corporation. It is developed that about 2 per cent of the total turnover of a corporation may profitably be spent for development, and that about 2 per cent of this development fund may be applied to information service.

This department should have as large a library as is justified, and, through weekly bulletins and monographs, should keep the workers informed of the progress of knowledge as developed in the literature and from experimental work. All the information available should be indexed in such a way that it may be readily searched. It seems desirable that this department should edit technical reports, in order that the relation between new work and old may be brought out. This department should be able to prepare reports which are intelligible to business executives.

The technical details of the establishment and operation of such a division are discussed.—R. P. Rose and J. H. Reel.

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[1] Part I, see The India Rubber World, October 1, 1919, page 21. See also The India Rubber World, June 1, 1919, pages 485-6.

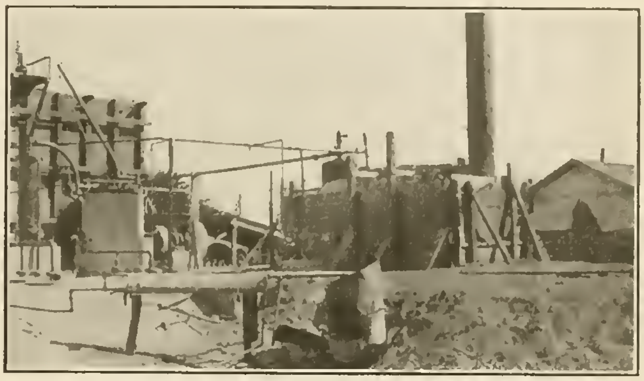
Ocotillo Again to the Front

In November, 1916, The India Rubber World chronicled the experimental work being done in extracting gum from ocotillo in Arizona. The first work was not apparently successful but that success is now assured is the assertion of Daniel M. Bechtel, president of the Ocotillo Products Co., of Indianapolis, which has just completed a large addition to its works at Salome, Yuma County, Arizona. The plant was started several years ago in an experimental way to obtain a chicle-like gum from the ocotillo to use in a waterproofing compound. A process of gasoline solvent-distillation was first employed for recovering the gum from the bark of the plant, but this method left in the gum so much resinous substance that a perfectly satisfactory cure could not be effected. So, too, the process was rather crude and wasteful; and, discouraged by the small output and the relatively inferior product, the projectors were often tempted to quit.

At the outbreak of the World War, however, Dr. E. Cornelius Weisgerber, a noted chemist, who had been put in charge of the research and development division of the United States Army and Navy, and who helped to originate valuable "smoke screen," explosive, and pyrotechnic preparations, was directed

The Ocotillo in Its Desert Home

to prepare a waterproof composition for painting concrete ships, for coating concrete piling, and for lining the insides of hand grenades. His attention was attracted to the possibilities of ocotillo gum; and, taking up the earlier and incomplete experiments at the desert works, he discarded the solvent-recovery process and substituted that of destructive-distillation with sub-



Factory of the Ocotillo Products Co., Salome, Arizona

sequent refinements. The result was the production of a rubber-cellulose base preparation, which, after being sprayed on dry concrete not only stopped all seepage but also overcame one of the worst troubles of concrete ship builders, electrolytic decomposition of the steel reinforcing. Concrete piling was coated on the part most liable to disintegration, between high and low water mark, and after a two years' test government experts declared that neither sun, air, nor sea water had perceptibly deteriorated the piling thus treated.

The company is now equipped to take 100 tons a day of ocotillo, which is gathered by Mexican laborers, who get $6 a ton for the shrubs delivered at the mill. The entire plant, except a short root, is used. From the loading platform the plants are hoisted to a chute, whence they are fed to a "hog," which grinds them into small chips. The chips are then put in a retort and decomposed by oil heat, and the volatile pyroligneous acid passes like steam through pipes to condensing vats underground, leaving the gums and tars in the closed vessel. The gums are separated from the tars with suitable solvents, and are sent to separate factories, while the liquor is shipped to a third factory. The Arizona plant makes no finished products.

One ton of ocotillo yields 306 pounds of charcoal, 206 pounds of tars, 130 gallons of pyroligneous liquor, and 173 pounds of gums. While the charcoal is said to be superior to willow or poplar charcoal for sugar-making, powder compounding, or absorbing emanations from radio-active water; while the pyroligneous liquor is said to be rich in acetic and carbolic acids, as well as wood alcohol, a synthetic oil rivalling linseed, and other substances useful in the arts; while the tars contain a high percentage of creosote and have in the laboratories yielded 104 fractions, including most of the dyes, drugs, and synthetic preparations hitherto imported from Germany; it is from the gums that there is extracted, after supplying material for lacquers, a substance said to equal first-class crude rubber, identical with it chemically, and capable of perfect compounding and vulcanization. This rubber content is 5 per cent of the whole plant.

A material practically akin to hard rubber or ebonite, it is said, has been made from the residue of the tars and has shown dielectric or insulating qualities equal to gutta percha. From this product the company intends to produce a compound for unbreakable talking machine records. The investigators have also discovered a cellulose from which may be made non-

inflammable motion picture films. All the processes so far perfected have been protected with patents. Incidentally it has been found that ocotillo fiber is even stronger than ramie. Dr. Weisgerber has had two tires made of such fabric, well frictioned with gum, and which are still good after 22,000 miles' use on a heavy sedan run mostly in a rough country.

Ocotillo, diminutive of "ocote," a kind of Mexican pine, and which is one of the candlewoods of the great arid region of the Southwest, known botanically as *Fouquieria splendens*, is a shrub with naked, wandlike, thorny branches, which, usually in February, after a brief rainy season, puts forth foliage and clusters of bright scarlet flowers. The stems have long been used for poles and wired for fencing. The plant is usually ten feet tall. The supply is practically inexhaustible. Soon after it is chopped off close to the root it starts to sprout again. While lying in heaps in the yard, even three months after cutting, it often puts forth its flowers. The Mexicans say that it has more lives than a cat, and that the only way to kill it is to burn it, root and branch. Officials of the company say that there is enough ocotillo within a fifteen-mile radius to keep their plant running at full capacity for fifty years.

Nor is the company satisfied with its present achievements. It is also experimenting with the species of cactus known as the "saguaro" (*Cereus giganteus*), from which it is predicted a yield of 11 to 12 per cent of rubber will be readily obtained. The saguaro, the largest of the cacti family, often attaining a height of sixty feet, is an arborescent plant growing abundantly in Arizona and New Mexico, with sparse, candelabrum-like branches, bearing yellow flowers and edible fruit.

The company's plant is located in a plain, which for heat and aridity during the long summer is said to be rivalled only by Death Valley, California. A temperature of 132 degrees F. is often reached. Water is to be had only from deep-driven wells. It is described as a country of almost endless sunshine, burning alkali sand, rank thorny growths, vipers, lizards, Gila monsters, scorpions, rattlesnakes, tarantulas, stinging flies and poisonous beetles. Yet the workers manage to adapt themselves fairly well to the unfavorable natural surroundings, and the company considerately makes the hours of labor as few as possible in the more torrid season.

RUBBER TECHNOLOGISTS FOR THE BUREAU OF STANDARDS

The United States Civil Service Commission announces open competitive examinations for the positions of associate technologist in rubber, textiles and other subjects, salary $2,000 to $2,800 a year, and assistant technologist $1,400 to $1,800 a year. Vacancies in Washington and elsewhere are filled from these examinations.

The Bureau of Standards covers a wide field of work in physics, chemistry, engineering and industrial technology, including research and standardization, and offers valuable experience in these professions, combining as it does theoretical, experimental, and practical work. The duties of the appointee will be in connection with original investigations in some field of the Bureau's work. The chances for advancement are good. Experience in the Bureau is considered an admirable training for scientific work, and its close connection with the industries makes it particularly valuable as a training in industrial research.

Competitors will not be required to report for examination at any place, but will be rated on the required subjects, such ratings being based upon the competitors' sworn statements in their applications and upon corroborative evidence adduced by the Commission. Papers will be rated promptly and certification made as the needs of the service require.

Applicants should apply for Form 1312, stating the title of the examination desired, to the Civil Service Commission, Washington, D. C.

THE MEASUREMENT OF CRIMP IN YARNS AND FABRICS[1]

By A. N. Gadsby and E. D. Walen[2]

In the process of weaving any fabric the raising and lowering of warp threads causes them to bend around the filling threads and assume a wavy shape. The filling threads are also bent out of their natural straightness by the pressure of the warp threads. The relative amount of waviness in warp and filling depends upon the nature of the threads, the method of interlacing and the subsequent treatment of the woven material.

In fabrics used for structural purposes, such as tire fabrics, the absolute and relative amounts of the waviness in two systems of threads becomes a consideration of much practical importance. The elastic properties of the fabric depend not only upon the yarns used, but also upon their interrelation. The purpose to be constantly kept in mind is to attain the condition that all parts of the material shall be affected by the stress of working conditions in proportion to their ability to withstand that stress. The relative elasticity of the fabric in warp and filling directions tends to determine the distribution of the stresses.

There seems to be some lack of clearness as to the meaning of the term "crimp," owing to confusion with the shortening of yarns during weaving, commonly called "take-up." The stresses of weaving, the retention of the yarns in a distorted position, and the treatment which they may receive while in that position, all help to alter the yarn permanently; so that, from the point of view of the fabric, the original properties of the yarn are not those which need be considered.

As applied to tire fabrics, crimp should be considered as the difference in distance between any two points on a yarn in a fabric and between the same two points after the yarn has been removed and straightened. The difference between crimp and take-up consists of the permanent elongation of the yarns incident to the processes of weaving and finishing. It is impossible to make a determination of take-up from an examination of the finished material. This term should only be used in connection with calculations involving the length of yarn required for a piece of cloth, the yarn being as received from the spinning or twisting machinery.

The determination of crimp involves making two measurements, first, in the fabric, and then after removing and straightening. The only difficulty met in making this determination, is that of producing straightness without also producing elongation due to the use of tension. The method commonly used is the crude one of holding the yarn fast at one end and passing the thumb over it toward the other end. This method is so obviously inexact and dependent upon the identity of the operator that it requires no further comment.

Another method suggested and frequently used is to apply a definite tension on one end, by the use of a spring, a weight, or other means, holding the other end fast. The objection to this method is that the load is arbitrarily selected and that it is by no means certain whether the crimp has been completely removed and whether no elongation has taken place. As no two yarns stretch the same amount when subjected to the same load under like hygroscopic conditions, crimp determinations upon different yarns, using a constant load method, are not comparable.

Since it seemed likely that a yarn would stretch under any tension, it was decided to make a study of its behavior under various tensions and to deduce from this the length of the yarn when straight and under no tension. Accordingly the instrument shown in Fig. 1, was constructed.

In using this instrument the yarn is securely clamped in a jaw

[1] Published by courtesy of the American Society for Testing Materials. Paper read at the annual meeting of the Society at Asbury Park, New Jersey, June 22-24, 1920.

[2] Formerly assistant physicist and laboratory assistant, respectively, of the Bureau of Standards, Washington, D. C.

at one end and a weight pan is suspended from the other end. A crossbar attached to the scale pan and resting against guides prevents the untwisting of the yarn. The small amount of friction between cross bar and guides may be reduced to a negligible quantity by causing the latter to vibrate.

The insert in Fig. 1 shows the method used for making readings. A spring brass clamp carrying an index mark is fastened to the yarn. The movement of the index mark over the scale may be observed directly as the weight on the scale pan is increased. The scale is graduated in half-millimeter divisions and readings may be made to quarter-millimeters easily and to smaller sub-divisions with a little practice. The weight of the lower clamp, crossarm, weight pan, and yarn below the clamp are included in each statement of the tension applied.

To make a determination of straight length, the yarn is fastened in the upper clamp of the instrument, a load of 2.5 grams is applied, and the spring brass clamp is fastened at a point 400 millimeters below the upper clamp. After allowing one-half hour for the yarn to adjust itself to this condition, the reading is taken opposite the index mark on the scale. Additional loads are then applied up to 340 grams, one-half hour being allowed before each reading. It has been found by experiment that, after this time has elapsed, the unit elongation per unit of time is very small.

The stress-strain curve obtained from plotting loads and length readings is shown in Fig. 2 for a typical sample of yarn used in making tire fabrics. It may be observed that this curve tends to become a straight line after a load of about 150 grams has been applied. By extending this line to cut the line of zero tension a point (a) is obtained which shows the length that the yarn would have had initially if there had not been present waviness in the fiber and other conditions tending to prevent the constant unit increase in length for unit increase in load. This length may properly be considered as the straight length of the yarn under no tension.

It is evident that, before weaving, yarns contain crimp as understood in this paper, this crimp consisting of various elements having to do with the nature and interrelation of the fiber and the strands in the yarn.

If a line (ab) is erected perpendicular to the line of zero tension at the point (a), it intersects the curve at the point (b), the distance (ab) indicating the load it is necessary to apply to the yarn to obtain this theoretical length directly. It is, however, advisable, in order to expedite the determination, to use a greater load capable of producing the same length in a shorter time. This load may then be applied to all yarn of the same kind for the proper length of time, and the full straight length determination need be made only when greater precision is required.

To make crimp determinations the marks are placed on the yarn while in the fabric, the yarn is removed and the straight length determined as above. The total crimp in this case consists of the sum of the additional length caused by waviness of the yarn in the fabric and that caused by looseness and waviness of fiber and single yarn elements. Fig. 3 shows the results obtained from determinations made on warp and filling yarns taken from a tire fabric. It is evident that the warp yarns contain much more crimp than the filling yarns.

Having determined the straight length (oa), the percentage of crimp is obtained from direct comparison with the length measured in the fabric. If we designate this length as L, the formula may be written:

$$\text{Crimp} = oa - L$$

and

$$\text{Percentage crimp} = \frac{oa - L}{L}$$

This formula is based on the length in the fabric, which would appear to be the logical basis because the determination used the fabric as a starting point. If, for any reason, it is desired to use the straight length as a basis, the formula:

$$\text{Percentage crimp} = \frac{oa - L}{oa}$$

may be used, provided that it is expressed or understood that the straight length basis is being used.

All determinations were made upon yarns which had been previously, and during the experiments, exposed to an atmosphere constantly maintained at approximately 65 per cent relative humidity and 21 degrees C. temperature.

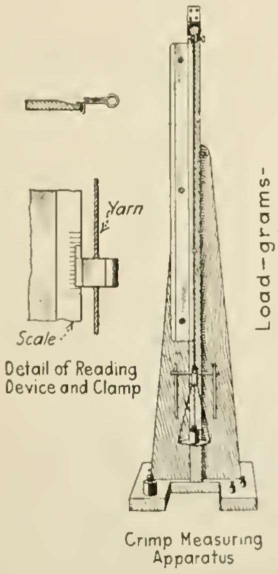


Fig. 1. Crimp Measuring Apparatus. Insert. Detail of Reading Device

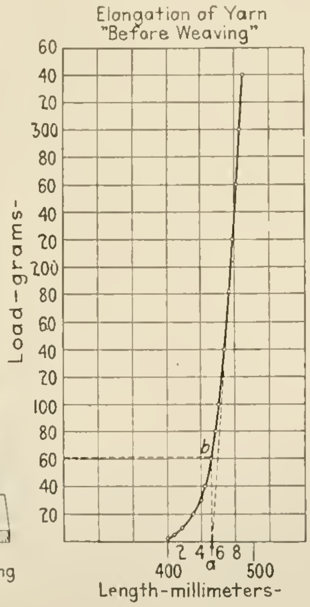


Fig. 2. Elongation of Tire Fabric Yarn Before Weaving

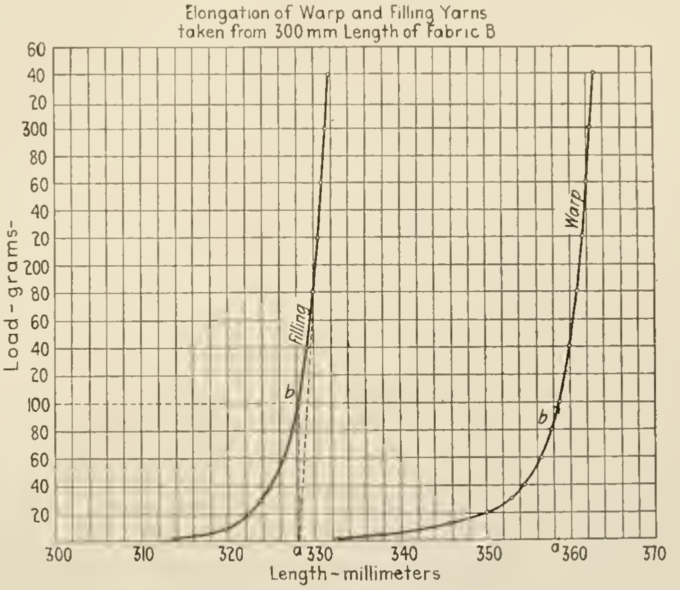


Fig. 3. Elongation of Tire Fabric Warp and Filling Yarns

Making Rubber Heels for a Hundred Million People

Explaining Interesting Developments That Have Increased Demand and Discussing Modern Production Problems That Confront Manufacturers of Rubber Heels

By Chester C. Burnham

The demand for rubber heels is increasing by leaps and bounds. If you doubt the correctness of this statement, a survey of the prominent shoe windows in your city will offer partial proof of its veracity and a visit to several shoe repair shops will complete your education. For further proof, a letter to any well-known shoe manufacturer should establish the fact that a vast number of shoe retailers now insist on complete lines with rubber heels as original equipment, and also the further fact that a rubber-heeled line will very often outsell its leather-heeled duplicate. It is easy to understand that with rubber heels furnished as a matter of original equipment the resale proposition is doubly easy and when it comes to replacing these worn down heels, it is usual for the customer to ask for the same kind of heels. A careful observer will note that a man or woman rarely enters a cobbler's shop to have rubber heels applied, without a definite idea of just what kind of a heel they prefer. It's a matter of education and the first lesson was given when they bought the shoes with the rubber heels attached.

With all this proof available there are some rubber manufacturers who have spent considerable money in trying to put a rubber heel on the market and have finally given it up as undesirable or unprofitable business. Undoubtedly there are good and logical reasons for their failure to put their plans across, but the fact remains that there is still a shortage of rubber heels as will be shown by the figures herein.

Rubber heels have been more readily accepted than were rubber soles, but their introduction and increased sale has not been a bed of roses for the persistent sales and advertising managers who have believed they were right and have forged ahead. Twenty years ago, the rubber heel enjoyed only a limited demand. Only a very few manufacturers of walking boots and women's house shoes ventured to offer rubber heels attached to their regular lines. More often the purchaser was obliged to have them applied as an "extra" and very often indeed the customer decided to wear down the leather heels before having rubber heels attached. Perhaps it was a spirit of thrift that prompted this course, but certainly very few persons were then impressed with the comfort and ease to be had with rubber-shod heels. Of course there were not miles of concrete sidewalks and yards of hardwood floors to walk upon in those days. The dirt sidewalks and carpeted floors did not seem to require heels protected with rubber. Here and there one would encounter an ardent admirer of rubber heels but it was the exception and not the rule. The change in living conditions and environments certainly played an important part in the changed demands for rubber heels, and with mosaic floors in public buildings, hardwood floors in homes, concrete sidewalks and a general use of composition and stone floorings in all newer buildings, the public began to incline more favorably toward the idea of cushioning its heels with rubber. Those who disliked that "creepy" feeling which rubber heels gave, were later inclined to overrule this objection when the matter of greater comfort was concerned. Those who were afraid of slipping on rubber heels, found that this idea was largely bugaboo and that the greater comfort of rubber heels warranted their wearing them and exercising greater care where there seemed any likelihood of slipping.

POINTS OF DISTINCTION IN RUBBER HEELS

I have said that some manufacturers tried to manufacture rubber heels and gave it up as unprofitable and I believe that in some of these cases the unprofitable venture was due to the fact that they manufactured rubber heels without a strong dominating feature to recommend them to the public. Not all people look for the same qualities in clothes. Some demand style at the expense of wear, others expect silk linings even if the cloth itself is low grade. So it is with rubber heels; no one heel seems to carry all the honor points, but each successfully marketed one has definite points of merit which are the fundamental points upon which a large business has been established. To illustrate my point more clearly let me call your attention to the illustrations herewith. Fig. 4 shows the common or "garden" variety of rubber heel, manufactured in large quantities, sold without brand or guarantee, made out of an almost unlimited variety of compounds and varying in wearing qualities from good to very poor. Heels of this type are often found on cheaper shoes, in fact, the quality of this heel usually lines up pretty well with the quality of the shoe to which it is applied. There is no reason why a heel of this shape and appearance may not be made to wear and be as good as the best, but somehow the lack of a brand or maker's name seems to invite adulteration and inferior compounds. Among the illustrations you will note many familiar heels and you will also note that each heel has had a definite reason for its success. That is a strong point to be considered in the further development of the rubber heel business. It is not enough to merely decide that you can produce a few thousand rubber heels per day and start in using any old compound or any old molds available. On the other hand it is fairly certain that a good heel, properly exploited, can build up a profitable business in a remarkably short time.

RUBBER HEEL PRODUCTION TODAY

No definite figures are available regarding the present-day rubber heel production, but it is a known fact that there are several manufacturers who are producing somewhere near 100,000 pairs of heels daily, several others who have reached a production of around 50,000 pairs daily and a dozen more who can easily rate their output at from 5,000 to 15,000 pairs per day. In addition there are many specialty manufacturers who have steady but somewhat limited outputs. With all this production in mind, I do not believe I would be overestimating the combined production if I set the figure at around 500,000 pairs per day.

For the sake of comparison, let us consider these figures along with the shoe production figures. The latest directory of shoe manufacturers records approximately 1,000 shoe manufacturers in this country and sets their daily output at around 2,059,400 pairs. It is entirely fair to discount these figures considerably when estimating on a yearly basis, because it is a known fact that the shoe trade is not regularly employed at capacity output for more than 200 working days in the year. Using this as a basis, we find that there is a tidy little total of 411,880,000 pairs of shoes produced each year of which a large percentage might well carry a pair of rubber heels as original equipment and require another pair or two for replacements. Thus we perceive that our rubber heel production, large though it may appear to be, would equip about 25 per cent of the manufactured shoes if the factories produced rubber heels 200 days per year. These figures do not include the demands of the repair trade. Possibly these figures may present the matter in the most glowing fashion, but the comparisons throughout are fairly relative.

As we have intimated in the foregoing, the greatest demand for rubber heels of the early type was for women's house shoes. There are several trademarked lines of footwear now on the market that owe much of their present-day popularity to the foresight

of their manufacturers in affixing rubber heels to them as original equipment. In those early days, the "pneumatic" idea predominated in rubber heel construction. Nearly every rubber manufacturer further tried in some way to get a cushion of air underneath the rubber heel or between the rubber heel and the shoe. Perhaps they were a bit skeptical about the cushioning powers of their rubber heel compounds in those days. However, it is a fact that numerous rubber heels appeared on the market which were built especially for "nurses'" shoes (this term clung tenaciously to all classes of footwear designed for indoor wear by women) and which had little to recommend them in the way of quality or wear. Such heels were sold remarkably cheap; often as low as four cents and at an average of around six cents per pair.

RUBBER HEELS REPLACING LEATHER

When leather was cheap, it is doubtful if a pair of good leather toplifts for a ladies' house shoe could be bought for four cents per pair. And even if bought for less, the shoe manufacturer had many special operations of finishing that were not necessary with a rubber toplift, as the half-rubber heel came to be called. With leather, there was the brass wire slugging to be done around the edges and numerous waxings, brushings and wheelings to be carried on, but with the rubber heels, they need only be nailed on, given a quick drying dose of heel ink and a quicker brushing out with a revolving brush. Production was speeded up, costs were about equal or slightly less and sales were soon found to be in favor of the rubber-heeled shoes when compared with their less resilient, more noisy, leather-heeled sisters. The women came to like rubber-heeled shoes around the home, for they were quiet and restful.

With these facts evident during the normal leather markets, imagine the state of the shoe manufacturer's mind when leather began to advance by leaps and bounds. No sole leather was cheap and all of it was so valuable that even the trimmings were begrudged for toplift use. Conservation of sole leather was preached when nailed to the underlifting it developed a tendency to spring away at the edges and left an unsightly looking edge. They corrected this by cupping it, but they easily went too far the other way and the heels had a sunken look after nailing. So they tried again and found the happy medium degree of cupping that produced the best results. At the same time, they learned that the appearance of the rubber heel had a great deal to do with the sale of the shoes and they accordingly gave the matter of mold making more attention.

Up to this time no one had given any thought to the quantity application of rubber heels, but the increased demand and the changing needs soon found the heeling rooms crowded with racks of shoes because they could not attach them fast enough by hand to keep up with the other machine processes of production. This quickly brought about a demand for a machine nailing method of attaching rubber heels. Those who lacked vision said it could not be done, and in truth there were many who scoffed at such an idea, but after a great amount of constructive and research work on the part of a prominent shoe machinery company that manufactures most of the heeling machines in the shoe world, certain definite and constructive steps were taken with the rubber manufacturers and "machine nailing" got its start.

ATTACHING RUBBER HEELS BY MACHINERY

Heretofore, there had been no standard for setting the nail holes in rubber heels. One rubber manufacturer built heels according to his ideas, and another with varying ideas built his heels differently. Many were guided by economy and put in as few nail holes as possible, for nail holes meant washers and added labor in handling, and others, believing that the more nails the better the heel would stay on, insisted on plenty of them. Some placed them near the edge of the heel and others placed them too far inside the edge. A few decided to omit the metal washers entirely and make the compound tough enough to hold the nail-head, while others had a special plate that took the place of the

Tite-Edge Spring Step Non-Slip Safety Cushion Air Heel Suction Shape

Successful Rubber Heels Have Strong Dominating Features That Recommend Them to the Public

through the trade press and by word of mouth from every leather merchant, and soon many materials other than leather began to creep into shoes at such places as insoles, outsoles, counters, box toes, tips, tops and heels. Then came the great incentive to use rubber heels in quantities hitherto undreamed of. Urged by necessity, it was soon found that rubber heels satisfied the bulk of the trade far better than the poor quality leather heels and it was found also, that they could be applied much more cheaply and with less trouble than leather heels.

HALF HEELS OUTSELL WHOLE HEELS

About this time the rubber heel business began to look itself over. The manufacturers discovered that they had overlooked points which when corrected would unquestionably improve sales. They found that there were definite needs in the shoe manufacturing field to be considered; that rubber half heels were better sellers than rubber whole heels, and consequently they began to balance their equipment accordingly. They learned that the idea of making a half heel with a flat back was entirely wrong because many washers. Various patents were obtained at that time and many are in use to-day.

Progress required that there should be some unanimity of opinion on all these matters and some standard of nailing established. So, despite the apparent hopelessness of the task, a well-known machinery company finally presented to the rubber heel manufacturers a composite template of nail-hole layouts that would leave each manufacturer free to decide how many nail-holes his heels might have, how near the edge they might be placed, and permitted him to follow almost identically all of his former practices and only required agreement to a few minor points which did not antagonize and really mattered very little. It really was a wonderful piece of diplomacy and design that was offered to the rubber trade and it readily found favor because of its fairness. No sooner was this standard template plan outlined to the rubber manufacturers than there was a mad scramble to get heels on the market made according to this new standard. Unfortunately, there did not seem to be much time to do much experimenting

and the market was soon in a strongly competitive condition and flooded with rubber heels made after the new ideas.

NAILING MACHINES PROVE SUCCESSFUL

There were a number of enterprising shoe manufacturers who at once installed these nailing attachments for their regular heeling machines and tried out the new process. It was soon demonstrated that the greater driving and clinching force of the machine driver aggravated the defects in the flat-backed heels and that whereas some manufacturers had continued to use them by adopting careful hand nailing methods, they were now impossible. Those who had not already changed their molds in this respect found that it was necessary to do so and so they remade their back plates so as to give the heel a slight concavity. The real aim, of course, was to give the heel enough concavity to make it offset the spring at the edge.

Hardly had this been done before an avalanche of reports poured in that the rubber heel nail-holes did not fit the driving fingers of the driving head. Careful measurements and comparisons were made with the key template and mold but no variations appeared. It was evident that the mold makers had done their work well, for almost no variation was found in thousands of cavities, but all had overlooked the fact that when the rubber heel was removed from the molds while hot, it shrunk when cool. This shrinkage varied with different compounds but it was found to be sufficient in most cases to pull the nail-holes out of line although the molds had originally conformed with the template measurements.

TROUBLESOME WASHERS

It must be understood that a modern shoe factory is a most sensitive organization and a single rack of shoes that does not proceed in its orderly and regular manner through the various rooms may cause no end of trouble and actual productive loss. The machine operations are so swift that a single heel jamming in a nailing machine may easily tie up a machine for a number of hours. Or the shoe itself may be spoiled, causing a loss quite out of proportion with the loss of the heel itself. This misalinement of nail-holes called for quick action on both sides and it was soon discovered that the only way to remedy this defect was to correctly determine the amount of shrinkage in a given stock and allow that much variation when placing the nail-hole posts or studs in the molds. A wide range of heel stocks had been the fashion, but this discovery resulted in cutting down the number of different compounds considerably and rubber manufacturers who had been making their compounds in a more or less hit-or-miss fashion out of every available kind of scrap now came to realize the desirability of standardization in compound as far as possible. The matter of stock shrinkage now became another definite factor to be reckoned with when compounding heel stocks, as also did the different properties of black, tan and white compounds. Some of these compound problems might have been very much more difficult had it not been for the invention of the conical washer or burr.

THE CONICAL WASHER INTRODUCED

Undoubtedly, the success of the machine nailing process for rubber heels would have been considerably delayed had it not been for the introduction of the conical washer. It was found that with the flat washer, a very slight variation was sufficient to jam the heel in the machine, and even though the driving fingers were purposely made of long springy steel wire construction to adjust themselves slightly to inequalities in the positions of the nail holes they very often did not function properly if the nail holes were the least bit out of line. On the contrary, it was found that with the conical washer some inequalities might exist and still fail to interrupt the successful operation of the nailing machine. The theory of this conical washer was that its sloping sides served as a guide for the driving fingers and that by taking advantage of the spring in these driving fingers, the conical washers permitted the nailing of heels which would be impossible were they constructed with flat washers. This theory proved entirely sound in practice and the conical washers were soon adopted as standard by the leading manufacturers of rubber heels.

Production was somewhat disturbed by the discovery that while an operator might rapidly place the flat washers on the studs or washer pins without any particular care or attention, the same operator must proceed much more slowly if he were to apply conical washers, as they all had to be applied right side up. A single conical washer inverted meant the undoing of all that had been done in a constructive way, as it made a heap of trouble in the shoe factory even though it was not discoverable after the heels were molded. This operation of molding heels was mostly a piece-work operation and the price scale was necessarily adjusted to suit the new requirements. In spite of the increased wage schedule, the production figures were lower and in some places the work was handled by two men working together, or a man and a girl. The one applied the washers to the washer-pins and dusted the molds, and the other handled the presses and removed the contents ready for the refill. This plan resulted in more contented workers but did not bring the production figures back to where they were under the flat washer plan.

Some idea of the number of washers handled in a single day may be gained from the following. A single workman often handled five presses, molding twenty heats a day on each, and carrying three 20-cavity molds to each heat for each press. Theoretically, this meant a grand total of 3,000 pairs of heels per day for one man and a total of 30,000 washers to be placed right side up with care, counting five washers to a heel. Some accuracy was required to have every one of them properly placed. There were those who thought to divide their production by using conical washers on heels for the shoe manufacturing trade and flat washers for the shoe repair trade. This was possible but hardly practical, as the slightest mix-up meant an endless amount of trouble. If the wrong kind should happen to get to the machine nailer, a tie-up might result that would cost many dollars in lost production. Thus it remained pretty near standard practice that conical washers should be molded into all standard heels. There are those who still believe that the flat washers can be satisfactorily used with the machine nailing attachments, but they are in the minority and their product suffers by comparison on this point, if in no other, when viewed by a cautious and far-seeing purchasing agent. Even if the purchasing agent should procure heels with flat washers, there are few heeling machine operators who would take chances to tie up their day's earnings at piece-work rates by using the flat washers, and you will see many an operator starting to use a new heel for the day's run cut one open with a knife in order to ascertain what style washer has been used.

HIGHER COST LEATHER FAVORS RUBBER HEEL SALES

While it is in every sense true that the public have become more kindly inclined towards rubber heels, it is true that they have been quietly if unconsciously aided in changing their minds by some rather interesting and unusual trade conditions. As we have said in the foregoing, only the cheaper grades of leather went into toplifts and heeling, and of course only the poorest kind of wear resulted. This did not satisfy purchasers of footwear and they soon learned that a good rubber heel would outwear several pairs of poor leather or paper heels. About this same time the shoe manufacturer awakened to the fact that with his factory properly organized and his heeling gang working harmoniously by the machine nailing method, it was less costly to make shoes with rubber heels. To appreciate this statement properly one must understand the several processes and parts that go to make up the heeling operation and the heels.

A complete leather heel consists of several separate and distinct parts known as a rand or "dutchman" (Fig. 1), a base (Fig. 2), which goes on top of the rand, and a toplift (Fig. 3), which is the topmost lift of the heel. Shoe manufacturers formerly made their heels complete in their own factory but now they buy these several parts from as many different specialty manufacturers be-

cause the matter of heels has become a highly specialized business. Sometimes the rand and the base are combined in one unit and especially is this true of paper or fiber heels. At other times the rand is first tacked to the heel seat of the shoe, then the base is nailed on by the heeling machine, and finally the toplift is nailed on top of all and is slugged with brass or zinc finishing nails for appearance. After that, the heel is rough trimmed by a special cutter, breasted or trimmed evenly on the front side of the heel and is then sanded and scoured on the breast and outside. Next comes a coat or two of wax heel ink and then a brushing and burnishing for finish. It is quite the thing in some lines of shoes to add to all this effort a fancy wheeling effect produced with a hot wheeling iron.

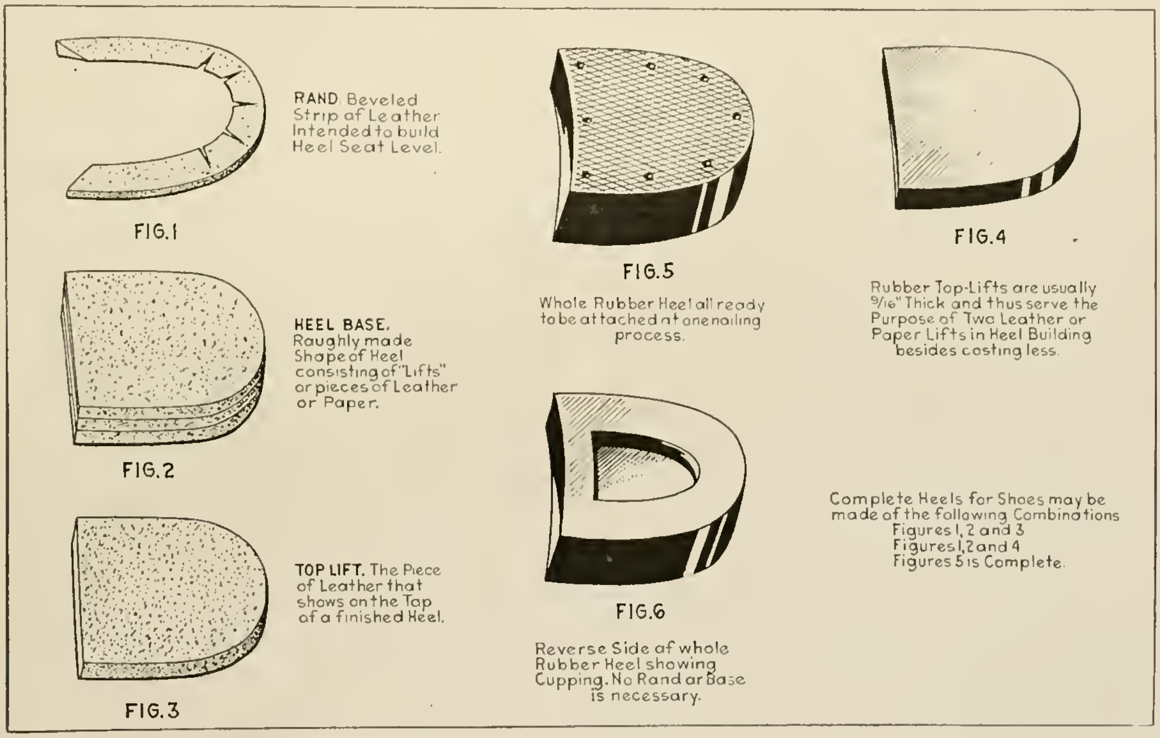
A whole rubber heel comes all shaped up to fit on the heel seat of the shoe (Figs. 5 and 6) and is first cemented and then nailed to the shoe with one machine-nailing operation. There is no toplift to bother with, no breasting, no rough trimming, no burnishing wax, no fancy slugging with brass or zinc wire, no wheeling and no assembling of the various parts as in leather heels. After it is nailed on, the heel is scoured on a sandpaper wheel and is then treated with one coat of special rubber heel ink and brushed out with a revolving brush.

Even to the layman the comparison of processes reveals the fact that the whole rubber heel certainly requires less labor, to say nothing of the number of parts that must be kept in stock and assembled when leather heels are required.

about the effect that one gets in wearing such a shoe. The specific gravity of compounds for whole heels should be less. The importance of perfecting this detail is apparent after comparing the figures above and estimating the saving to be effected in a year's output of shoes equipped with whole rubber heels. It is indeed strange that no rubber manufacturer has successfully marketed a whole rubber heel as light in weight as a leather heel.

GREATER PUBLICITY DESIRABLE

I could go on telling of the changes in design and methods which have had a goodly effect upon the sales of rubber heels and more particularly upon the public acceptance of them. What we now need is a closer study of the demand and the plan for merchandising them. Let the farmhand and laborer know that a whole rubber heel will outwear several pairs of leather heels such as he habitually gets on working shoes. Call his attention to the reason why his last pair of farm shoes lost their heels because the iron nails that held them corroded off after constant contact with ammonia and lime. Tell the railroad man why the underlifting on his heels squashed out because he was standing on the wet floor of the firebox area. Tell the public in general how much more wear they can get out of a rubber heel. Tell the parents how desirable it is for their children to wear rubber heels. It reduces the jar on their sensitive nerve centers just as it does on grown-ups, it's as quiet in the home and in the schoolroom as your own rubber heels would be. Would walking hold the same pleasures for the elderly if rubber heels were denied? Are they less afraid of walking on rugs and polished floors when rubber shod? Do



The Whole Rubber Heel Requires Less Labor and Fewer Parts Than the Leather Heel

I said in a previous paragraph that the whole heel had not sold as well as the half heel and apparently because of its excessive weight and improper shape. Unfortunately, most whole rubber heels have the appearance of rubber boot heels and no amount of sanding and trimming have converted them into anything satisfactory in appearance. The greater volume of rubber of a whole heel makes the weight more apparent, and you will get the effect I am trying to describe if you will take a finished boot that has been heeled with a whole rubber heel and lift it by the top. Instead of the toe pointing down as it should, the added weight of the rubber heel will make the heel point down and that is just

you appreciate it when your office force dons rubber heels and yet you allow your children to play around home with steel-shod leather heels?

Even a little study of the rubber heel market shows unlimited possibilities. Whether you wish to manufacture a high grade heel or a low grade one your interest can be stimulated if you will visit a high class shoe store for information concerning the high class demand and question the manager of your local 5 and 10 cent store as to the size of his orders for the lower grade article. If you go further and call on a jobber of shoe findings you will be amazed at the traffic in that direction. The possi-

bilities in manufacturing heels for 110,000,000 people are not to be compared to the fly-by-night charlatans who peddle their wares to the unsuspecting public. The field is so fertile that it throws out a challenge to the best manufacturing talent of the rubber industry, and at a time when other lines of your business may be dull it offers a lucrative departure for those who will engage in it seriously.

ACTIVITIES OF THE RUBBER ASSOCIATION OF AMERICA

Following the usual quiet period prevalent during August of each year in the work of the Association, which conditions may be explained by reason of the custom to omit all meetings during that month and the vacation season, this organization's activities have taken new life during the current month, and from all indications seem to point toward a very successful year.

DIVISION COMMITTEE MEETINGS

The Executive Committee of the Rubber Sundries Manufacturers' Division met in New York on September 14, and a most interesting discussion was held, not only with respect to those subjects presented in the docket, but general trade conditions as well.

There was a meeting of the Executive Committee of the Tire Manufacturers' Division held in the Association rooms on September 22, at which some questions of paramount interest to all tire manufacturers were considered. There was also present at the meeting a committee representing the Federal Highway Council, composed of S. M. Williams, chairman of that organization, Mr. Dahl, vice-president of the White Co.; Mr. Brosseau, president of the International Motors, and Mr. Blodgett of the Autocar Co., and these gentlemen explained the work of the Council in its relation to "good roads" throughout the country.

QUESTIONNAIRE NO. 102

The report with regard to responses received under questionnaire No. 102 recently sent out by the Association which has been submitted to the Association by the Guaranty Trust Co., which is acting as its statistical agent in the matter of questionnaires, is very gratifying, and it is hoped that Questionnaire No. 103, which is to cover the period from January 1 to June 30, 1920, will shortly be promulgated.

APPEARANCE OF THE TRAFFIC COMMITTEE BEFORE THE RAILROAD FREIGHT CLASSIFICATION COMMITTEE

The Railroad Freight Classification Committee held hearings during the month of August concerning two subjects which are of a great deal of importance to the rubber industry. One of these subjects was with respect to the application of the Traffic Committee for a reduction in the rates applicable to pneumatic tires in carloads to points west of the Mississippi River, generally known as western classification territory. Proposal of the Traffic Committee was for a reduction in ratings on pneumatic tires in carloads from second class to third class with a minimum carload loading weight of 20,000 pounds, the same as applies in Eastern and Southern territories. As a counter-proposal, the Classification Committees proposed third class rates uniformly throughout the country with minimum carload loading weight of 24,000 pounds. The Traffic Committee appeared at this hearing and submitted statistics and other facts which it is felt conclusively upheld its contentions that third class rates are proper for this class of traffic, with a minimum carload loading weight not to exceed 20,000 pounds.

The other subject before the Classification Committees was with respect to a revision of the specifications for railroad containers for shipments of rubber footwear. It was proposed by the Classification Committees that all containers for rubber footwear be protected against losses through pilferage and other causes by additional metal straps, and analysis of this proposal developed that the expense that would be placed upon the footwear manufacturers would result in greatly increased costs totaling several hundred thousand dollars annually. Statement was made by the Railroad Classification Committees that this investigation had brought out so much additional information, a great deal of which is submitted by the Traffic Committee, that a further investigation will be made by the carriers before any definite action is taken by them. With respect to this matter, it is also confidently felt that the facts submitted have convinced the Classification Committees that no change should be made in the present regulations of the carriers.

SEPTEMBER MEETING OF THE TRAFFIC COMMITTEE

The regular monthly meeting of the Traffic Committee was held in Cumberland, Maryland, at the Fort Cumberland Hotel. This meeting was a very interesting one, a large number of subjects that had been docketed for consideration having been disposed of. One of the most important matters given consideration is the proposal of the carriers for a freight classification that shall be uniform as to ratings throughout the country. This proposal has not yet reached development where concrete proposals have been made to the shipping public, but is one that is already receiving the active consideration of the Traffic Committee.

SIXTH NATIONAL EXPOSITION OF CHEMICAL INDUSTRIES

The Sixth National Exposition of Chemical Industries was held September 20-25, 1920, at Grand Central Palace, New York.

The exhibits were more numerous than at any previous show and included a wide range of industry. Daily conferences were held during the exposition, at which many chemical and economic problems were discussed by leading experts and many important manufacturing operations were illustrated by moving pictures.

Of the exhibits of special interest to rubber men the following are cited:

The American Hard Rubber Co. showed practical commercial applications of acid-resisting hard rubber. A hard rubber centrifugal pump was shown in operation, in connection with lines of hard rubber pipe and fittings. Two columns of hard rubber, 10 inches in diameter, mark the furthest step that has been made in the manufacture of large pieces in this material. A single acting pump, tanks, pails, dippers, etc., were also on display. A collection of samples of hard rubber which have been subjected to the action of forty representative chemicals for a period of a year demonstrated the actual resistance which this material offers to the commoner corrosive solutions.

The Barber Asphalt Paving Co. exhibited products manufactured from Trinidad Lake asphalt, including Genasco mineral rubber. A brochure was distributed describing and illustrating the operations of mining and refining Trinidad asphalt from Bermudez Lake.

The Bristol Co. displayed their well known recording instruments for pressure, vacuum, temperature, electricity, speed, etc.

The Buffalo Foundry & Machine Co. had an extensive display of full-size apparatus for vacuum drying, evaporating, sugar bag filtration, etc., exemplifying the latest developments in these lines.

J. P. Devine & Co. showed full-size vacuum drum dryers, chamber dryers and other apparatus in process of construction. This company holds a leading place in the chemical industries due to its success in designing important apparatus for the manufacture of explosives and other chemical products demanded by the war emergency.

Eagle-Picher Lead Co. Model of a sublimed white lead plant illustrating the manufacture of this pigment was shown, together

with samples of many lead products for paint, rubber and other manufacturing uses.

The Hunter Dry Kiln Co. exhibited a model of their humidity dryer for crude rubber and other material, and a varied line of samples of products dried by their process.

Innis, Speiden & Co. showed samples of industrial chemicals, colors which the company manufacture, also samples of a variety of waxes some of which find use in rubber manufacturing

A. Klipstein & Co. exhibited a variety of chemicals, colors, dyestuffs, gums, waxes, oils, etc., of which they are dealers. Their classified catalog of these goods shows an extended list of compounding ingredients adapted for the rubber trade.

The Morse Chain Co. had on view samples of their silent driving chains, which operate at uniform speed and run quietly without jar or slip.

National Aniline & Chemical Co. This exhibit was devoted to showing an extensive line of dyes and intermediates manufactured by the company, displayed to advantage in a stage setting of life-like figures costumed in up-to-date fashions.

The New Jersey Zinc Co. featured the route of manufacture of their various zinc products from the ore. These products were all displayed, including zinc oxide, lithopone, albolith, a new light-resisting pigment, besides many manufactured forms of metallic zinc.

Salmon Falls Manufacturing Co. Fabric for automobile tire building was shown, impregnated with the sulphur-terpene product known as Toron, which not only increases the tensile strength of the treated fabric but increases the adhesion of rubber to both fabric and rubber, besides producing other important effects. A line of automobiles tires and solid tires was shown in demonstration of these claims.

Schaeffer & Budenberg Manufacturing Co., manufacturer of recording thermometers and gages, exhibited a new type of thermometer and a new watchman's recording attachment applied to their recording gage.

Henry L. Scott & Co. Two testing machines were shown, one electrical, for fabrics, with recording chart device, and one hand-power for paper testing.

C. J. Tagliabue Manufacturing Co., maker of thermometers, gages and control apparatus for many manufacturing purposes, featured the Witham system of automatic temperature control.

Taylor Instrument Co.'s interesting feature of the exhibit was that showing the development of indicating, recording and regulating instruments.

Westinghouse Electric & Manufacturing Co. One feature of the display was the arc furnace regulating and control panels. The electric furnace has been an important factor in the successful expansion of the chemical and metallurgical industries, and the Westinghouse company has been closely identified with the development of electric furnaces since their inception.

Whitall Tatum Co. A very complete line of its "Nonsol" chemical glassware constituted the larger part of this company's display. It was supplemented by an exhibit of rubber corks and tubing for chemical purposes, made by the company.

CRIMSON ANTIMONY[1]

Crimson antimony has been the most generally satisfactory red pigment used in coloring rubber compounds. It has good coloring power, is fairly stable, especially in press cures. In open cures, however, everyone using this pigment has experienced difficulties, on account of its tendency to change from the unstable oxysulphide to the stable black sulphide. This reaction takes place at times only to a slight extent, but sufficiently to ruin the value of crimson antimony as a coloring ingredient, and it is most pronounced on the surface of the rubber compound where it comes in direct contact with the live steam.

Such a variety of possibilities may cause this change, that many explanations are possible. If crimson antimony is not manufactured under proper conditions, it will not cure satisfactorily in open steam, and so far as known there is no chemical test that will detect the difficulty except trial. The presence of too great a quantity of alkaline substances in a compound will always cause trouble; sulphurous acid when present to the extent of 0.2 of one per cent will cause trouble and is positive proof that the crimson antimony has not been properly made. Any crimson antimony will darken if vulcanized in open steam at an excessive temperature. A temperature corresponding to 50 pounds is the limit.

DEVELOPING NEW MANUFACTURING METHODS

Prior to 1914, no satisfactory crimson antimony was made in this country and at least 10 per cent of that imported was not satisfactory for open steam cures. At the outbreak of the war, we realized that it was necessary to find a substitute for crimson antimony, or manufacture it ourselves. The manufacture of crimson antimony, as outlined in the literature, led us to believe that it was easier to manufacture this pigment than to find a substitute. We started to develop a method of manufacturing this pigment by these methods, but soon learned that while the methods outlined in the literature might be satisfactory for manufacturing crimson antimony for calico printing, they were far from giving a product that would vulcanize in open steam, even under ten pounds, steam pressure. We had little success in finding a substitute, so we continued our efforts to manufacture a satisfactory product.

The manufacture of crimson antimony, like that of many other chemical substances, can frequently be carried out in laboratory batches and give satisfaction, but when the same method is tried on a commercial scale it will not be successful. We have developed processes which on a small scale apparently were satisfactory, but on trial in large batches they would invariably darken, the cause of this darkening not always being apparent. We began by trying to obtain antimony trichloride by treating the metal, oxide, and sulphide of antimony with hydrochloric acid. But we were unable to obtain uniformly good results. We eventually discovered that we were not obtaining pure antimony trichloride and that unless this is done a satisfactory crimson antimony cannot be obtained.

If antimony trichloride made by the above methods be distilled, it will invariably be found that water and hydrochloric acid will come from the still, then, antimony trichloride, but before distillation is complete, the material in the flask will change in appearance and the distillation will leave a large amount of antimony tri-oxide. This antimony oxide, when boiled with sodium thiosulphate, does not change to oxysulphide, but to antimony trisulphide.

We tried making antimony trichloride by treating antimony metal with sulphur chloride, the action taking place in an iron retort, and then distilling the antimony trichloride. This gave antimony trichloride, from which we are able to make satisfactory crimson antimony, but the reaction was so violent that it was difficult to control. The retort was short-lived, and we were at a loss to find one which would, for any great time, withstand the action of antimony trichloride, at the temperature at which this reaction takes place.

Graphite retorts were quite satisfactory for a few distillations, but the walls of the retort soon absorbed so much antimony trichloride that they would invariably break when the third or fourth distillations were attempted. Stoneware retorts would probably have been quite satisfactory, but we changed our method before making a trial.

We next made antimony trichloride by passing chlorine over metallic antimony in a water-cooled receptacle from which the

[1] By John M. Bierer, Boston Woven Hose & Rubber Co., Cambridge, Massachusetts.

antimony trichloride was siphoned from the bottom. To this we added sufficient water to prevent crystallization. The substance is antimony trichloride with one molecule of water. This is a definite chemical compound, fairly stable; and does not change to antimony tri-oxide. This material, when added to an excess of water, is precipitated as antimony oxychloride, which is the most satisfactory substance to convert to oxysulphide with sodium thiosulphate. If precipitation is carried out properly crimson antimony will result, which will cure satisfactorily.

COMMERCIAL PROCESS

The following procedure will give good results on a commercial scale:

To 135 pounds of antimony trichloride add 15 pounds of water to keep it in a liquid and stable form while it is being manufactured. This is poured into a large tank containing about 60 cubic feet of water, where it is slightly mixed by wooden paddles and converted to antimony oxychloride. At this point add 21 pounds of whiting to reduce the acid concentration so that the formation of antimony oxysulphide is not hindered when the thiosulphate is added. This step in the procedure is important; for if the reaction is attempted at too high an acid concentration, side reactions take place. Four hundred eighty pounds of commercial sodium thiosulphate are now poured into the tank, and the whole immediately agitated by four steam jets. The steam serves the double purpose of agitating and heating the solution. The heating is continued for approximately ten minutes, or until the desired color is obtained. The steam is then shut off and approximately 250 cubic feet of water quickly run into the tank to stop the reaction. (The time of heating depends on local conditions.)

The material is now allowed to settle and is washed three times by decantation. It is then washed free of sulphurous acid in a filter press, and dried at a low temperature.

We have been continuously manufacturing crimson antimony by this method since the spring of 1915, and during that time have had only 250 pounds of unsatisfactory material, and this was due to carelessness.

Some Aspects of the Stress-Strain Curve

By William B. Wiegand [1]

MUCH of practical value will be found in the following excerpts from Mr. Wiegand's interesting paper, read before the Rubber Section of the Toronto Branch of the Society of Chemical Industry, February 27, 1920.

STRESS-STRAIN RELATIONSHIP OF RUBBER

Among the many interesting physical properties of rubber, perhaps the most extraordinary is its stress-strain relationship. The general characteristics of the rubber stress-strain curve are familiar to everyone. They were first described in detail by Villari in 1869. Hooke's Law of proportionality of stress to strain, which is universally true of most of the structural materials within their elastic limits is, of course, not valid. The ratio of stress to strain is constantly changing. In other words, Young's modulus of elasticity is in the case of rubber not a constant but a rate. Nevertheless, rubber is the only substance for which Young's modulus is anything else than a mathematical calculation. You can actually measure Young's modulus in the case of rubber, because you can stretch it to twice its length and measure the stress required to do so.

Rubber is the only substance for which the elastic limit extends out as far as the actual rupture point. Whereas, in the case of metals, the first part of the curve is stiff and the latter parts show a yielding region, vulcanized rubber is yielding at first but stiffens or tightens up later on. These extraordinary stress-strain relationships of rubber attracted the attention of some of the most brilliant physicists of the 19th century.

The most exhaustive and masterly studies of the elastic properties of vulcanized rubber were carried out by Professor H. Bouasse of the University of Toulouse, who published his memoirs in 1904. Bouasse had carried out extensive work on the elastic properties of other materials and was attracted to rubber by the unequalled large scale of its properties of extension. He saw an opportunity of, as it were, magnifying the ordinary elastic constants and being able to study the phenomena of hysteresis and of the effect of temperature on these properties to better advantage. Bouasse worked in the main with pure gum mixings containing only rubber and sulphur.

The following are examples of Bouasse's well-established generalizations. They are valid both for pure gum and for heavily compounded mixings.

1. The elastic modulus decreases with increasing elongation, passes through a minimum and then increases rapidly up to the breaking point.
2. As the cycles are repeated the modulus corresponding to any given elongation decreases, first, very quickly, then slowly, finally reaching a practically constant value. Thus, in arbitrary units, a series of values for the first three cycles (at a given elongation) were 816, 535, and 460.
3. The hysteresis in the moduli is also very great after the first cycle, but is already small in the third cycle, and after five cycles is almost gone.

Perhaps Bouasse's broadest generalization, and one which has profound technical significance, is the following:

> Every stretching of vulcanized rubber, every reduction in length, in general every change of form, tends to diminish the value of the modulus corresponding to any given elongation. Also every rest tends to augment it and this augmentation increases in proportion as the position of rest is nearer to zero extension.

Practical illustrations of this will occur to all. A stiff rubber band can be "softened" by a few preliminary stretchings. A laboratory test piece which slips out of the jaws of the testing machine before rupture gives, on retesting, quite abnormal values. In short, the physical properties of vulcanized rubber (as of course those of crude rubber) are a function of its previous life history.

HYSTERESIS

Let us turn to the question of the retraction curve, which differs markedly from the extension curve. The area contained between the two curves is called the hysteresis loop. There is no more important quantity in the whole rubber technology than the area of this hysteresis loop. Boileau, in 1856; Villari, in 1869, and, above all, Bouasse and Carriere, in 1903, have, along with others, been pioneers in the study of hysteresis. These workers found that the hysteresis diminished as the number of cycles increased, and finally reached an approximately fixed value. The difference between the first two cycles was greater than that between any other two. Schwartz found, in 1910, that the area of the loop became fixed sooner in a high grade than in a low grade of rubber. He also found that when cycles were generated to a constant final load, the increasing extension at the

[1] Director of Manufacturing, Ames-Holden-McCready, Limited, Toronto, Ontario, Canada.

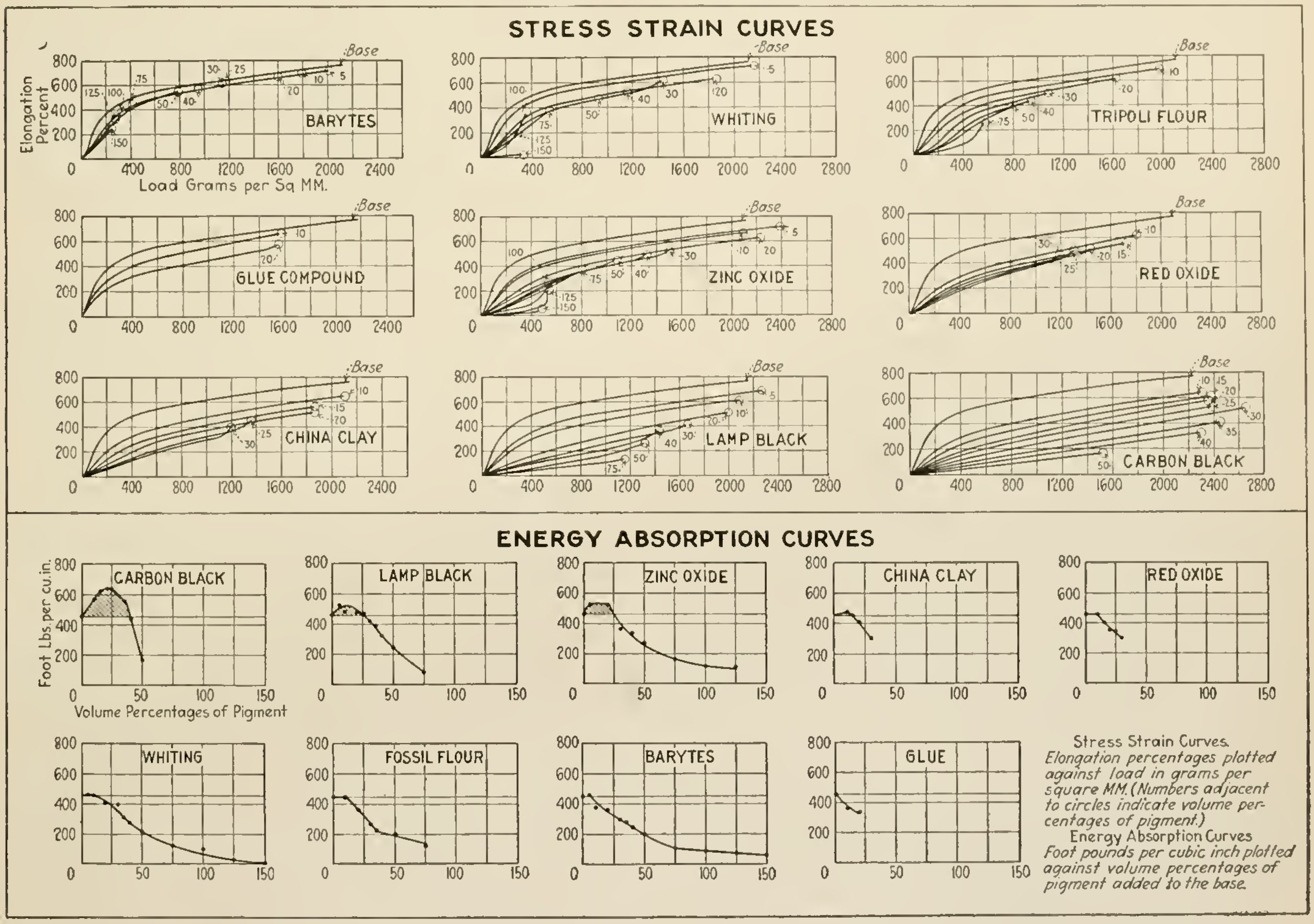
end of each cycle was proportional to the logarithm of the number of the cycle in question. Also, and naturally, these workers found that the shorter the extension the narrower was the hysteresis loop.

Another general rule laid down by Bouasse and confirmed by Schwartz is that the greater the speed of generation of the cycle the greater will be its area. You will at once appreciate the significance of this in regard to the internal heating of solid tires. Not only do excessive driving speeds multiply the number of hysteresis loops per second and, therefore also the heat liberated, but they also actually increase the calories of heat generated per revolution of the wheel.

One aspect of hysteresis is at least encouraging, namely, that the area of the loop diminishes with increased temperature. We may be thoroughly thankful that the converse is not the case. Solid tires and the breaker strips in pneumatic casings would go to pieces in no time if there were not this compensating law. Incidentally this temperature relationship strongly suggests the effect is now generally known as the Joule effect. Interestingly enough, the very first stages of extension are accompanied by a slight cooling effect. The corresponding cooling which accompanies retraction of the stretched rubber is definitely less than the heating effect on the extension. This difference representing the net increase in thermal content of the sample is the exact equivalent of the hysteresis loop, to which I have already referred. This heat must be attributed to internal friction in the rubber.

It may be of interest to compare the thermodynamical behavior of vulcanized rubber with that of better understood systems. Gases when expanded or compressed isothermally develop pronounced thermal effects. In fact, the energy expanded during compression, for example, is all turned into heat. Steel springs, on the other hand, are examples of systems which develop practically no thermal effects when deformed. All of the work done on the system appears as potential energy of strain.

Vulcanized rubber is intermediate between a gas and a steel



resemblance in many respects of rubber to a viscous liquid. In fact, Shedd and Ingersoll use the term "viscosity loop" rather than hysteresis loop for this reason.

THERMAL PHENOMENA

In the year 1805, Gough recorded in the memoirs of the Manchester Literary and Philosophical Society, that when he stretched a strip of rubber and held it to his lips it felt warmer than before stretching. Page, in 1847, made the same observation. Finally Joule also recorded the fact that while metals and other materials cooled on stretching, rubber, on the contrary, warmed. Lord Kelvin applied Le Chatelier's principle of equilibrium and predicted that if this was so, stretched rubber must contract on heating. Joule confirmed this by actual experiment, and the spring. When rubber is stretched the work done turns partly into potential energy of strain and partly into heat. In the case of an ideal rubber or compound (that is, one which shows complete reversibility), all of the heat liberated during extension will be reabsorbed during retraction and likewise all of the work done will be regenerated, thus leaving the sample in the same thermal as well as mechanical state as it was before stretching. Such a rubber would not heat up in a casing or solid tire any more than would a perfect gas, when alternately expanded and compressed. There would be no hysteresis. Actually, of course, the heat is not completely reabsorbed and the energy is correspondingly reduced. It is thus convenient to keep in mind the two thermal values involved in any cycle of extension

and retraction, namely, QR or reversible heat and QF or frictional heat, which is non-reversible and which accumulates when a rubber article is subjected to repeated strains.

The production of rubber compounds and cures for which QF is a minimum should be one of the focal researches for us all. The profound effect of mineral additions upon this quantity is already a part of technical knowledge. The fundamental reasons for this inter-relationship are deserving of our best thought. They lead us into the arcana of rubber structure.

INVERSION POINTS

In 1898 Lundal discovered that if a given load was applied to a rubber sample under gradually increasing temperatures, there was one temperature at which the addition of the load in question would cause no heating, and in fact above which it would produce cooling. Conversely at any given temperature he found that there was a critical load at which there would be no thermal effect. The lower the temperature the lower was the value of this critical load. Thus in a particular example raising the temperature from 18 degrees C. to 58 degrees C. increased the critical load from 44 to 102 grams.

The technical importance of these points of inversion in the Joule effect is manifestly very great. Suppose, for example, we could so adjust the thickness of the friction and skim coat between the plies of fabric in our casings as to bring the actual strains on the gum stock in actual service on the road to the critical point of inversion. Under such conditions there would be no thermal effect, no heating up of the stock, no perishing, no ply separation. Obviously it will be worth millions of dollars to our industry to conduct a successful research along the lines of determining the situation of these critical or neutral points as the state of cure and composition of the various mixings are systematically varied.[2]

TESTING CRUDE RUBBER

Reference is made to the method of Schidrowitz which will be found in detail in The India Rubber World, December 1, 1919, page 149. Briefly, Schidrowitz first notes that the stress-strain curves for the same mixing, but with advancing cures, come regularly down the paper and never intersect. The stiff parts of the curves are, moreover, parallel to each other.

Second, the inclination or slope of the final part of the curve is an index of the quality of the crude rubber under test. The flatter the curve, that is, the less the slope, the better the crude as ordinarily estimated.

Joule, Kelvin, Bouasse, Rontgen and the other master physicists were interested mainly in the correlation of the properties of rubber, as rubber, with those of other materials. We, on the other hand, are vitally interested in knowing how one rubber and one compound differs from another in its physical properties. Reference will therefore now be made to some of our own experiments designed to bring out the comparative behavior of a few of the more generally used inorganic compounding ingredients. These included carbon and lampblack, china clay, red oxide, zinc oxide, glue, whiting, fossil flour, and barytes.

BASIC MIXING

In order to avoid the tedium of doing a series of cures for each mixing, a base mix was developed containing,

	Parts by weight
Fine Para	100
Litharge	30
Sulphur	5

By volume this is:

	Volumes
Rubber	100
Litharge	3
Sulphur	2½

In this mixing the accelerator and sulphur are so balanced as to preserve a practically flat curing condition over a range of cure from 15 to 45 minutes at 40 pounds of steam. To this base mixing increasing amounts of each pigment were added on the volume basis. The additions were continued until the stock grew so dry and leathery on the mill as to be unworkable. The cures were made in an ordinary laboratory press and the test pieces stretched on a Scott machine.

BARYTES

Note the unchanged curvature of the base mixing curve. Increasing additions of this pigment have merely the effect of shortening the curve. Barytes is nothing but a diluent. It adds no useful property to any compound, but on the other hand detracts from both the tensile strength and elongation. For this very reason very large proportions (up to 150 volumes) could be incorporated into the hundred volumes of rubber before the stock became unmanageable.

FOSSIL FLOUR

This pigment shows signs of disturbing the basic stress-strain curve. There is less curvature. The curve has moved toward the "load" axis. A compound containing fossil flour is definitely stiffer than one containing barytes. However, after 30 volumes have been added there is no more rotation of the curve, which merely shortens, as in the case of barytes. The fossil flour particle is smaller than the barytes particle, and, in our opinion, the change in behavior after 30 volumes is most simply explained by assuming an agglomeration of the fossil flour particles, at this stage, into larger complexes, generating less rubber surface. The total quantity absorbed by the gum was in this case only 75 volumes.

WHITING

Here again the curve shows some displacement (stiffening) up to an addition of 20 volumes of the pigment. Thirty volumes adds nothing to the effect, and we assume that between these two volumes agglomeration has set in. The maximum absorption of pigment was in this case 125 volumes. Those who use more than 20 volumes of whiting in a compound must disclaim any beneficial effects on the physical properties.

GLUE

This was added in the jelly state. Up to 20 volumes there was a definite displacement of the curve indicating that glue is not a mere diluent, like barytes, but exerts a definite stiffening or toughening action in a compound. The tensile at break is, however, lowered.

ZINC OXIDE

This pigment shows a marked reinforcing or stiffening effect on the compound. The tensile strength at rupture is maintained undiminished up to a volume addition of 20 volumes.

Beyond this the curve recedes, as in the case of barytes. Agglomeration of particles has set in. Up to 20 volumes zinc improves wearing power. Beyond this it partakes more and more of the characteristics of a diluent. The best white treads contain not much more than 20 volumes of zinc to 100 of rubber.

The maximum absorption was in this case about 125 volumes.

RED OXIDE

This useful (and sometimes treacherous) pigment shows a reinforcing action up to 15 volumes. Beyond this is agglomeration. The tensile does not hold up so well as with zinc.

CHINA CLAY

China clay vies with zinc oxide as a re-inforcing agent. The rotation of the curve is even more marked than with zinc, although the breaking tensile is less well maintained. Twenty volumes again represents the maximum loading without detracting from the physical properties. Naturally, clays differ markedly according to their origin and colloidal condition. The above result must be regarded as only an individual finding.

LAMPBLACK

We now approach royalty in the pigment realm. Note the steady, clear-cut, downward progression of the curves toward

[2]For a discussion of the cause of Joule effect and many other matters, reference is made to a forthcoming volume by Professor G. S. Whilby of McGill University, Montreal, Canada.

the load axis, indicating greater and greater toughness. And yet the breaking tensile holds up splendidly. A stock containing 20 volumes of lampblack possesses stress-strain properties resembling in type those of steel and other rigid bodies; the curve is practically linear, that is, Hooke's Law applies. There is none of the usual flabbiness at low elongations. It is no wonder such a stock wears better as a tire tread than one made up even of zinc oxide or the finest grade of china clay.

Beyond 20 volumes, however, aggregation again supervenes and the pigment reverts to the barytes class.

CARBON BLACK

We come now to the king of pigments. The re-inforcing qualities of lampblack are here displayed in superlative degree. Instead of being diminished or at best maintained, the breaking tensile is markedly improved. Linear (Hooke's Law) stress-strain conditions begin early and continue unabated up to 40 volumes.

Particle aggregation, with resultant collapse of the reinforcing effect is postponed to 40 volumes, which is, of course, unapproached by any other pigment.

NUMERICAL MEASURE OF REINFORCING ACTION

The question now arose as to a suitable quantitative means of assessing the toughening effect of these various pigments on compounds containing them in varying amounts. One method consisted in measuring the rotation or displacement of the curve toward the load axis by simply taking the height (or elongation) at a definite load, say of 16,000 grams per square millimeter. The trouble with this method was, of course, that it took no account of the lowering of the tensile at rupture, which property varies greatly with different pigments.

The method finally chosen was developed by a consideration of the conditions governing the phenomenon of abrasive wear. Take for example an automobile casing tread. "Wear" here consists in the gouging or tearing out of small masses of gum, due to impact upon the road surface. Now a numerical measure of impact is the work done on each little mass of rubber. If this work can be stored up without stressing the rubber substance past its rupture point the mass will stay in place. The less energy it can so absorb, the easier it will be torn from its moorings.

Now the energy absorption is in each case represented by the area contained between the stress-strain curve and the elongation axis. This area was therefore measured by a planimeter and the results calculated to foot-pounds per cubic inch of original stock.

The curves in the graphs show the remarkable results obtained. Foot-pounds per cubic inch are plotted against volume percentages of pigment added to the base.

The base mix stored up 450 foot-pounds. The addition of barytes continuously diminished the energy content. Fossil flour, glue, whiting and red oxide all behave in essentially the same manner. China clay, however, is capable of slightly increasing the energy content. Zinc oxide and lampblack run neck and neck, showing marked increases. Carbon black is again the winner, and if not added in excess of 25 volumes may increase the energy content up to nearly 150 per cent of its original value.

SPECIFIC SURFACE

These facts point at once to the conclusion that the presence within the rubber matrix of a disperse phase, such as carbon black, which must be regarded as chemically inert, may nevertheless profoundly alter the characteristics of the system. The subjoined table indicates almost beyond a doubt that these effects run parallel with the specific surfaces developed by the various pigment phases.

The particle diameters here shown were determined microscopically and are of course only approximate, particularly in the case of the finer pigments. The surface developed per cubic inch of pigment was in each case calculated from the observed average diameter of the particles. The values range from 30,000 (barytes) to 2,000,000 (carbon black), and if, for simplicity, we assume that the adhesive force between the rubber substance and the pigment is the same in all classes, the enormous differences in the area of contact are alone sufficient to account for the striking differences in physical properties.

As a matter of fact zinc oxide increases the energy absorption of a compound to a greater degree than would be accounted for by its specific surface, and it is safe to assume that in this case there is also an exceptional surface tension behavior.

WORK OF H. F. SCHIPPEL

The fundamentally important work done by my colleague, Mr. Schippel[3], showed that, contrary to general assumptions, compounded rubber under strain undergoes relatively large volume increases which must be attributed to a separation of each pigment particle from its rubber matrix, doubtless forming a vacuum at each pole. He found increases, at, for example, 200 per cent elongation, ranging from 1.5 per cent for carbon black to over 13 per cent for barytes. The volume increases ran roughly parallel with the size of the pigment particles, zinc oxide again occupying an anomalous position.

Schippel's results throw a clear light on the mechanism of the reinforcing action of the finer pigments. These resist the increase of the free surface energy necessary to separate them from their rubber matrix. When a carbon black stock is stressed to rupture, the work done on the rubber phase must be increased by an amount representing the increase in surface energy required to separate each particle of carbon from its surrounding bed of rubber. In the case of a coarse pigment, such as barytes, this increase in surface energy is negligible.

The fact that with the finer pigments the rubber remains nearly uniformly anchored, instead of pulling free along the poles of each particle, must also result in a more uniform stress on the pure rubber phase and so contribute materially to the enhanced tensile properties and "energy capacity" of the compound.

Pigment.	Apparent Surface Sq.in per cu.in	Displacement of Stress-strain Curve	Total Energy of Resilience Foot-pounds	Volume Increase @ 200% El. Percentage
Carbon black	1,905,000	42	640	1.46
Lamp black	1,524,000	41	480	1.76
China clay	304,800	38	405	...
Red oxide	152,400	29	355	1.9
Zinc oxide	.152,400	25	530	0.8
Glue	152,400	23	344	...
Lithopone	101,600	..	...	...
Whiting	60,950	17	410	4.6
Fossil flour	50,800	14	365	3.5
Barytes	30,480	8	360	13.3
			Base 450	

In the above table are brought together for convenience the various properties already referred to, for mixings containing in each case 20 volumes of pigment.

Taken in conjunction with the well-known wearing properties of the various compounds, this table will bring out the fundamental casual connection between toughness or abrasive power, capacity for storing work, and bond between particle and rubber matrix; all three of these being, in the main, functions of the degree of dispersion of the rigid pigment phase.

One interesting deduction from this work is that perhaps the most direct and accurate way of determining the average fineness of an unknown pigment is to take its stress-strain curve in a standard mixing, measure its area with a planimeter, and compare the energy content with that of a known pigment. The application of this method to a glue compound gave a particle diameter, which was later confirmed by direct microscopic examination after staining.

[3]The India Rubber World, January 1, 1920.

STEAM REQUIREMENTS FOR VULCANIZING

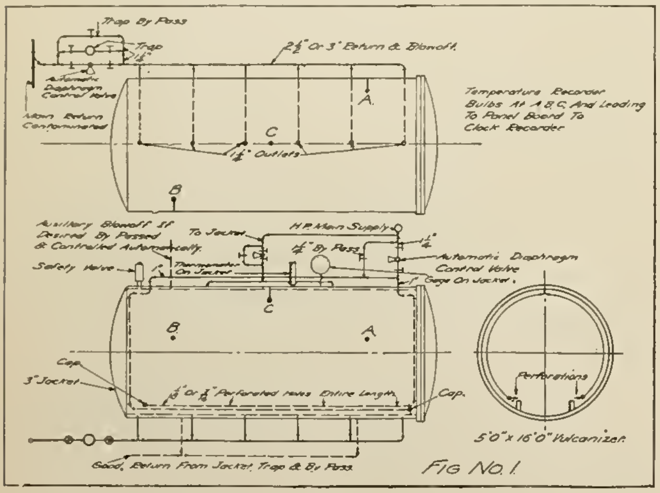
By Walter J. Bitterlich

The most important requirements in vulcanizing rubber products are even temperatures. Different products require varying time durations of cure and some require a steady rise in temperature, whereas others require a quick rise and then a constant temperature. The steam distribution should be designed to meet the different requirements.

Engineers who are not familiar with vulcanizing processes believe that rubber plants are great wasters of steam; however, until there is a perfect trap on the market that will allow a steady instead of a fluctuating circulation, steam-traps will be by-passed that a continuous flow of steam may be obtained to insure even temperatures.

OPEN-CURE METHOD

In this method the steam comes in direct contact with the product and the cure is accomplished in a shell vulcanizer where pressures between 20 and 70 pounds are used, depending on goods to be vulcanized. The essentials for this method are dry steam, ample supply, and quick discharge. The former may be obtained by supplying boiler pressure up to 150 pounds, superheated at the boiler, directly to vulcanizer and reducing the



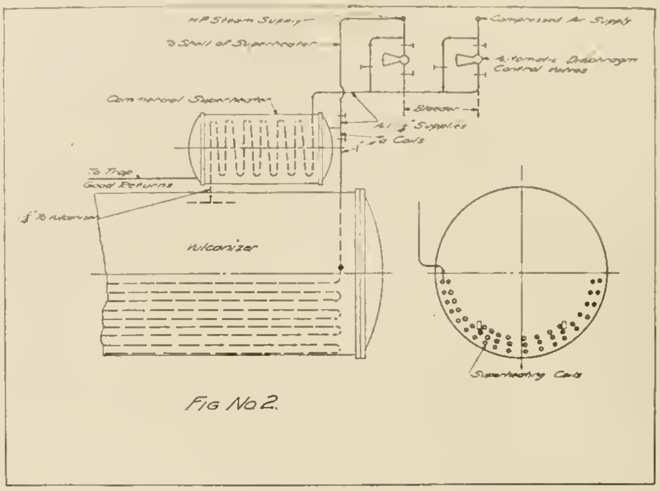
Piping for 5 by 16-Foot Jacketed Heater

pressure by means of a diaphragm valve close to vulcanizer. This has a superheating effect on the reduced pressure entering the vulcanizer, due to the high temperature of the higher pressure in the main supply.

A superheating effect of from 3 to 4 degrees F. is sufficient and if superheated steam of higher temperature is in the main supply pipe, its temperature cannot be controlled evenly by automatic vulcanizer control. To overcome this effectively it is necessary to install a saturator which is a commercial temperature control that automatically sprays water into the main steam supply, thereby lowering the steam temperature to within 3 to 4 degrees F. of its saturated value.

Should the steam be wet or condense as it enters the vulcanizer, the goods will be stained, causing a defective product. To avoid this the vulcanizer is warmed up first. This may be accomplished in several ways, namely: (1) by jacketing the shell vulcanizer and supplying it with steam at higher pressure. The jacket, however, is expensive in first cost but some goods cannot be cured otherwise with good results. The temperature of the steam should be about 10 degrees F. higher than the steam entering the vulcanizer; (2) by installing coils in the interior of the vulcanizer at bottom and sides and supplying steam at higher pressure; (3) by using compressed air, superheated to high temperatures; (4) by using a combination of two or all three of the above methods, depending on the quality of goods to be cured and quality of steam available.

Fig. 1 shows a typical piping system for a 5 by 16-foot jacketed

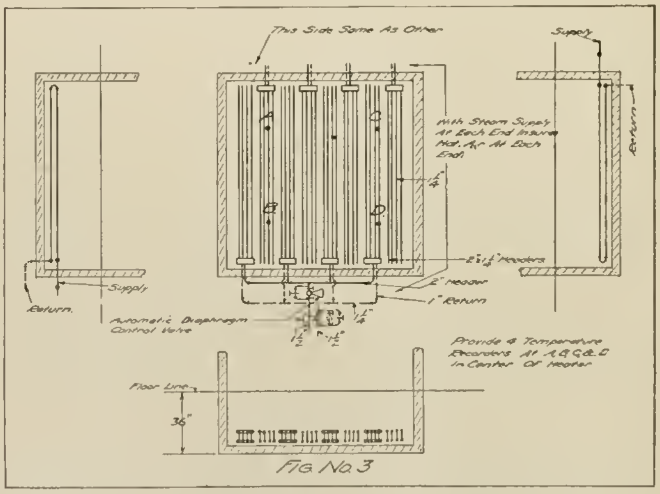


Superheating Coils and Heated Compressed Air System

vulcanizer. Fig. 2 shows the warming-up feature with superheating coils and the heated compressed air system.

Referring to Fig. 1, the steam supplied through perforated pipes inside the heater near the bottom is to insure hot steam at the bottom. If the supply entered near the top the hot steam would remain near the top and the bottom would be lower in temperature. The total area of all the perforations should be at least 10 per cent less than the area of the pipe to create an equal velocity through each perforation.

The several bottom outlets serve two purposes, one of which is to drive out all the air which is heavier than steam and which if mixed with steam during vulcanization has a powerful oxidizing effect on the product. Particular care should be taken to locate the outlets as close to each end of the vulcanizer as possible as this is where the air is most likely to pocket. The other purpose is for quickly discharging the steam at the end of

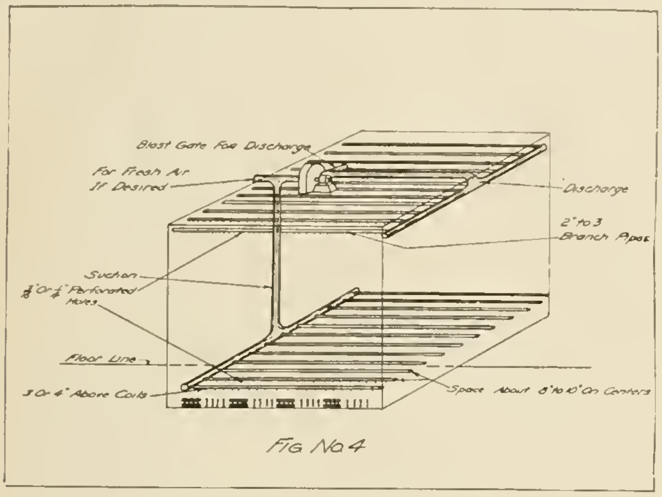


Typical Square Heater

the cure to prevent overcuring and to allow immediate removal of the goods.

In this respect the main return pipe should be amply large with no back-pressure valve on the exhaust riser. In pit vulcanizers for tires, overcuring is prevented by flooding the vul-

canizer with cold water at the end of the cure. A source of trouble encountered with return pipes is the eating away of the pipe, fittings and valves, due to the action of a weak solution of sulphurous acid formed after vulcanization from the

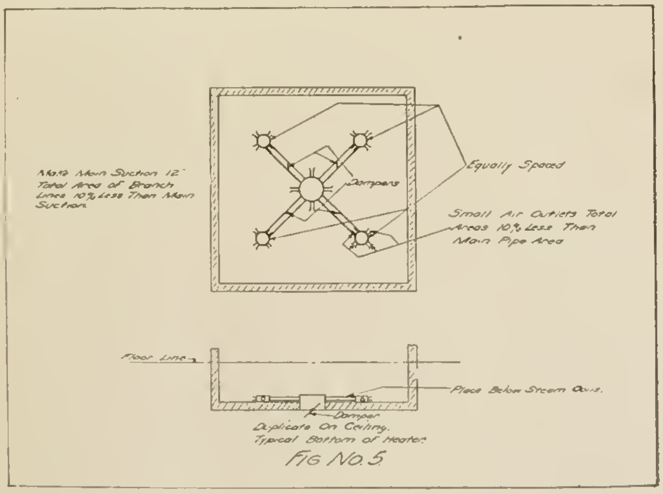


Mechanical Air Circulation

sulphur dioxide, the effect of which is worse than a strong solution.

Lead-lined pipes and fittings have been used but even they are attacked by the acid especially at the joints. Extra heavy cast-iron flanged or wrought-iron welded flanged pipe with extra heavy cast-iron flanged fittings will give best and longest service. Steel pipe should never be used. When monel metal diaphragm disks become pitted they may be replaced at considerably less expense with an alloy of 90 per cent aluminum and 10 per cent copper which gives equally good service.

A tremendous amount of steam goes to waste, owing to the fact that a steady circulation is required, and because an unobstructed exhaust is required. The only possible re-use may be obtained by the installation of a specially constructed water heater built of very heavy copper coils or tubes and cast iron shell, allowing free passage of the exhaust steam. Even this



Circulation Without Mechanical Means

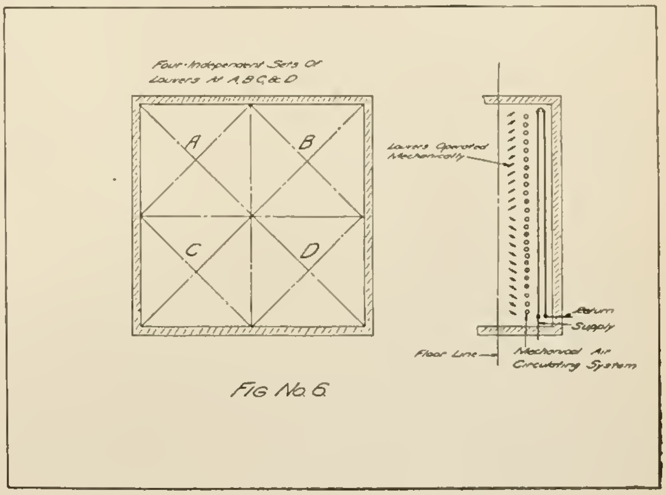
cannot be guaranteed to withstand the acid fumes more than several years.

AUTOMATIC CONTROL AND THERMOMETER RECORDERS

The importance of automatic control of the steam supply and exhaust to maintain even temperature can hardly be overestimated and a liberal installation of thermometer recorders in different sections of the vulcanizer will be well repaid in the perfection of the product, if the steam supply and exhaust are regulated to make them record alike. This can best be accomplished by having a central control room with all recorders mounted on a panel in front of an operator who can control the diaphragm valves with aid of compressed-air needle valves. One operator can take care of two or more vulcanizers. The thermometer bulbs become pitted by the action of sulphurous acid and can be renewed by an alloy consisting of 75 per cent lead, 15 per cent antimony and 10 per cent tin.

CLOSED-CURE METHOD

In the closed-cure method the product is cured through the medium of air heated from the radiation of steam coils, and is accomplished in a box-type heater where no pressure occurs. They are usually built of the following materials: (1) wood, sheet iron, asbesto-cel and magnesia; (2) tile, sil-o-cel or burnt cork and magnesia; (3) structural sheet iron, asbesto-cel and magnesia. All depending on cost, insulating qualities, and fire hazard. No. 2 and 3 being the preferred class. Broken up air space gives the best insulating qualities and can be obtained with asbesto-cel.



The Use of Mechanically Operated Shutters

Fig. 3 shows a typical heater absolutely square for better distribution of its piping arrangement. With good insulation a ratio of one square foot of pipe surface to five cubic feet of contents will produce temperatures up to 300 degrees F. with steam at 100 pounds pressure. The number of supplies is determined by size of the heater. A heater about 20 feet square should have at least four supplies, each of which should be controlled automatically by temperature control equipment.

Ideal vulcanizing conditions are obtained in absolutely still air with even temperatures but the latter cannot be accomplished in still air and therefore a minimum of circulation should be striven for in order to obtain even temperature throughout the heater. The following methods may be used for accomplishing this purpose: (1) use of a slow-moving paddle directly over the steam coils; (2) use of a blower with perforated galvanized iron pipes, drawing the hot air over the coils and discharging it at the top of the heater, as shown in Fig. 4. The capacity in cubic feet per minute of blower should be 25 per cent of the volume of the heater; (3) use of galvanized iron air ducts without mechanical means of circulation, as shown in Fig. 5; (4) use of shutters in combination with any one of the above methods as shown in Fig. 6. Automatic controls and temperature recorders should be provided liberally as mentioned under the open-cure method.

ELECTRICAL HEATERS

Experiments have been made in using electric current in place of steam for closed heaters, with good results. Its operating cost, however, with cost of current per K. W. and steam per boiler horsepower being equal is more than 100 per cent greater than the steam. Its advantages are as follows: (1) flexibility, allowing heaters to be placed anywhere in the plant requiring wiring only and no expensive steam mains and returns; (2) lower maintenance expense; (3) better control either hand or automatic. When current is cheaper it would not surprise the writer to see more electrical heaters used for the closed type.

For hydraulic presses steam is the better agent because of the ease in maintaining an even temperature in the platens. This is because of the fact that the cast iron platens are small and of uniform thickness and only require a steady circulation of steam at a given pressure.

VAPOR CURE HEATERS

Where goods are cured with acid fumes generated from air heated by steam coils, the temperatures are under 150 degrees F. and the same general design of closed-type heater can be followed but no mechanical means of air circulation is required because the heaters are generally built considerably smaller. Acid-resisting materials such as asbestos and magnesia should be used on the interior, and if any wood or metal is used it should be thoroughly painted with asphaltum.

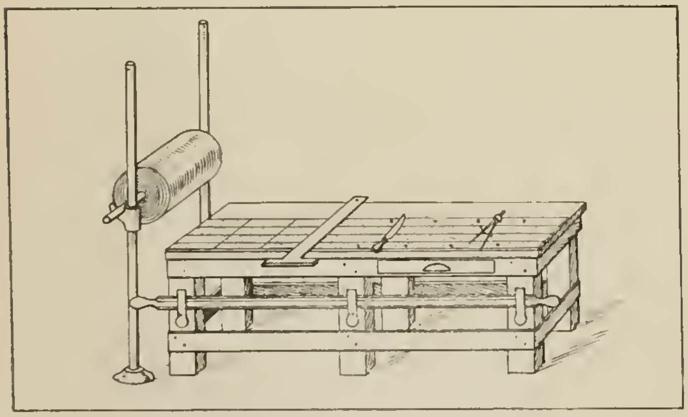
In conclusion it should be borne in mind that since all rubber goods must be cured the importance of vulcanization can hardly be overestimated, and time and money spent for its improvement to insure uniform product will be well repaid by increased orders.

THE MANUFACTURE OF DENTAL RUBBER

By Arthur C. Squires

The manufacture of dental rubber is a highly specialized branch of the rubber manufacturing industry. This material is supplied to the dental trade in unvulcanized sheets for the purpose of making individual dental plates. Dental rubber must be absolutely pure and free from all foreign matter. It should possess strength, light gravity, permanent color, the quality of packing easily in the vulcanizing molds, and cure in 55 minutes at a temperature of 320 degrees F. It must finally take a high polish.

A variety of colors are made for the dental trade including pink, maroon, orange, and jet black in plain and mottled finish.



Glass Top Cutting Table

Jet black dental rubber is the strongest and lightest in gravity. Dark orange is the strongest of the colored rubbers, and maroon comes next.

Pink dental rubber is used only as a facing to match the natural gums of the individual wearer. Owing to the amount of white pigment used in combination with other colors in producing a natural pink gum color, the strength of pink dental rubber is not equal to that of the lighter gravity rubbers. A plate would not be strong enough if made entirely of pink rubber and therefore it is utilized only in gum facings.

The following list shows the great variety of colors used in the dental trade:

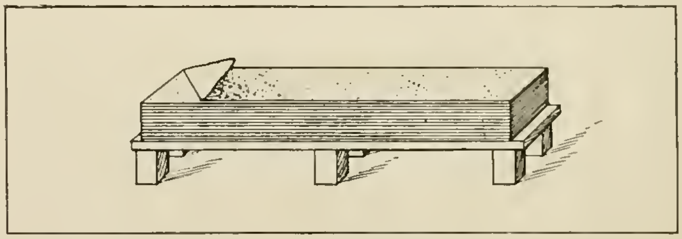
No.	Colors	No.	Colors
1.	Light orange	10.	Medium pink
2.	Medium orange	11.	Rose pink
3.	Dark orange	12.	Snow white
4.	Mottled light red	13.	Red palate
5.	Mottled dark red	14.	Black palate
6.	Plain maroon red	15.	Sunset orange
7.	Jet black	16.	Mottled maroon
8.	Coal black	17.	(1) Weighted
9.	Light pink	18.	(2) Weighted

Numbers 3, 6, 7, 9 and 17 dental rubbers are most used; however, the greater number of colors are made under special brands for the dental depots and sold exclusively by them.

As a matter of history it is interesting to note that prior to 1897, the Imperial Rubber Works of New York City imported a white vulcanite base to which color was added and milled at the works of this company. After many unsuccessful experiments the writer succeeded in producing a pink dental rubber, mention of which was made in The India Rubber World, January 1, 1897. Practically the same recipe is now used in this country in the manufacture of standard pink dental vulcanite.

The following is a brief description of the processes used in the manufacture of dental rubber:

Bolivian rubber is considered to be the strongest and best rubber for this purpose, and after a thorough washing on a



Sheet Stock Smoothing Table

cracker-washer, the thin sheets of rubber are then rewashed on a smooth-roll mixer equipped with water connections for constantly spraying the stock. During this operation the mill rolls are closed as tightly as possible, for the thinner the sheets the better the result. After washing, the thin sheets of raw gum are thoroughly dried in a vacuum drier.

The washed and dried rubber is then broken down on a regular mixing mill, this operation requiring at least three hours time, as the stock must be extremely soft before adding the compounding ingredients in order to insure their perfect distribution throughout the batch.

Two grades of sulphur are generally used in compounding dental rubber, ordinary flour of sulphur for all mottled vulcanite, and lac sulphur for plain colors, such as pink, maroon, light, medium and dark orange rubbers. There are three colors of specially manufactured vermilion, Nos. 2, 3, and G. O., which may be combined to produce certain required colors. In combining sulphur with vermilion it is necessary to sift the mixture in a rotary sifting machine.

Particular attention should be given to the mixing and milling operation which is performed on an ordinary two-roll mixer. The front roll should be coated with the soft, broken down stock, one to two inches thick. In adding the ingredients care must be taken not to allow the rubber to break or the surface of the rolls to be exposed. Nor should the compound be added to the batch faster than the soft milled rubber can absorb it.

The following typical dental rubber compounds, taken from "Crude Rubber and Compounding Ingredients," are interesting in

showing the various ingredients and the proportions used in practice.

Dental—Light Pink

Fine Pará	16.0
Lithopone (green seal)	56.0
Lac sulphur	6.0
Lime	2.0
Pale vermilion	20.0
Ultramarine blue	Trace

Dental—Black Palate

Fine Pará	77.0
Lac sulphur	15.0
Lampblack	4.0
Lime	4.0

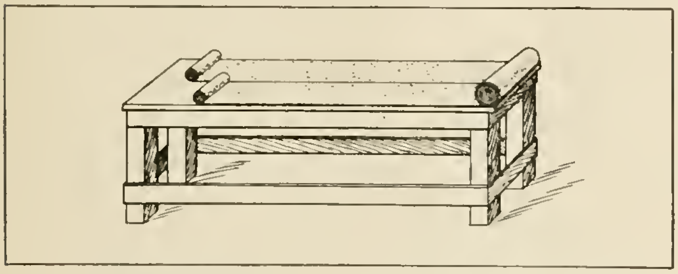
Dental—Red Palate

Fine Pará	62.5
Lac sulphur	12.5
Dark vermilion	22.0
Lime	3.0

Dental—Black Weighted

Fine Pará	20.5
Lac sulphur	15.5
Lime	1.0
Pure tin foil	61.5
Raw linseed oil	1.5

After the mixing operation is complete, the rubber is transferred to a refining mill, the rolls of which are set closely



Method of Equally Dividing Glazed Hollands by Tearing

together and between which the rubber is passed seven times in order to attain the desired results.

Calendering dental rubber differs from ordinary practice in that absolute smoothness is not required in the soft calendered sheets, as they are piled on a special smoothing table where any unevenness is removed. Another difference is the use of glazed hollands, running 85 yards to the roll, on which the dental rubber is calendered. The selvage of the hollands is removed by tearing, and the width of the sheet divided, also by tearing, into equal widths of 18 or 20 inches. It is not practical to sheet dental rubber on full width goods.

The calendering operation consists in feeding the rubber stock in small quantities from the warming mill to the calender, the thickness of the calendered sheet being regulated by the adjustment between the center and top rolls, while the width is governed by two cutting knives. An average batch of dental rubber is 60 pounds.

As the sheet of hollands passes between the center and bottom rolls, the rubber sheet is laid continuously on the fabric by pressure of the middle roll, and wound up on the stock shell. As soon as possible after calendering, the roll is removed to the cutting room and eight-foot lengths are cut from it and piled one upon the other on the smoothing table where any unevenness in the sheets will disappear, due to the softness of the calendered stock.

This special table for cutting dental rubber is provided with a plate-glass top, 10 feet long, 18 inches wide, and ⅝-inch thick. A 10-foot straight-edge, a T-square, a cutting knife, and dividers complete the equipment. Two sheets of rubber are then removed from the smoothing table and placed rubber side down on the cutting table. The width and length of cuts to be made are laid off on the sheet with the dividers and the cutting is done with the hand knife guided by the straight-edge in the longitudinal cuts and the T-square in the cross-cuts.

When the two-ply sheet has been cut into the required sizes they are removed from the cutting table and a sheet of hollands is placed on the exposed rubber surface of each sheet for protection. The sheets of dental rubber are then stamped, weighed, boxed, and delivered to the shipping room.

Declared exports of rubber to the United States from Lisbon, Portugal, totaled $194,825 for the quarter ended June 30, 1920.

NEW RUBBERIZED AIRSHIP FABRICS

Fabrics for the gas envelopes of lighter-than-air craft usually consist of cotton cloth coated with rubber. The requirements are high strength, light weight, low diffusion, water resistance and durability. The most important of all is durability, and extended observations show that the intensity and time of exposure to sunlight varies the life of rubberized fabric to a great extent. Dirigibles operating off the Florida peninsula and using envelopes made with a fabric that a year ago was considered to be of standard quality have had a useful period of not over thirty days. At the end of that time replacement of gas is necessary, which reduces the operating period. Envelopes made of the same fabric and operated off waters adjacent to Long Island have shown an average useful life of fifty days before deflation was necessary.

The Manufacturers Aircraft Association has learned that a study of British and other foreign practice in fabric manufacture, combined with the results of extended exposure tests carried out under various climatic conditions with fabric made experimentally in this country, has led to the formulation and adoption of what are believed to be improved rubberized fabrics that withstand the sun's action.

The cloths that are used to the greatest extent are known as AA, BB and DD, respectively 2-ounce, 2.5-ounce and 4.5-ounce. All are of long-staple Sea Island, Egyptian or Arizona-Egyptian cotton, 40.5 inches wide when finished, with a tolerance of ⅜-inch. The other specifications follow:

Cloth AA.
Weight: 2.1 ounces, maximum per square yard.
Tensile strength: 30 pounds minimum for either the warp or filling finished.
Count: 118 threads minimum per inch either way, finished.

Cloth BB.
Weight: 2.65 ounces maximum per square yard, finished
Tensile strength: 45 pounds minimum for either warp or filling, finished.
Count: 128 threads minimum per inch either way, finished.

Cloth DD.
Weight: 4.6 ounces maximum per square yard, finished.
Tensile strength: 65 pounds minimum for either warp or filling, finished.
Count: 95 threads minimum per inch in the warp and 105 threads minimum per inch in the filling finished.

After weaving, a careful inspection is made of the cloth, both before and after desizing and washing. All slubs and imperfect spots are marked so that they may be cut out before rubberizing. The cloth is then passed through spreaders which apply thin coats of Pará rubber solution containing only a very minor percentage of sulphur and litharge without the usual organic cure accelerators previously used. This thin rubber solution fills up the interstices of the weave. Much heavier rubber dough is then applied as the process proceeds.

After twenty to twenty-five coats are spread and dried, a continuous, gas-tight film is produced. High count cloth and heavy proofing give the minimum diffusion. For instance, with a 2-ply BB cloth having a gas film of 3½ to 4 ounces there is obtained very low diffusion. Added weights of proofing applied to higher count cloth would probably induce but slightly better results than are obtained with the above construction. Two plies of the treated cloth are stuck together by means of roll ply machines. The fabric is then wound on drums, wrapped and steam cured at carefully controlled temperatures, pressures and periods of time. Colored proofing is then added which, it is believed, constitutes an important factor in reducing the action of light. The exterior of the fabric is faced with an aluminum coat which acts as a continuous light reflecting coat.

The inner or gas side of the fabric is coated with one-half to one ounce of pure rubber per square yard which helps to keep the cloth moistureproof, reduces diffusion and makes a good sticking coat for successful taping. The tape is applied both to the exterior and interior.

Toron Patents and Products[1]

All rubber manufacturers will be interested in securing the practical results claimed for the use of the patented sulphur-terpene compound known as Toron. Chief among these is the increase of strength imparted by the material to fiber and increased adhesion of friction to fabric treated with the material; also its ability to bond firmly together metal and rubber.

The nature and method of production of this material are quoted below from the patent application.

SULPHUR-TERPENE COMPOUNDS

It is possible to treat terpenes and certain of their derivatives with sulphur to produce useful sulphur-terpene compounds. When treatment is completed the product is a hard mass, soluble alone or with other substances, and useful for coating surfaces or impregnating and coating the fibers of absorbent materials. If the chemical reaction is moderated or stopped short of completion, the product is more or less viscous or semi-solid, and is available for use alone or in solution or in admixture with other materials.

PROCESS OF MAKING TORON

One process, by which this sulphur-terpene compound can be produced is thus described:

Equal parts by weight of oil of turpentine and sulphur are placed in a suitable converter, in the neck of which is fixed a condenser suitably arranged to pass back into the converter the products of condensation. An outlet is also provided for removal of the gases generated during the reaction without loss of the volatile constituents. The contents of the converter are heated to melt the sulphur. The reaction is well determined by the time a temperature of 150 degrees C. is reached.

During the ensuing period of one hour, the temperature is raised to 175 degrees C., the mass being agitated preferably with air, and, during the next two hours, the temperature is raised 12.5 degrees C. each hour, with lessened or no agitation. During the reaction, which appears to be progressive, the sulphur reacts with the turpentine, partly to combine with it and partly to set hydrogen free from the turpentine in the form of hydrogen sulphide. Also secondary reactions take place, resulting in removal of the sulphur introduced into the terpene residue with the hydrogen of the latter in the form of hydrogen sulphide, and the production of char. It is because of these facts that the temperature is moderated.

PROPERTIES OF THE PRODUCT

The product thus produced, when cooled to ordinary temperatures, is a hard, brittle mass resembling mineral rubber. It breaks with a fracture, showing curved surfaces presenting a glassy luster. When manipulated between the fingers the material becomes plastic. It is insoluble in water, partly soluble in acetone, soluble in turpentine with reaction, and soluble in tolnol and xylol. When in solution it will pass through parchment and, according to this test, is non-colloidal.

Analysis has shown that certain of these hard sulphur-terpene compounds, produced from equal parts of sulphur and turpentine, as described, contain from 30 to 50 per cent of sulphur.

When the reaction has reached the stage when free sulphur is no longer present in the mass, the latter, on cooling, is a black, viscous liquid. During the reaction which follows that stage, if the heating is continued, the evolution of hydrogen sulphide continues, with increasing viscosity of the mass until charring occurs. The reaction therefore may be interrupted at will, and sulphur-terpene products of various characteristics and properties produced as desired.

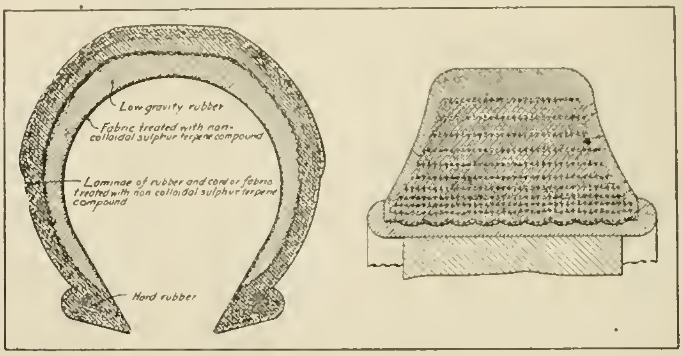
[1]United States patents Nos. 1,349,909 to 1,349,914, inclusive.

The semi-solid products produced may be employed for coating or impregnating various materials. For most practical purposes in order to provide a quick-drying coating or impregnating material it is found preferable to dissolve the hard compound in toluol, xylol or their equivalent. For many purposes other substances may be added to the solution, such as pigments and dissolved crude or vulcanized rubber.

APPLICATIONS OF TORON

The practical utility of a material possessing the properties exhibited by this product will be very important in the rubber industry. The practical applications are covered by a series of patents.

Referring briefly to the principal functions of this material in rubber goods manufacture, it has been found that cotton fabrics impregnated with this product are not only preserved from



Sections of Toron Pneumatic and Solid Tires

deteriorations but gain very markedly in tensile strength. When such impregnated fabrics are friction-coated the penetration and adhesion of the rubber composition are much superior to those obtained without the chemical impregnation. This is due to the fact that the sulphur-terpene compound by vulcanization unites with rubber so that contiguous layers of rubber and fabric cannot be stripped apart at their juncture.

This feature constitutes a distinct advantage over present practice in the manufacture of every variety of rubber goods containing fabric such as tires, hose, belting, boots, shoes, etc.

As a bonding material to unite rubber to iron it is particularly effective for the manufacture of rubber-covered press rolls or solid tires. The metal is first surfaced with a solution of the sulphur-terpene material, upon which are built several plies of toronized, frictional fabric and the tread composition. The sulphur-terpene compound and the rubber-sulphur compound react and vulcanize together and bond solidly to the metal.

In explanation of the union of rubber to metal the theory is offered that the sulphur-terpene compound in contact with the iron, excludes the possibility of surface oxidation, and that the sulphur-terpene compound interacts with the iron to form a sulphur-iron compound, which not only furnishes a protective coating on the iron surface, but also acts as a bond between the iron and the sulphur-rubber compound.

SYRINGA VULCANINE

A new organic accelerator known as Syringa Vulcanine is being supplied to the rubber trade of Great Britain and continental countries by the English manufacturers. It is a special drug which enhances toughness and durability without decreasing the resiliency of the cured product. It has been proved of especial benefit in the manufacture of tire treads, rubber heels, etc. It is claimed also as an equalizer of vulcanization, requiring less sulphur and obtaining more uniform results.

What the Rubber Chemists Are Doing

INVESTIGATIONS ON DIFFERENT COAGULANTS

The following summary of results is taken from the paper by Dr. O. de Vries, published in *Archief Voor de Rubbercultuur,* May, 1920.

SULPHURIC ACID

Sulphuric acid has been used on several estates during the war. It is a strong coagulant which partly or wholly replaces the anti-oxidant, sodium bisulphite. Small quantities used for coagulation do not give large deviations in properties of the rubber, but by the use of large quantities the rate of cure and viscosity of the rubber are markedly decreased and more rapidly than when corresponding amounts of acetic acid are used. Uniformity in rate of cure of the product is more difficult to preserve when using sulphuric acid as coagulant because variations in the amount used may always occur in practice.

Many manufacturers do not like the use of sulphuric acid. as they fear a harmful action of traces left in the rubber. Aging experiments have not shown this effect. The properties of the raw or vulcanized product, on aging, changed in exactly the same way as after acetic acid coagulation. The slow rate of cure caused by sulphuric acid changed more rapidly than with acetic, and the abnormal values recovered to normal ones, as if some retarding substance had gradually disappeared.

ALUM

Alum as a coagulant is very largely used by native planters. Coagulation proceeds best with undiluted latex, in which three to four grams per liter would be sufficient, while eight to 12 grams give rapid coagulation. Small quantities of alum cause a marked decrease in rate of cure and viscosity, while large doses, such as are often used to obtain rapid coagulation, give abnormally slow-curing rubber with a low viscosity. The tensile strength shows no marked deterioration, no greater than might be expected from the much longer time of cure. The slope of the stress-strain curve decreases somewhat by larger doses.

ACETIC ACID

Acetic acid obtained by wood distillation has the drawback that the tarry substances are difficult to remove completely, so that crêpe cannot be prepared with it and the color of the sheet becomes too dark. Acetic acid prepared by fermentation of alcohol is cheap and a good coagulant. Commercial acetic acid, if cheap enough, is preferred. The crude acid gives rubber of practically the same properties as the pure commercial acid.

FERMENTED COCONUT WATER

The juice from coconuts, on fermentation, gives an acid that proved satisfactory as a coagulant. Transport of this dilute acid fluid is too expensive, so that it can be used only on estates growing both rubber and coconuts. Large series of coagulation experiments proved that these acids gave rubber of exactly the same properties as commercial acetic acid, which are uniform over just as long periods.

ACID COFFEE JUICE

The acid juice obtained when fresh red coffee berries are allowed to ferment for some days in water was tried as a coagulant, but as it has a dark red color, crêpe cannot be prepared with it, and sheet also takes a darker red than usual. The properties of the rubber from some experiments seemed to be injured somewhat. This coagulant would be available only during the few months of the coffee harvest and is not likely to gain any importance except in emergencies.

CRATER LAKE ACID WATER

Acid water from a crater lake in the volcano Idjen in East Java was tried as a coagulant. It has a strong coagulating power, containing alum, sulphuric and hydrochloric acids. Its composition varies with the depth from which it is taken and, as might be expected, it proved injurious to the properties of the rubber, especially when used in large quantities. Aging tests on rubber coagulated by this acid crater water showed marked deterioration in tensile strength and viscosity.

ALCOHOL

Alcohol and denatured spirits were tried as coagulants. Coagulation is quite different from ordinary acid coagulation, as it is instantaneous. Where alcohol mixes with the latex it forms a clot and no further coagulation of the remaining latex occurs. Only strong alcohol and undiluted latex can be used, else the quantities of alcohol become much too large. The cost of this coagulant is ten times that of acetic acid even when using denatured spirits free from duty. Alcohol has some advantages for trial coagulations and experimental purposes, as it gives rapid and complete coagulation. Coagulation by alcohol was found to leave the rate of cure unchanged, while the slope of the stress-strain curve was always steeper and the viscosity mostly lower. The tensile strength remains unchanged or becomes somewhat less (by denatured spirit).

FORMIC ACID

Considering the price and coagulating power, formic acid might be a good substitute for acetic acid, but it seems to be irregular in composition, perhaps sometimes containing formaldehyde, and gives irregular results, notably sometimes a marked decrease in rate of cure.

LACTIC ACID

Lactic acid has no importance as a coagulant in practice, as it is too expensive. Since this acid is found in most fermentation processes and plays a rôle in spontaneous coagulation, and in different fermented saps, such as coconut water, some experiments were made with it. The properties of the rubber were found to be unaltered, except for a small decrease in rate of cure.

HYDROCHLORIC ACID

An experiment with hydrochloric acid showed that a strong dose retarded the cure very much, although somewhat less than an equivalent dose of sulphuric acid, while viscosity and tensile strength deteriorated markedly and the slope became somewhat better. After two years the sample became tacky and could not be vulcanized, while the viscosity decreased to a very low figure. The samples prepared with strong doses of acetic and sulphuric acid remained unchanged in appearance, though the viscosity decreased.

BLACKENING OF RED RUBBER TUBES[1]

The black spots which sometimes appear on the surface of rubber goods, and also the blackening of the interior during vulcanization, are most likely due to the interference of iron. This may be obviated to a great extent by taking special precautions to prevent the direct contact with either condensed water containing traces of iron in solution or suspension, or the sulphiding and subsequent reducing action of the iron surface of the mandrel acting on the red antimony in the red rubber goods. Probably the actual blackening is not caused directly by the formation of ferrous sulphide, but rather that the iron, in conjunction with the water vapor present, tends to act in such a way as to form a temporary solution of a small part of the antimony. This results in the ultimate reprecipitation of the antimony sulphide in the black variety on the part affected.

[1]From The Rubber Age, London, June, 1920, page 152.

Regarding the condition wherein the complete blackening of the whole mass of rubber occurs, this may be due to the composition of the rubber mixing (which should not contain accelerators that have as the principal part of their composition alkali hydroxide or sulphide), as these would act on the antimony in a similar way to the iron salts mentioned, causing solution and subsequent precipitation of the antimony as black sulphides. It should be possible with a good antimony and the right kind of iron oxide (if it is desired to use these two pigments in conjunction) to produce a good red tube, although not of as light a color as with antimony alone. In cases, therefore, where these two materials are used in conjunction, and where blackening has occurred, a blank should be tried out, using the antimony alone. It will be generally found, if the vulcanizing conditions are comparable to that of bulk, that the antimony is at fault because of its instability under the vulcanizing conditions.

Where crimson antimony has been found to be unstable, if a little magnesium oxide is added to the mixing and it is cured in a mold, the antimony color is preserved in its rich bright shade.

Similarly, when the same mixing is cured in open steam, the outside only becomes darkened. This varies from brown to coal black, according to the excess of magnesium oxide used and with the degree of instability of the antimony, while under the surface the color will be found equal in shade to that of the press-cured result. It has been demonstrated that a good red color for open steam articles with an unstable antimony may be obtained if care is taken to determine by trial the exact amount of magnesium oxide to use in the mixing rather than to use an excess.

With regard to the suggestion that red iron oxides are prone under vulcanization to blacken with the formation of ferrous sulphide, our experience is that those oxides of brick red, consisting chiefly of Fe_2O_3, do not change color except for a slight darkening toward a chocolate shade on the surface of open steam cured goods, while the purple oxides and brown umbers keep their color with very little change. In colored rubber work generally, it should be borne in mind that open steam cured results must not be confounded with the results obtained from molded or press-cured, as the conditions are entirely different as regards the effect on the pigments used in the mixings.

The cause of the antimony blackening when cured either with or without the admixture of iron oxides does not seem to arise from the small trace of acid that is generally present in the antimony pigment, though anything in the nature of a real acid excess would tend to have a blackening effect, as explained in the previous cases, by the ultimate solution and reprecipitation of a small part of the antimony. Even with a mixing wherein an acid substitute was used, this would practically be neutralized by such materials as whiting, magnesium carbonate, lime, or calcined magnesia that are generally present in such mixings where white substitutes are used.

It must be remembered that it is the nature of all red sulphides of antimony to revert to the black tri-sulphide when subjected to sufficient heat. In the inert atmosphere of a gas such as carbon dioxide, the temperature at which such blackening is complete is 155 degrees C., the change of color at this temperature being practically spontaneous. Longer periods at lower temperatures (145-150 degrees C.) will ultimately produce the same effect. It is therefore advisable to cure red goods at as low a temperature as possible if the best results as regards color are desired. In this connection it is well to point out that although an antimony may be found to blacken when heated alone in steam at the temperature to which it is to be subjected during the ultimate vulcanization when compounded, it does not necessarily follow that it will give bad results, because it has been proved in practice that the rubber acts to a large degree as a protective coating to the red antimony particles and so prevents the discoloration taking place.

In conclusion, to prevent the blackening of all red goods containing antimony, (1) see that the mixing is correct, (2) select the quality of the materials in direct regard to the specific purpose for which they are intended, (3) make trial mixings compounded and cured under conditions comparable to those used in the factory.

PERMEABILITY OF RUBBER TO GASES[1]

By J. D. Edwards[2] and S. F. Pickering[3]

THEORY OF PERMEABILITY

One object of this investigation was to establish, if possible, a quantitative relationship between the permeability of a film of rubber to any particular gas and the various factors on which it is dependent. Only a portion of the program was completed, however, before it became necessary to discontinue the work.

A simple and satisfactory picture of the process is one of dynamic equilibrium in which the gas is dissolved at one side of the rubber at a rate proportional to its solubility and partial pressure, and diffuses through the rubber where it evaporates from the other side. The same process takes place in the opposite direction so that the net transference of gas is proportional to the difference in the partial pressures at the two faces of the rubber. Because of the lack of data it is not feasible to analyze the relations between solubility and rate of diffusion through the rubber. The permeability in every case investigated increases rapidly with increase of temperature. According to Kayser[4] the solubility of both carbon dioxide and hydrogen decreases with increase of temperature. If this be true there must be a rapid decrease in the internal resistance of the rubber to the passage of the gas, because the ordinary temperature coefficient of gaseous diffusion is unable alone to account for the facts.

A rough parallel, with notable exceptions, may be drawn between the permeability of rubber to different gases and to the boiling points of the gases. In general, the higher the boiling point of the gas the greater the rate at which it penetrates rubber. The specific chemical characteristics of the gas and of the rubber colloid determine, however, the solubility, rate of penetration, etc., and not enough is known of them at the present time to warrant further speculation. There are, however, many interesting fields of investigation opened by this work, and the results should be extremely useful in the many cases where the behavior of rubber in contact with gases is concerned.

SUMMARY

1. The permeability of rubber compounds varies with the composition as would be expected. The aging of rubber films is accompanied by a decrease in permeability; a similar decrease may be effected by overvulcanization. The rubber, which shows a very low permeability for these reasons, is usually very much deteriorated and frequently brittle, so that it is a disadvantage from the standpoint of gas-tightness.

2. The permeability to any gas is found to be directly proportional to its partial pressure provided the total pressure is constant. The variation of permeability with total pressure depends on the thickness of the rubber, the way in which it is supported, etc.

3. The permeability to hydrogen is inversely proportional to the thickness of the rubber. No other gas was tested in this respect.

4. The specific permeability to hydrogen at 25 degrees C. of vulcanized rubber similar to the grade known as dental dam is about 20×10^{-6} cc. per minute. This value varies somewhat with the age and chemical characteristics of the rubber.

5. The temperature coefficient of permeability is quite high. For example, in the tests at 100 degrees C. the permeability to

[1]Condensation of a comprehensive report to be issued by the United States Bureau of Standards.

[2]Physical chemist, Aluminum Co. of America. Formerly with United States Bureau of Standards.

[3]Associate Chemist, United States Bureau of Standards.

[4]Wied. Ann., volume 43, page 544, 1891.

carbon dioxide or helium was about seventeen times the rate at 0 degrees C. The permeability to hydrogen was about twenty-two times as great at 100 degrees as at 0 degrees C.

6. The relative permeability of rubber to some common gases is shown in the following summary:

Gas	Relative Permeability Hydrogen = 1
Nitrogen	0.16
Air	0.22
Argon	0.26
Oxygen	0.45
Helium	0.65
Hydrogen	1.00
Carbon dioxide	2.9
Ammonia	8.0
Methyl chloride	18.5
Ethyl chloride	200.0

7. The permeability of rubber to water vapor is high—approximately fifty times the permeability to hydrogen. This value, not having been determined with any precision, is not included in the table above.

METHODS OF ANALYSIS

THE DETECTION OF NATURAL BARYTES IN LITHOPONE, ETC.

The following method has been in use for 22 years in the laboratory of Michael Nairn & Co., Limited, Kirkcaldy, Scotland. It is given as reported by S. Stewart, F. I. C., in the *Journal of the Society of Chemical Industry*, July 15, 1920, page 188T.

Lithopone, Orr's zinc white, and other pigments composed essentially of zinc sulphide and barium sulphate should contain the latter only in the precipitated form. Inferior qualities sometimes contain natural barytes, to the detriment of their covering power, owing to the large size of the particles of barytes as contrasted with those of the precipitated sulphate. Its opacity is less, and although, when used as an ingredient in ordinary paints, this is perhaps of secondary importance, it becomes a matter of serious consideration when used for some other purposes; for example, in making white inlaid linoleum the use of lithopone containing natural barytes leads to the production of a yellowish white.

The microscope affords a convenient means for differentiating between natural and precipitated barium sulphate. The test is carried out as follows: A minute portion of the sample is spread on a microscope slide with a drop of water, dried, and examined with a ¼-inch or ⅙-inch objective, the diaphragm being closed so as to give a dark background. If only precipitated barium sulphate be present, it appears as a very fine powder composed of minute crystals of uniform size, whereas if there is an admixture of natural barytes, even when very finely ground, transparent irregular pieces of greater size will appear. The certainty of the method is enhanced if the zinc sulphide present in the lithopone be first removed by treatment with dilute hydrochloric acid and potassium chlorate and the insoluble residue examined as above.

TECHNICAL ANALYSIS OF LITHOPONE[1]

TOTAL ZINC AS ZINC SULPHIDE

Weigh two grams of lithopone into 600 cc. beaker, add a little water to moisten, and then 20 cc. 1-1 hydrochloric acid. Take to dryness on steam plate, take up in 75 cc. of water, add five cc. of concentrated hydrochloric acid, and seven grams of ammonium chloride, dilute to 350 cc. with hot water, heat to 180 degrees F. on steam plate and titrate slowly with potassium ferrocyanide, one cc. of which equals 0.01 gram of zinc, using uranium acetate as external indicator.

[1] J. A. Wyler in the Chemist-Analyst.

ZINC OXIDE

Weigh 20 grams lithopone into 400-cc. beaker, add 100 cc. of five per cent acetic acid and let stand on the steam plate for two hours, with occasional stirring. Filter into 600 cc. beaker, wash with water, boil to small volume, transfer to porcelain dish and evaporate to dryness. Add 20 cc. 1-1 hydrochloric acid and evaporate again. Take up in water, add five cc. concentrated hydrochloric acid and seven grams ammonium chloride, dilute to 350 cc., heat to 180 degrees F. and titrate with potassium ferrocyanide. Calculate to zinc oxide.

ACTUAL ZINC SULPHIDE

From the total zinc substract the zinc found as zinc oxide and calculate difference to zinc sulphide. Total barium as barium sulphate.

Weigh three grams sample into 250 cc. pyrex beaker, add ten cc. water and ten cc concentrated hydrochloric acid. Take to dryness on steam plate, add 75 cc. water, few drops methyl orange and if not acid add a few drops hydrochloric acid. Boil, filter and wash. Return filter plus precipitate to original beaker, add ten cc. water and five cc. nitric acid. Take to dryness on steam bath, add 30 cc. concentrated sulphuric acid and fume strongly. In case acid is dark in color add crystals of potassium nitrate until colorless. Fume until only a trace of insoluble matter (silica) remains. Cool, dilute to 200 cc., boil, let stand in warm place to settle, filter, wash, ignite and weigh as barium sulphate. Calculate to percentage barium sulphate.

WATER SOLUBLE SALTS

Ten grams lithopone are weighed off into a covered 400-cc. beaker, 200 cc. water added, mixture stirred and heated on the steam bath for one to two hours to effect solution of soluble salts. Filter on four-inch Buchner, wash with hot water and evaporate filtrate in porcelain dish. When down to 50 cc. filter through a blue ribbon paper and wash with water. Receive filtrate in a weighed platinum dish, evaporate to dryness on steam bath and then dry at 110 degrees C. for one-half hour. Cool, desiccate and weigh.

IRON

Weigh 20 grams into 400-cc. beaker and moisten with about 15 cc. of water, then add 50 cc. concentrated hydrochloric acid slowly and with stirring. Let it stand over night, filter, wash with hot water containing hydrochloric acid, oxidize the filtrate with bromine and precipitate the iron by using a slight excess of ammonia water and allowing to settle several hours. Filter, dissolve and reprecipitate the iron three times. The iron precipitate is now ignited and weighed as ferric oxide.

MANGANESE

Boil five grams lithopone with 50 cc. 1-1 nitric acid, filter, wash and dilute filtrate to 150 cc. with cold water. Then add a little sodium bismuthate and allow to stand in the cold for twenty minutes. Filter through asbestos pad and compare with standards.

CHEMICAL PATENTS

THE UNITED STATES

Sponge Rubber. Articles such as balls having cells therein, largest at the central portion of the article and decreasing in size toward the surface of the article, may be formed from a mixture of rubber 70, sulphur 6, ammonium carbonate 8, zinc oxide 12, and magnesium oxide 4 parts. (James B. Wishart, Trenton, New Jersey, United States patent No. 1,345,904.)

Sulphur-Terpene Compound. A sulphur compound which exhibits the following characteristics; neutral, amorphous, non-colloidal, insoluble in water, soluble in toluol and xylol and capable of reacting with rubber. (William Beach Pratt, Wellesley, Massachusetts, assignor to E. H. Clapp Rubber Co., Boston, Massachusetts, United States patent No. 1,349,909.)

Waterproofed Fabric consisting of a fibrous foundation impregnated with a non-colloidal sulphur-terpene compound. (William Beach Pratt, Wellesley, Mass., assignor to E. H. Clapp Rubber Co., Boston, Massachusetts. United States patent No. 1,349,310.)

Vulcanized Article and Process. A new manufacture comprising a fibrous body, and a non-colloidal sulphur-terpene compound bonding the rubber and fibrous body, all vulcanized together. (William Beach Pratt, Wellesley, Massachusetts, assignor to E. H. Clapp Rubber Co., Boston, Massachusetts. United States patent No. 1,349,911.)

Article and Process of Bonding Metal and Vulcanized rubber which comprises coating the surface of the metal with a non-colloidal sulphur-terpene compound, placing thereagainst a material to be bonded to such surface, and subjecting the structure to heat and pressure. (William Beach Pratt, Wellesley, Massachusetts, assignor to E. H. Clapp Rubber Co., Boston, Massachusetts. United States patent No. 1,349,912.)

Pneumatic Tire and Process which consists in treating a fibrous material with a non-colloidal sulphur-terpene compound, forming the tire structure of rubber and the treated fibrous material, and vulcanizing said structure. (William Beach Pratt, Wellesley, Massachusetts, assignor to E. H. Clapp Rubber Co., Boston, Massachusetts. United States patent No. 1,349,913.)

Solid Tire and Method of Manufacture. A tire comprising a rim, a solid rubber tread, and a layer of non-colloidal sulphur-terpene compound uniting the tread to the rim. (William Beach Pratt, Wellesley, Massachusetts, assignor to E. H. Clapp Rubber Co., Boston, Massachusetts. United States patent No. 1,349,914.)

Process for Vulcanizing Rubber which comprises applying an inert gas as a vulcanizing medium to a vulcanizable plastic material in a chamber communicating with the atmosphere and vulcanizing the plastic material by said inert gas while preventing the passage of air into the chamber by a counter-passage of gas. (Willis A. Gibbons, Flushing, New York., assignor to American Rubber Co., Boston, Massachusetts. United States patent No. 1,350,798.)

Process for Vulcanizing Rubber comprising the addition of a small quantity of a concentrated solution of a caustic alkali. (Edwin E. A. G. Meyer, assignor to Morgan & Wright, both of Detroit, Michigan. United States patent No. 1,350,824.)

Tire Filler and Method of Manufacture, consisting of the following ingredients in the proportions stated; 152 pounds sunflower seed oil, 32 pounds of sulphur chloride; 5 pounds of calcium hydroxide, 4 ounces of soluble dyes, and 8 pounds of soap oil. (Franc D. Mayer, Chicago, Illinois. United States patent No. 1,351,670.)

THE UNITED KINGDOM

Varnish, Adhesive, and Waterproofing. A composition for waterproofing of all kinds, and fabrics which may also be used as an adhesive, comprises the following preparation: dissolve 20 parts of caoutchouc and 60 parts of cellulose acetate in 60 parts of tetrachlorethane. Sulphur may be incorporated in the mixture to enable the coating to be vulcanized either by steam or hot air, or cold, by means of chloride of sulphur. Other substances may be added, such as organic or inorganic loading or coloring materials, and a softening agent for the cellulose acetate. (Etablissements Hutchinson, 124 Avenue des Champs Elysées, Paris. British patent 129,630.)

Recovery of Volatile Solvents. In recovering volatile solvents evaporating during the drying of india rubber articles and the like, an absorption agent is placed in the drying chamber, and uniformly distributed over it. The agent is preferably made to flow through the chamber, and may be conducted by means of rods, threads, wires, textile fabrics. The solvent is subsequently recovered by distillation or other means. (H. Schmidt, Cologne, Germany. British patent No. 141,739.)

Process for Rubber Boot and Shoe Manufacture. "Ammonia powder" is placed inside a cloth bag coated with gum arabic and shaped like a shoe. A rubber bag of similar shape is coated internally with gum arabic and the first bag inserted therein. The two bags are sealed and placed in a shoe-shaped metal mold which is then heated, when gas generated from the powder by the heat causes the rubber and cloth to adhere and take the shape of the mold. After removal from the mold an opening is cut for the introduction of the foot. (Y. Ose, 1 Majima-Cho, Shitayu-ku, Tokio, Japan. British patent No. 142,801.)

Treating Bark from Rubber Trees. Bark shavings are ground and masticated between rollers heated to about 275 degrees F. so as to knead the rubber with the bark and convert the whole into a plastic mass. The product, after mixture with a vulcanizing agent and vulcanization, is suitable for the manufacture of tapping-cups, coagulating-dishes, floor matting, etc. If the vulcanizing agent be added prior to grinding, the raw material may be treated in a scrap washer and crêping machine as for the extraction of raw rubber. (R. T. Smith, 89 Chancery Lane, London. British patent No. 142,946.)

India Rubber Composition. In compositions containing a large proportion of caoutchouc, one or more of the compounding ingredients is or are dispersed through a carrier liquid before compounding, and the liquid removed before vulcanization. The liquid must be volatilizable and is preferably water. The compounding ingredients may be dissolved, or in colloidal solution, or suspended in the liquid. Suitable ingredients for compounding are sugar, glue, aluminum hydroxide, and barium sulphate A protective colloid such as glue may be added to maintain a solid ingredient in dispersion. (H. Wade, 111 Hatton Garden, London. [The Goodyear Tire & Rubber Co., Akron, Ohio, U. S. A.] British patent No. 143,610. Same as United States patent No. 1,301,639.)

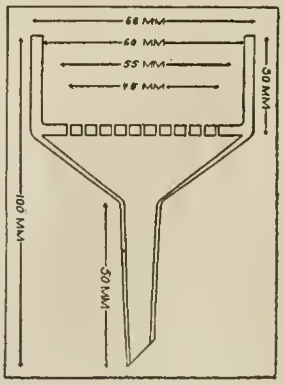
Wheel Tires. Air tubes for tires are reinforced by fabric impregnated with a solution of Turkish birdlime. A lining of Turkish birdlime may be applied to the inner surface of the tube. (C. W. Bradley, 107, Kenilworth Court, Putney, London, England. British patent No. 144,102.)

Heavy Composition to enhance the flight of golf balls consists of a non-rigid and elastic composition either of rubber or a gelatinous compound loaded with litharge, a chemical compound, or powdered heavy metal. In weight the material is from 20 to 40 per cent of the weight of the whole ball. (R. F. Hutchison and W. Patton, Murano Works, Albert Street, Edinburgh. British patent No. 144,126.)

LABORATORY APPARATUS

IMPROVED BUCHNER FUNNELS

An improved and standardized Buchner funnel is shown in the illustration which embodies the suggestions of numerous chemists. Standardization has been effected in the distance of plate from rim, filter paper from inside wall of funnel, and perforated area from edge of filter paper. The result is that funnels may be obtained in which standard filter papers will fit without unnecessary folding or loss of time in cutting.



Coors Porcelain Funnel

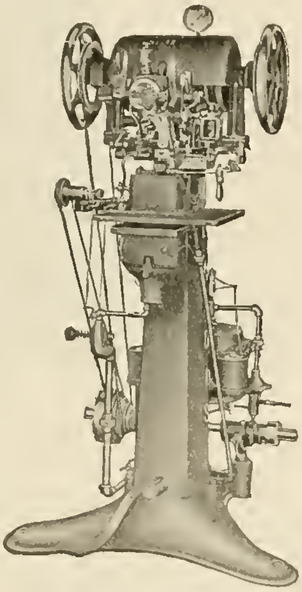
Filter papers may be made to fit this form of funnel by shaping them around a wooden disk, which will secure very quick filtration of precipitates for quantitative work and their efficient washing. (The Herold China & Pottery Co., Golden, Colorado.)

New Machines and Appliances

COMPOSITION SOLE STITCHING MACHINE

Attaching composition soles to leather shoes by sewing has become the general practice in this country and has resulted in the successful adaptation of leather sole stitching machines for this purpose in the shoe factory and repair shop.

A machine of this type, shown herewith, possesses a stitch adjustment from 12 to three and one-half inches per stitch. The heating system is self-contained, being attached directly to the pedestal of the machine. It operates with a small quantity of water and at a steam pressure of not over five pounds. All parts of the machine may be brought to the desired heat at the same time, and in the proper condition for sewing in 25 minutes. The take-up and thread-measuring mechanism are completely inclosed, thereby preventing the thread from exposure to cold air and becoming cold and stiff, and which results in thread economy. The wax pot holds a small quantity to insure fresh wax, while the galvanized pot and attached parts, and the copper steam coil, prevent the wax from being discolored. The complete machine is only furnished on a power stand. The heating may be accomplished with gas, gasoline or electricity. (Landis Machine Co., St. Louis, Missouri.)



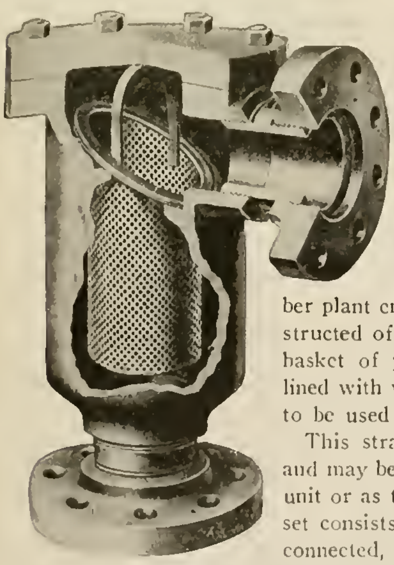
Landis Sole Stitcher

THE G-R STRAINER

Strainers are required on the suction and discharge lines of lubricating oil, fuel oil and quenching oil systems, for the removal of solid foreign material in suspension. Also power plants which secure their water supply from such sources as rivers or lakes, require strainers to prevent weeds, sticks, marine plants and small fish from entering pipe lines.

For this purpose the strainer shown in the accompanying illustration is recommended to rubber plant engineers. The body is constructed of cast iron and the strainer basket of perforated sheet steel and lined with wire mesh when strainer is to be used on an oil line.

This strainer is of the single type and may be installed either as a single unit or as the G-R strainer set. This set consists of two of these strainers connected, complete, including two three-way valves and necessary connecting elbows, unions and nipple. This set permits the cleaning of either of the two units without interruption of the service. (The Griscom-Russell Co., 90 West street, New York City.)

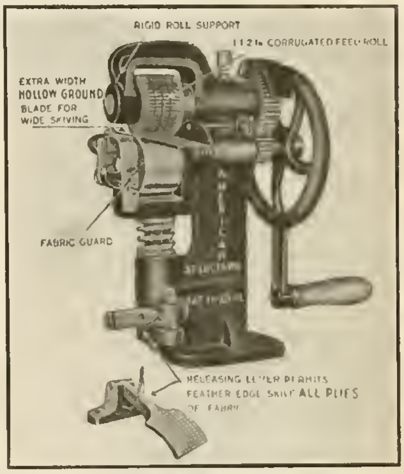


Single Strainer

A NEW FABRIC-SKIVING MACHINE

A new fabric-skiving machine that finds ready utility in tire rebuilding and repairing is shown in the accompanying illustration. It is particularly adaptable for skiving down the plies of pulled fabric in making reliners, blow-out patches, and in general repair work.

The makers claim that the machine will do the work in one-tenth of the time required in hand work, and that it will skive two-ply reliners successfully. The machine is adjustable to skive up to five-ply fabric. (R. T. Sales Co., Green Bay, Wisconsin.)

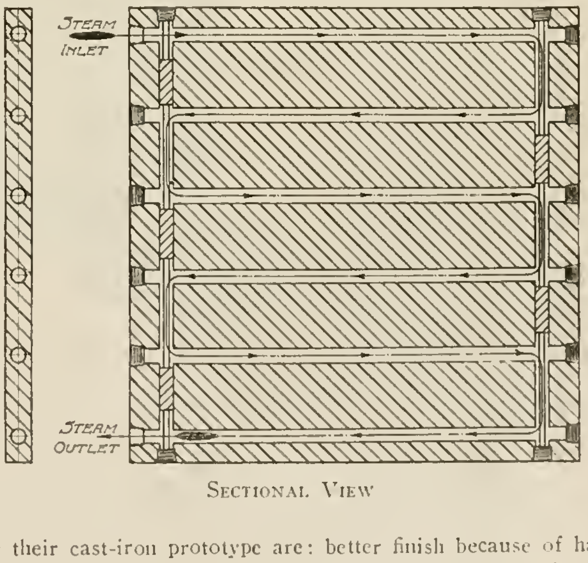


Wide Blade Fabric Skiver

STEEL PLATENS FOR HYDRAULIC PRESSES

An innovation in the construction of vulcanizing presses is the substitution of rolled steel steam platens for those of cast iron. The steel platens are made from the best grade of rolled steel boiler plate and the surfaces are planed, polished, drilled and connected for steam circulation. The advantages claimed over their cast-iron prototype are: better finish because of hard, smooth surfaces; saving of time by reason of quicker heating and chilling; saving of steam on account of greatly reduced

Rolled Steel Platen

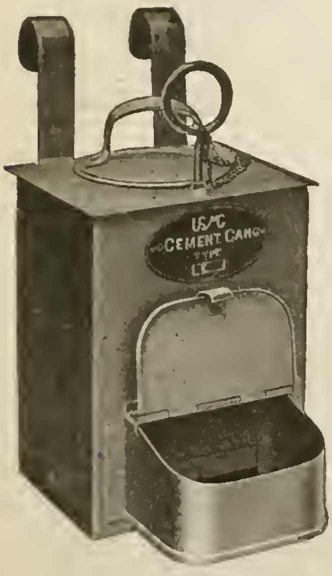


Sectional View

radiation surfaces of the platen edges; greater comfort for the workers because of less heat in the curing room; saving of space, as generally twice as many steel platens as cast iron can be installed in the same press. The thickness of the steel platen is usually 1½ inches as against 4½ inches of the cast iron; doubling of output on the same number of presses; greater durability. The steel platen is practically indestructible. It will not crack nor explode from alternate heating and chilling. The greater hardness of the surfaces prevents pitting. (Southwark Foundry & Machine Co., Philadelphia, Pennsylvania.)

NAPHTHA AND CEMENT BENCH CANS

A novel type of cement can and an improved dispensing can for inflammable liquids are among the most interesting of the new products supplied to the rubber trade and especially to rubber footwear manufacturers.



Cement Bench Can

The cement can is made on up-to-date non-explosive lines. It has a shut-off gate which regulates the flow. The supply trough is fitted with a spring-closed cover. It is filled through the opening at the top over which is fitted a removable cover. This opening is large enough to make cleaning easy. The fusible latch which closes the cover when it melts prevents explosion and confines the fire to one spot. The can cannot explode and scatter burning cement over a large area. It is made in one size only, holding approximately one-half gallon.

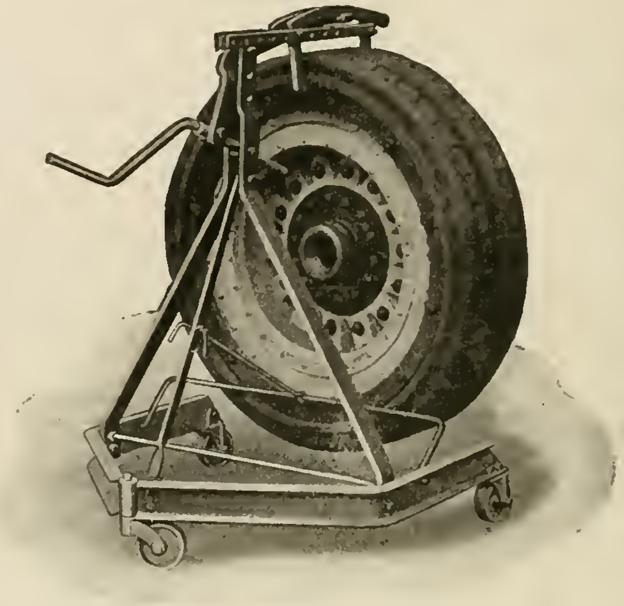
The improved naphtha dispensing can is designed for the safe and economical use of inflammable liquids, and its construction is such that in case of fire its contents will blow off and burn slowly rather than explode and scatter.

It consists of a large, air-tight chamber or reservoir which is connected with an open, spring-pressed cup by means of a spout and a ball valve. A slight pressure on the cup allows the ball to drop from its seat and the liquid flows freely into the open cup which, when released, reseats the ball, thus stopping the flow. The vacuum principle controls the feed, and makes overflow impossible. All necessary parts are manufactured of non-corrosive metal. The rest is cast iron. It is made in one size only, holding approximately one quart. (The United Shoe Machinery Corporation, Albany Building, Boston, Massachusetts.)

Naphtha Bench Can

CRANE FOR GIANT PNEUMATIC TIRES

With the increase in size and added weight of giant pneumatic tires comes the need of a device for conveniently handling motor truck tires and wheels. With the crane here shown, it is claimed that one man can handle any size of wheel or solid tire, special grab hooks being furnished for use with pneumatic tires. The crane works in small clearance between tire and

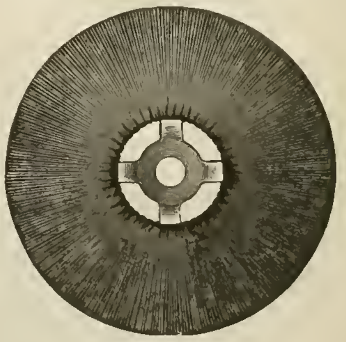


Atlas Wheel Crane

fender or body. To provide for variation in wheel diameters, the crane arm may be pivoted at two different heights, thereby permitting two different ranges of vertical lift. Moreover, the crane will pick up wheels which are standing on the floor. (The Thompson Auto Specialties Co., Columbus, Ohio.)

STEEL WIRE BUFFING WHEELS

Steel wire buffing wheels are indispensable in tire making and repairing. The old-type solid wire brush has long since been displaced by wheels made up of sections that fit on a permanent hub. When the sections wear out, new ones are replaced on the old hub and the brush is as good as new. A recent type of steel wire brush is called the "Sampson," section of which is shown in the accompanying illustration. (Chas. E. Miller, Anderson Rubber Works, Anderson, Indiana.)



Sampson Brush Section

MACHINERY PATENTS

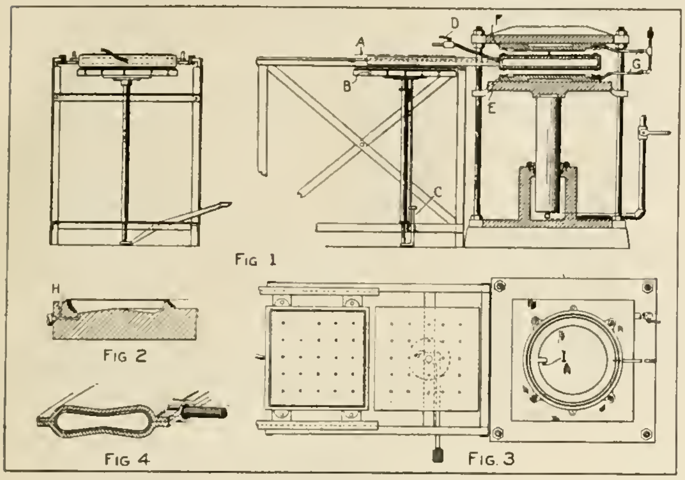
MOLDING INNER TUBES BY THE PNEUMATIC PROCESS

Two-part hollow rubber articles, such as inner tubes, are made by this process, whereby the parts are first cut from a sheet, formed in a mold which causes the edges to adhere, and then removed to a vulcanizing mold in which they are seated by internal pressure.

In carrying out this process a square sheet of raw rubber is laid on the upper surface of the plate A and a similar sheet is laid on the table B, shown in Fig. 1. The vacuum plate is then brought to a position directly over the table, the pedal C operated to raise the table, bringing the rubber sheet thereon into contact with the under side of the plate, whereupon the valve D is operated to apply vacuum to this plate, thus drawing both

the rubber sheets closely into contact therewith. The table is then lowered, leaving its sheet held to the under side of the vacuum plate, which is moved to the position shown in Fig. 1, directly between the forming molds.

A valve is operated to apply hydraulic pressure to the plunger, raising the lower forming mold E into contact with the rubber



Roberts' Tube Molding and Vulcanizing Apparatus

at the under side of the plate A, and the raising movement is continued, carrying the plate upwardly, bringing the upper sheet into contact with the upper mold F. Here the movement of the platen is stopped, the valve D is operated to relieve the vacuum in the plate, and a valve controlling the vacuum tubes G is opened, drawing the air from the mold cavities and from the groove H shown in Fig. 2, securely holding the sheets to the mold members.

The platen is then lowered and the vacuum plate withdrawn, leaving the sheets held to the molds by vacuum. This plate is then moved to the position shown in Fig. 3, and the rubber sheets are again placed upon this plate on the table B while the forming operation is continued in the press.

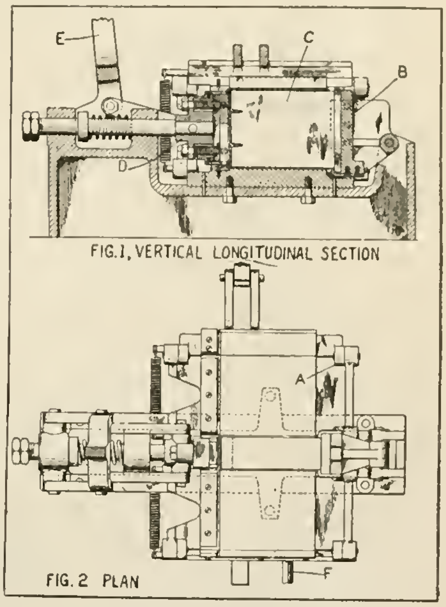
The application of vacuum to the mold is continued until the rubber sheets are stretched tightly into the cavities, when the platens are brought together until the cutting edges meet, severing the rubber within the mold cavities thus forming a substantially flat ring comprising two annular members having their edges pinched together by the bevel surfaces of the cutting edges, and thus caused to adhere. Upon separating the forming molds the tube is then removed and placed in a vulcanizing mold.

In making inner tubes for pneumatic tires, it is desirable to secure the valve stem between the meeting edges of the rubber ring severed from the sheets, so that when a tube thus formed is vulcanized it may be complete. Accordingly the cutting edge is looped inwardly as indicated at I in Fig. 3 and within this loop a cavity is provided into which the rubber is drawn by the suction, so that before bringing the forming molds together to sever the sheets the valve stem may be laid on rubber in the lower mold in this cavity, with its head in the concave portion of the trough. When the mold members are brought together and severed, the rubber is caused to lie closely about the shank of the valve stem and the sheets are severed entirely around the stem by the edges.

The vulcanizing mold illustrated in Fig. 4 preferably comprises two trough-shaped members formed of pressed metal having convex portions complementary to the convex portions of the tube, while at the sides the cavity extends inwardly in concave form, fitting the concave sides of the tube. Flanges provide for securing the mold members together by bolts or clamps. At one point these flanges are bowed outwardly to surround the valve stem and press the rubber into contact therewith, while the remaining portion of the rubber surrounding the shank may be trimmed off at the inner sides of the flanges before vulcanization. A considerable number of tubes carried in such molds are inflated therein, pressing the walls of the tube tightly to the inner surfaces of the mold. These are then placed in a vulcanizing chamber and cured. (Fred T. Roberts, Cleveland Heights, Ohio, assignor to Paramount Rubber Consolidated, Inc., Philadelphia, Pennsylvania. United States patent No. 1,346,848).

MACHINE FOR FORMING BATTERY JARS

The operation of this apparatus is started with the wrapping box *A* opened out flat, as shown in Fig. 2 and the mandrel holder *B* turned up from the position represented in the drawings so that a core *C* will occupy an inverted vertical position. In this position, the pieces of raw stock for forming the lugs may be inserted in their grooves, and the bottom-forming sheet accurately laid on the end of the mandrel. A side-forming sheet cut to the proper size is laid on the opened-out box and properly registered with the edges thereof, its bottom edge being slightly overlapped upon the edge-turning plates. The holder and mandrel are then swung down into horizontal operative position, and the plunger *D* is advanced until its presser-plate rests against the work to hold the bottom sheet in place as shown in Fig. 1, the weight of the lever *E* keeping the parts in this position while the side wrapping is performed. Then the free sections of the wrapping box, carrying with them the super-imposed portions of the side-forming sheet, are closed upon the mandrel. First, the two wider side sections are swung upwardly into position, and then the third section is turned over on the upper side of the mandrel and clamped by a cam lever which produces pressure on the work. The final step in the side-folding operation consists in turning the fourth folder section and its corresponding sheet portion over on the upper face of the mandrel by means of the handle *F* and applying pressure to the side seam formed by the overlapping skived edges of the rubber sheet. The wrapping action is progressive and avoids the entrapping of air. The final closing movement of the fourth section causes a shearing action which trims off the excess of material on the outer side of the seam.



Battery Jar Machine

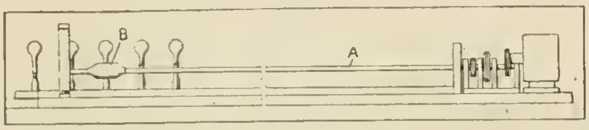
By pressure on the hand-lever *E* the plunger compresses and embosses the bottom sheet and consolidates it with the lugs while the seam-pressing plates on the plunger compress the inwardly-turned edges of the side sheet and perfect the bottom seams. The wrapping box is then unclamped and opened out, and the mandrel with the formed jar thereon, is swung upwardly into vertical position. It may then be removed by sliding it from the holder and the jar vulcanized in the usual manner while still on the mandrel. Another mandrel is then substituted and

the foregoing operations repeated. (James H. Wagenhorst, Akron, Ohio, United States patent No. 1,338,470.)

MACHINERY PATENTS

MACHINE FOR FORMING TOY BALLOON BEADS

A parallel series of forms are secured to the form boards adapted to support the balloons. A rectangular frame is secured to the base of the machine, allowing the form boards to be moved through the frame. Horizontal shafts arranged in pairs are



Bead-Rolling Machine

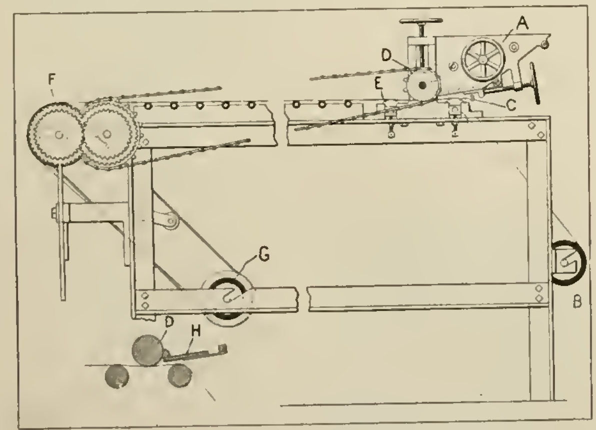
bracketed and geared so that they turn in the opposite direction. On each shaft *A*, a rotary brush *B*, covered with chamois or other flexible material, provides a yielding friction surface to rub against the ends of the balloons.

As the form board is slid in and out of the guide formed by the base, the forms will bring the balloons into contact with the covered brushes, and the rolls or beads will be quickly and uniformly made. (Harry B. Gill, Ashland, Ohio. United States patent No. 1,346,706.)

A NOVEL SPREADING MACHINE

This invention employs a roller for applying the rubber solution to the fabric instead of the usual spreading knife or "doctor."

The dope is placed in the hopper *A* and a web of uncoated fabric drawn from the roll *B* over the guide roller *C* beneath the spreading cylinder *D*, over the guide roller *E*, thence over the heating pipes and drum cylinder to the take-up roller *G*. Power is then applied, rotating the cylinder so that its lower portion



A Calender Spreader

moves in the direction of the travel of the fabric. The web of fabric is driven by the cloth covered drum *F*, through gearing, at the desired rate of speed relatively to the speed of the spreading cylinder.

The gate *H* is adjusted to deliver a sheet of dope of a predetermined thickness upon the surface of the roller which spreads it upon the fabric, condenses the coating and smoothes it by its wiping contact so that a desirable finish is produced.

The coated fabric thereupon passes over the drying coils with the back or uncoated side of the fabric toward the coils so that the heat is applied through the fabric and back of the coating. (Andrew Thoma, Cambridge, assignor to Abraham Sydeman, Boston—both in Massachusetts. United States patent, No. 1,346,615.)

OTHER MACHINERY PATENTS

THE UNITED STATES

No. 1,340,776.* Apparatus for reclaiming rubber. F. L. Kryder, Akron, O., and E. W. Snyder, Indianapolis, Ind.

1,348,228. Apparatus and method for electrically vulcanizing tires. J. Ledwinka, assignor to Edward G. Budd Manufacturing Co.—both of Philadelphia, Pa. (Renewed January 8, 1920.)

1,348,316. Apparatus for cutting rings and washers from rubber tubing. J. E. Perrault, assignor to Hood Rubber Co.—both of Watertown, Mass.

1,348,596. Tire-building stand. E. Sterns, St. Louis, Mo., assignor to Surety Tire & Rubber Co., a Delaware corporation.

1,348,612. Separable sectional core for tires. G. H. Willis, assignor to The Miller Rubber Co.—both of Akron, O.

1,349,039. Repair vulcanizer. A. A. Bitter, Los Angeles, Calif., assignor by mesne assignments to Western Vulcanizer Manufacturing Co., Chicago, Ill., a copartnership.

1,349,366. Tire ahrader. F. N. Cordell, St. Louis, Mo. (See The India Rubber World, February 1, 1920, page 297.)

1,349,390. Apparatus and process for the manufacture of tires. J. A. Swinehart, Akron, O.

1,349,424. Apparatus for the manufacture of pneumatic-tire casings. E. Hopkinson, New York City.

1,349,560. Apparatus and process for producing a hollow rubber biscuit H. Z. Cobb, New York City, assignor to The Mechanical Rubber Co., a New Jersey Corporation.

1,349,688. Tire and tube vulcanizer. O. Nichols, Mound Valley, Kans.

1,349,693. Repair vulcanizing apparatus. W. S. Robinett, Oakland, Calif.

1,349,721. Apparatus for use in vulcanizing pneumatic-tire casings. E. Hopkinson, New York City.

1,349,752. Apparatus for recovering rubber from armored hose, etc. C. F. Erb, Youngstown, O.

1,349,796. Vulcanizing mold for boots and shoes. D. F. Wilhelmi, Doorwerth, Netherlands.

1,350,105. Mold for rubber heels. H. F. Maranville, assignor to the Firestone Tire & Rubber Co. both of Akron, O.

1,350,117. Bead-forming ring for molding pneumatic tires. J. Schmidt, assignor by mesne assignments to Howe Rubber Corporation—both of New Brunswick, N. J.

*Omitted from our issue of July 1, 1920.

THE DOMINION OF CANADA

ISSUED JULY 27, 1920

202,260 Tire dressing wheel. S. M. Taber and P. E. Taber, Berkeley, Cal., U. S. A.

ISSUED AUGUST 17, 1920

203,007 Repair vulcanizing apparatus. W. H. Miles, Stafford, England.

203,099 Apparatus for placing tires in molds. The Dunlop Rubber Co., Ltd., Westminster, Co. of London, assignee of C. Macbeth and E. Sullivan, both of Birmingham, Co. of Warwick—all in England.

203,105 Pneumatic tire building machine. The Goodyear Tire & Rubber Co., assignee of J. D. Thompson, both of Akron, O., U. S. A.

THE UNITED KINGDOM

143,927 Tipping-apparatus for kneading-machines, etc. Canstatter Misch- und Knetmaschinen-Fabrik, Canstatter Dampf-Backofen-Fabrik Werner & Pfleiderer, Pragstrasse, Canstatt, Stuttgart, Germany. (Not yet accepted.)

144,779 Repair vulcanizer. H. Frost & Co., 148 Great Portland street, London, and W. H. Welch, 182 Ashley Down road, Bishopstone, Bristol.

144,822 Apparatus for making cord tires. Vickers, Ltd., Vickers House, Broadway, Westminster, Sir J. McKechnie, Naval Construction works, Barrow-in-Furness, and A. Ryan, 43 Cranbrook street, Oldham.

144,041 Apparatus for making hollow rubber articles. Paramount Rubber Consolidated, 5232 Germantown avenue, Philadelphia, Pa., assignee of F. T. Roberts, 1051 Power avenue, Cleveland, Ohio—both in U. S. A. (Not yet accepted.)

PROCESS PATENTS

THE UNITED STATES

No. 1,348,164. Putting beads on tire carcasses. W. G. Fording, assignor to J. T. Lister—both of Cleveland, O.

1,348,755. Manufacture of clutch facings. S. Simpson, assignor to The Raybestos Co.—both of Bridgeport, Conn.

1,349,423. Manufacture of pneumatic tires. E. Hopkinson, New York City.

THE UNITED KINGDOM

144,809 Making hollow rubber articles such as valve balls. F. T. Roberts, 1105 Lakeview road, and R. H. Rosenfeld, 1895 East 71st street—both in Cleveland, Ohio, U. S. A.

DIATO

Pure diatomaceous earth from an extensive fresh water deposit located in Oregon is being introduced to the rubber manufacturing industry. Analysis and microscopic examination shows Diato to be practically free from lime, entirely free from grit, and contains only two types of diatoms. These are in the form of hollow cylinders possessing relatively larger cavities than is the case with the discoid forms which are so often the dominating types in diatomaceous deposits.

New Goods and Specialties

AN X-RAYED GOLF BALL

The perfect central balance of the ideal golf ball is obtained by building evenly around a heavy core. A ball that is tested by X-ray for core imperfections would seem a help towards avoiding an erratic game. The "Clincher Cross" golf ball is X-rayed before leaving the factory, to make sure that the core has not become displaced during the building and molding operations. (North British Rubber Co., Limited, London, England. American representative, James Peckham, 17 Battery Place, New York City.)

"CLINCHER CROSS" GOLF BALL

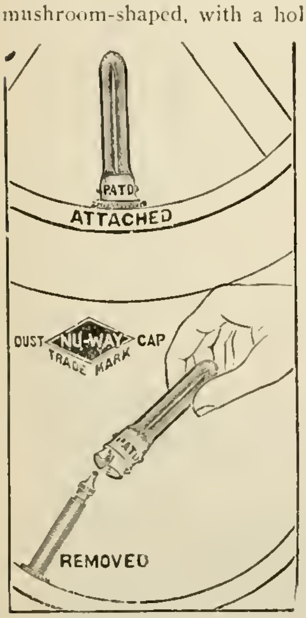
QUICK REPAIR FOR PUNCTURES

A handy little repairing device for punctures is the "No-C-Ment" puncture plug, which, the maker claims, will repair any puncture in less than ten seconds without using cement. The plug is made of soft rubber, mushroom-shaped, with a hollow "stem" into which a small lead ball is inserted, and works on a pneumatic principle automatically to close the puncture. "No-C-Ment" puncture plugs are made in two sizes. (H. & K. Accessory Co., 4005 West North avenue, Chicago, Illinois.)

"NO-C-MENT" PLUG

PNEUMATIC-TIRE DUST CAP

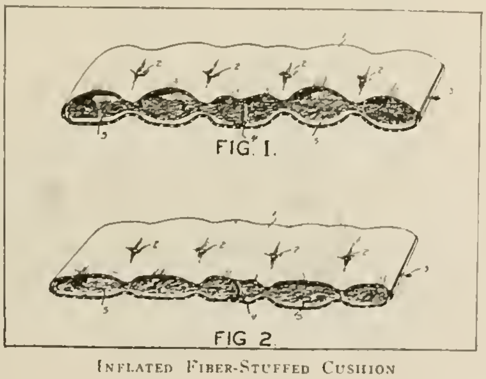
The "Nu-Way" dust cap for pneumatic tires is a combined dust cap and nut which can be instantly removed and attached. The maker claims it will do away with tedious waits while filling tires. "Nu-Way" caps are made of high-grade materials and will add to the appearance of any car. (A. L. Just Manufacturing Co., Syracuse, New York.)



"NU-WAY" DUST CAP

SEMI-STUFFED AIR CUSHION

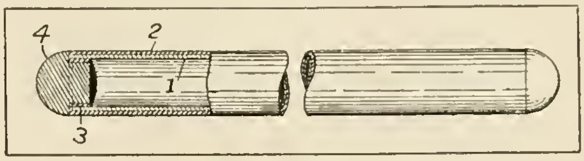
Pneumatic cushions are almost indispensable to motorists and canoeists, but their extreme resiliency often makes them a dangerously unsteady seat. An air cushion that furnishes a substantially firm seat when inflated, and a comfortable support even if partially or wholly deflated, is a recent patent. It is preferably oblong in shape, of rubberized fabric enclosing a layer of fibrous material. Bolts pass through the cushion, forming tufts to hold the fibrous filling in place. An inner partition divides the cushion into two parts, and a valve at one end is used for inflating. (Edwin S. Sylvester, West New Brighton, New York, assignor to Rubber Regenerating Co., Naugatuck, Connecticut. United States patent No. 1,332,933.)



INFLATED FIBER-STUFFED CUSHION

RUBBER-COVERED DYE STICK

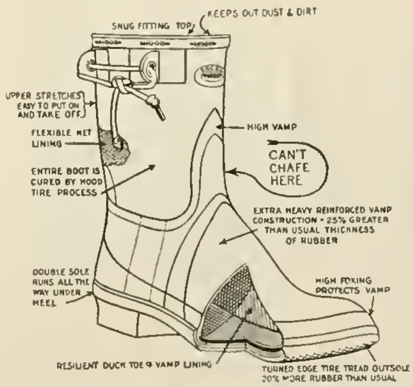
An improved dye stick that will not be affected by heat, moisture, or chemicals while in use is composed of a thin tube of metal (1) enclosed in a close-fitting, smooth-surfaced tube of hard rubber, (2) lapping over the metal tube at the ends, (3) or cut flush. Secured in each end of the tube may be a soft rubber plug (4) which will prevent injury to the tube if accidentally dropped endwise. In dyeing cloth or yarn the dye stick must not catch in the material while changing its position in the vat of dye. Wooden dye sticks quickly splinter and injure the fabric. (W. F. Foley, assignor to India Rubber Co., New Brunswick, New Jersey. United States patent No. 1,337,009.)



SMOOTH-SURFACED DYE STICK

MINER'S RUBBER SHOE PAC

The new Hood "Flex-I-Pac" has been designed especially to obviate the uncomfortable features of the old-style miner's pac. Its extreme flexibility is attained, the maker says, without in any way lessening its wearing qualities. The shoe is made without a flap. The girth at the top is just large enough to admit the foot and can be tightened to the leg by means of the tie-strap. This excludes dust and dirt to a minimum and eliminates painful irritations that lessen production. The "Flex-I-Pac" is made of the highest quality materials. The turned edge tire tread outsole uses 20 per cent more rubber than usual. The double sole runs all the way under the heel and the entire boot is cured by the Hood tire process. The maker claims for the shoe extra long wear and absolute comfort. (Hood Rubber Products Co., Inc., Watertown, Mass.)



HOOD MINER'S "FLEX-I-PAC"

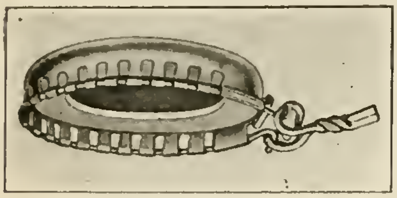
A CANADIAN RUBBER HEEL

A new design of the old standard "Maltese Cross" rubber heel is illustrated here, called the "Scoop." It is of the concave type that is now so popular because of its added springiness and gripping qualities. The finish and workmanship of the "Scoop" rubber heel are of the highest standard of "Maltese Cross" quality. (Gutta Percha & Rubber Co., Limited, 47 Yonge street, Toronto, Ontario.)

"MALTESE CROSS SCOOP" HEEL

A SAFETY BOTTLE CAP

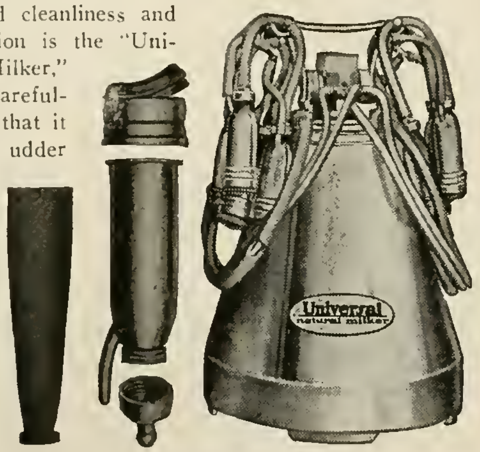
A bottle cap developed from the point of view of the bottle user, that can be opened easily without an opener or corkscrew, that closes securely and stays closed, is called the "Kork-N-Seal." It consists of a metal cap, cork-lined, fitting closely over a rubber gasket, and having a wire ring within the outwardly rolled edge, contracted by a slight pressure of the finger on a small wire lever attached to the ends of the ring. This closes the cap tightly over the rubber gasket and hermetically seals the bottle. (The Williams Sealing Corporation, Decatur, Illinois.)



The "Kork-N-Seal" for Bottles

THE UNIVERSAL NATURAL MILKER

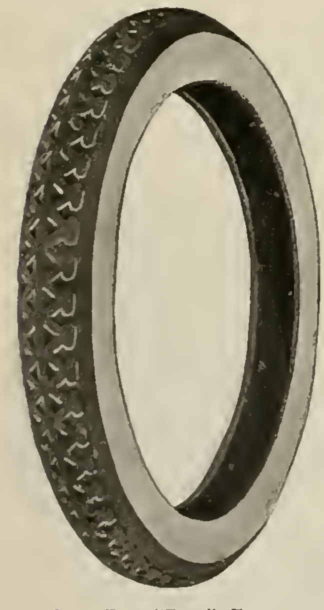
A mechanical milking machine that beats the old-time hired man in speed and cleanliness and rivals him in action is the "Universal Natural Milker," which has been carefully constructed so that it cannot injure the udder of the cow. It has few parts, including, besides the necessary vacuum outfit, one pipe line through the barn connecting the vacuum pump to the milk pail, and on top of the pail a vacuum pulsator with two rubber tubes extending to a cluster of four teat cups, each lined with the best soft rubber. At the top of each cup is a solid rubber ring—soft, like the calf's nose, leaving no cold metal to touch the cow. The vacuum action in the rubber air tubes attached to the teat cups makes possible the alternating action which the manufacturer asserts is the nearest approach to the natural feeding method of the calf. The rubber lining of the teat cups permits a massaging action similar to that of the sucking calf. It is claimed the machine will save money for any farmer milking six cows or more. (The Universal Milking Machine Co., 200 West Mound street, Columbus, Ohio.)



"Universal" Milking Machine; Teat Cup and Its Rubber Liner

A TIRE WHOLESOLE

A new type of repair-tire is the Eno "Exso" tire, a wholesole which is vulcanized from the outside and produces a tire that looks like new. The "Exso" tire is made of the best tire fabric, breaker, cushion, and tread stock, and is said to have the wearing qualities of a new tire at half the cost. (George W. Eno Rubber Co., 1026 South Los Angeles street, Los Angeles, California.)



The Eno "Exso" Tire

NEW HUNTING EQUIPMENT

Of the new host of articles brought out yearly, intended to add to the comfort of the hunter and deplete his pocketbook, the most comfortable to be had at reasonable cost sell best.

Fishing Coat Ladies' Outing Boots Under Pants

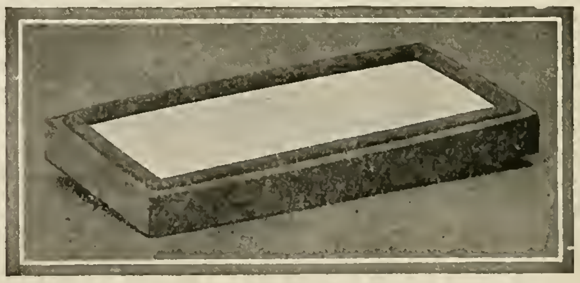
The fishing coat shown has five pockets, one rubber-lined and reversible for bait, and a fish or game bag of double-coated washable material, conveniently attached to the back but out of the way when walking through brush.

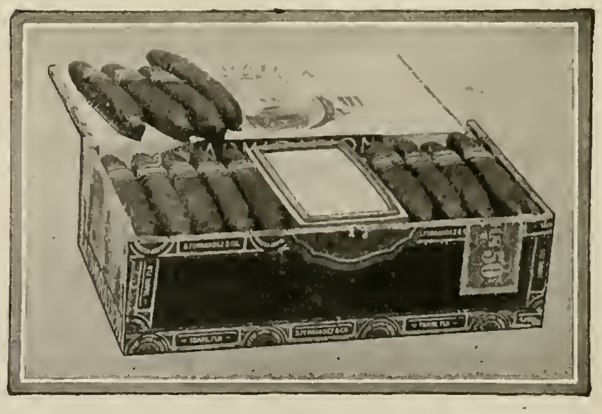
The woman's outing moccasin is sporty-looking and most practical and comfortable for fall hunting. Ten inches high, it has waterproof, flexible rubber sole and soft, smoked elk upper.

Convenient and economical, too, are the waterproof and windproof under-pants for men to be worn under regular trousers in rain or snow. The legs and seat are of light-weight rubber-coated material, the waist and body not rubberized. (L. L. Bean, Freeport, Maine.)

MOISTENING DEVICE FOR CIGARS

This new "Humidyzor" is made of fine white biscuit porcelain encased in a moisture-proof and mar-proof rubber tray that is odorless and eliminates all possibilities of damaging the cigars with either moisture or marring. Pearson's cigar "Humidyzor" is said to keep a box of cigars conditioned from two to ten days. (Pearson Products Co., 725 Broadway, New York City.)





Pearson's Cigar-Box "Humidyzor"

THE OBITUARY RECORD

GENERAL SUPERINTENDENT OF THE HEWITT RUBBER COMPANY

Edward H. Openshaw, general superintendent of the Hewitt Rubber Co., Buffalo, New York, died on September 10. Although he had been in poor health during the past few years and had failed perceptibly in the last two months, yet his passing away was sudden and quite unexpected. His declining health was caused by hardening of the arteries, which brought about slight strokes which caused his death.

Edward H. Openshaw

Mr. Openshaw was born in Osswald Twistle, England, September 7, 1863, and arrived in Philadelphia on his nineteenth birthday in 1882. He started his rubber career with the Home Rubber Co., Trenton, New Jersey, and was connected there for a period of twenty-five years. From 1908 to 1914 he was with the Cincinnati Rubber Manufacturing Co. and the United & Globe Rubber Cos. as general superintendent. In 1914 he accepted the position of general superintendent with the Hewitt Rubber Co., with which company he was active until his death.

Mr. Openshaw was well known throughout the rubber industry, particularly in the mechanical goods line, with which he was so long and successfully connected. He invented many new manufacturing methods which are still in use, having never been improved upon, and incidentally was the first to succeed in vulcanizing rubber to horseshoes.

Mr. Openshaw was a man with a loyal and upright character, who easily made and retained a host of friends. He was a member of the Ashler Lodge, Free and Accepted Masons, and Zuleika Grotto No. 10.

He is survived by his widow, daughter and two sons, Frank and Edward, both of whom are connected with the rubber industry, the former with the Cincinnati Rubber Manufacturing Co., and the latter with the Hewitt Rubber Co.

WELL KNOWN IN NEW YORK RUBBER CLOTHING TRADE

The Clifton Manufacturing Co., Boston, Massachusetts, announces, with great regret, the death of T. Frank McCarthy on September 10, 1920. Mr. McCarthy has been the New York representative for the rubber surface clothing department and had a host of friends in the rubber clothing trade. He was respected and esteemed for his honorable dealings as well as for his genial disposition, unfailing kindness and helpfulness to all his acquaintances in that business.

His death will be sincerely mourned by his customers, and his loss will be deeply deplored by the company with which he was so long connected, and by whom his services were greatly valued.

A PIONEER IN SOUTH AMERICAN SHIPPING

Michael P. Grace, chairman of the board of directors of William R. Grace & Co., the large shipping organization, died September 20 in London, England, aged 78. Mr. Grace was also head of Grace Brothers & Co., Limited, of London, and a brother of the late William R. Grace, a former mayor of New York City.

Michael P. Grace was born in Queenstown, County Cork, Ireland, and at an early age went to Peru, where his father, James Grace, had sought to establish an Irish agricultural colony, and where his brother, W. R. Grace, had become a partner in the trading firm of Bryce, Grace & Co.

W. R. Grace came to the United States and established the house of W. R. Grace & Co., Michael P. Grace remaining in Peru, building the business into the largest in the country and operating a vast fleet of ships which carried much of the South American rubber to New York and London.

After the Chile-Peruvian war of 1877-1881 Michael P. Grace, who had become an American citizen and had assumed charge of the parent house in New York, went to Peru to further develop the business and to extend it to Chile. Later he resided for some years in England, making his home in the famous Battle Abbey at Hastings.

Mr. Grace is survived by his widow, who lives in London, and three daughters, Mrs. J. S. Phipps of New York City, the Countess of Donoughmore and Mrs. Joseph Benskin of London.

RUBBER TRADE INQUIRIES

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The editor is therefore glad to have those interested communicate with him.

(826) A subscriber desires the name and address of the present manufacturer of the Bachmann hose-wrapping machine, formerly made by a company now gone out of business.

(827) A reader desires the address of the manufacturer of "Nitrex," used for painting tires to protect from sun and atmosphere.

(828) A manufacturer desires to know the average tensile strength of rolled brown crêpe.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS

Addresses may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or from the following district or cooperative offices. Requests for each address should be on a separate sheet, and state number.

District Offices	Cooperative Offices
New York: 734 Customhouse.	Cleveland: Chamber of Commerce.
Boston: 1801 Customhouse.	Cincinnati: Chamber of Commerce; General Freight Agent, Southern Railway, 96 Ingalls Building.
Chicago: 504 Federal Building.	Los Angeles: Chamber of Commerce.
St. Louis: 402 Third National Bank Building.	Philadelphia: Chamber of Commerce.
New Orleans: 1020 Hibernia Bank Building.	Portland, Oregon: Chamber of Commerce.
San Francisco: 307 Customhouse.	Dayton, Ohio: Dayton Chamber of Commerce.
Seattle: 848 Henry Building.	

(33,598) A cooperative mercantile company in Australia desires to purchase and secure an agency for the sale of tires and tubes.

(33,604) A merchant in Canada desires to correspond with manufacturers in position to export rubber horse-shoe pads. Cash on delivery. Quote f. o. b. port of shipment.

(33,606) A commercial agent in Turkey desires to represent firms for the sale of rubber overshoes. Quote c. i. f. Constantinople. Payment in United States currency, 20 to 25 per cent with order, balance against documents.

(33,620) A manufacturer in South Africa desires to secure an agency for the sale of rubber soles and heels, canvas tennis boots and shoes, uppers for sewing soles on same (not for vulcanizing), molds for making rubber soles, stitching machines for attaching rubber soles, motor tires and tubes, mechanical rubber goods, rubber compound for tire repair work and retreading, also reclaimed rubber for mold work, of which samples and prices are required.

(33,633) A tire and rubber agency company in New Zealand desires to secure the sole agency for the sale of good tires and tubes that can be guaranteed for use on the roads of that country. Quote c. i. f. New Zealand port.

(33,656) A commercial agency firm in Portugal desires to secure an agency for the sale of automobile tires. Correspondence may be in English. Catalogs and price lists requested.

(33,674.) A mercantile firm in Mexico desires to purchase erasers, fountain pens, and rubber stamp material. Quote c. i. f. El Paso, Texas. Correspondence may be in English.

(33,676.) A firm of selling representatives in the British West Indies desires to obtain illustrated catalogs and prices of rubber boots and shoes.

(33,678.) A firm of merchants in one of the Baltic provinces desires to represent a manufacturer of rubber shoes. Correspondence may be in English.

(33,718) A merchant in Spain desires to secure an agency for the sale of rubber goods. Quote c. i. f. Spanish port. Correspondence should be in Spanish.

(33,733) A merchant in Austria desires to establish relations with manufacturers with a view to securing an agency for the sale of American tires.

33,737) An agency is desired by an inquirer in Italy for the sale of belting and rubber goods. Correspondence should be in Italian, though English may be used.

(33,739) A firm of manufacturers in Austria desires to secure an agency for the sale of automobile tires.

THE EDITOR'S BOOK TABLE

HOW TO MAKE AND USE A SMALL CHEMICAL LABORATORY. By Raymond Francis Yates. The Norman W. Henley Publishing Company, New York, 1920. (Paper, 102 pages, 5 by 7¾ inches.)

The author has successfully accomplished the task of preparing a book for those who wish to become acquainted with the great fundamentals of chemistry. The author has not followed the usual method of treatment but begins at once by explaining in non-technical language the nature and relations of molecules, atoms and electrons. Since chemistry is discussed to-day in terms of the Electron Theory, familiarity with its outstanding features is essential at the beginning of its study. The second part of the book is occupied by instructions to the amateur chemist on the construction of a home laboratory, while a third section is devoted to experiments illustrating the broad aspects of chemical science and to methods of constructing necessary apparatus.

"HAND-BOOK OF FIRE PROTECTION." BY EVERETT N. CROSBY, Henry A. Fiske and H. Walter Foster. Sixth Edition, 1920. D. Van Nostrand Co., New York City. (Cloth, 757 pages, 4½ by 6¾ inches.)

This volume is the standard compilation on the fundamental principles of fire protection. Its several distinct divisions cover: (1) general, giving an understanding of the magnitude of fire prevention and fire protection, its relation to accident prevention, the opportunities and responsibilities of the fire protection engineer, and the functions and interrelations of the National Fire Protection Association, the National Board of Fire Underwriters, and the Underwriters Laboratories; (2) causes of fire; (3) spread of fire; (4) construction for special occupancies; (5) extinguishment of fire; (6) miscellaneous, relating to egress, self-inspection and protection of records and valuables; (7) tables of data; (8) index. As a reference book it is invaluable to engineers, architects and plant managers.

NEW TRADE PUBLICATIONS

The Tire Surgeon, Volume I, Number 1, has made its appearance, dated September 10, 1920. It is a 12-page illustrated monthly especially for the tire repair man, part trade paper and part house organ, published by the Hayward Tire & Equipment Co., Indianapolis, Indiana.

"Trade with the Orient" is the title of one of a series of attractive 32-page pamphlets on foreign and domestic trade published by the Bank of Pittsburgh National Association, Pittsburgh, Pennsylvania, for free distribution. It presents in condensed and graphic form some of the more salient facts and data bearing upon the resources and trade of the leading transpacific countries, and serves to acquaint American manufacturers, exporters and importers with the possibilities of foreign trade in the near and far East.

JUDICIAL DECISIONS

THE GREAT REPUBLIC TIRE & RUBBER MANUFACTURING COMPANY ENJOINED.

Federal Trade Commissions vs. The Great Republic Tire & Manufacturing Co.

The respondent, a corporation organized and doing business under the laws of the State of Delaware, and having its office and place of business in Muskogee, Oklahoma, engaged in the sale of automobile tires and inner tubes branded and advertised as "Great Republic" tires and tubes, notwithstanding a full knowledge of the existence of the Republic Rubber Co., of Youngstown, Ohio, engaged in the manufacture and sale of tires and tubes under the brand name "Republic."

The respondent is forbidden to use the brand name "Great Republic," any phrase including the word "Republic" or suggestion of it. The company is also forbidden to use the corporate name, "The Great Republic Tire & Rubber Manufacturing Co.," except in connection with the words, "of Muskogee, Oklahoma," and unless there is substituted in place of the brand name "Great Republic" another brand name equally conspicuous but in no wise similar. (Federal Trade Commission, Docket No. 492, Washington, D. C., August 10, 1920.)

INTERESTING LETTERS FROM OUR READERS

ABOUT A NOVEL TOY BALL

To the Editor:

Dear Sir:—

In The India Rubber World, July 1, 1919, you kindly published an article showing my novelty ball. In consequence of the world-wide publicity, I had letters from the Dutch traders in Holland and many from the United States. I have made every effort to get them made, but the factories are all "too busy."

Will you be kind enough to tell me if there are any books for beginners in rubber work, or where could I get information on the subject of making rubber balls; also the apparatus and material for making in an experimental way, after which I shall organize a company for making on a larger scale. It is surely an improvement on what is recorded as the most salable toy ever placed on the market.

Thanking you greatly for any information you can give, I remain.

C. Otis Griffin.

Box 184, New Bern, North Carolina.

HOT VULCANIZATION OF RUBBER

F. Kirchoff in a recent article[1] claims that he discovered and announced before Harries the physical-chemical principle of vulcanization by heat, granting to Harries the credit of having established by experiment the difference between primary and after-vulcanization.

The chemical interpretation of vulcanization has undergone various modifications through the development of our knowledge of the constitution of rubber, due to Harries and to the investigations of Schmitz on the action of bromine or depolymerized rubber.

The United States Postal Bulletin for September 3, 1920, announces that among the articles that may be imported into Germany by parcel post without special authorization are balata, raw or cleaned or the refuse of balata; gutta percha, raw or cleaned, or the refuse of gutta percha; and rubber, raw or cleaned or the refuse of rubber.

[1]Kolloid Zeitschrift, 1920, 26, 168-173.

News of the American Rubber Industry

DIVIDENDS

The American Zinc, Lead & Smelting Co., Boston, Massachusetts, and St. Louis, Missouri, has declared its regular quarterly dividend of $1.50 per share, payable November 1 on preferred stock of record October 15, 1920.

Ames-Holden-McCready, Limited, Montreal, Quebec, has declared its quarterly dividend of 1¾ per cent, payable October 1 on preferred stock of record September 17, 1920.

The Boston Woven Hose & Rubber Co., Boston, Massachusetts, declared its quarterly dividend of $3 per share, payable September 15 on stock of record September 1, 1920.

The Corn Products Refining Co., New York City, has declared a quarterly dividend of $1 and an extra dividend of fifty cents per share, both payable October 20 on common stock, and a quarterly dividend of $1.75 per share payable October 15 on preferred stock, all on stock of record October 4, 1920.

The Driver-Harris Co., Harrison, New Jersey, has declared quarterly dividends of one and three-quarters and two per cent on preferred and common stock, respectively, both payable October 1 on stock of record September 20, 1920.

The E. I. du Pont de Nemours & Co. (incorporated), Wilmington, Delaware, has declared a dividend of 1½ per cent on its debenture stock, payable October 25 on stock of record October 9, 1920; also a quarterly dividend of $2 cash and $2.50 stock per share, payable September 15 on common stock of record August 31, 1920.

The Harbirshaw Electric Cable Company, Inc., Yonkers, N. Y., has declared its regular quarterly dividend of 37½ cents per share, payable October 1, on stock of record September 20, 1920.

The Kelly-Springfield Tire Co., New York City, has declared a quarterly dividend of $1.50 per share on its six per cent preferred stock, payable October 1 on stock of record September 20, 1920.

The Keystone Tire & Rubber Co., Inc., New York City, has declared a quarterly dividend of 5 per cent, payable October 1 on preferred stock of record September 15, 1920.

The McGraw Tire & Rubber Co., Cleveland and East Palestine, Ohio, has declared its regular quarterly dividend of one and three-quarters per cent.

The National Aniline & Chemical Co., New York City, has declared a dividend of 1¾ per cent on preferred stock of record September 13, payable October 1, 1920; also a stock dividend of four-tenths of one share of common stock, payable October 9 on common stock of record October 1, 1920.

The Salmon Falls Manufacturing Co., Boston, Massachusetts, declared a regular quarterly dividend of 2½ per cent, payable September 1 to stockholders of record August 25, 1920.

The United Shoe Machinery Corporation, Boston, Massachusetts, has declared dividends of one and one-half per cent on preferred stock and of 50 cents per share on common stock, both payable October 5 on stock of record September 20, 1920.

FINANCIAL NOTES

The president of the First National Bank of Philadelphia issues a statement which says, in part: "The country is making excellent progress in cashing in its high price inventories, and, slowly but surely, the nation is adopting a more reasonable price level. The situation must be handled with great care, however, as transition is no easy task because of the extraordinarily high level attained by general prices throughout the list of commodities."

Net earnings of The Mason Tire & Rubber Co. for the third quarter ended July 31, were $152,011.16. This makes total net earnings for the first nine months of the present fiscal year of $841,490.18, before deduction of taxes, but after deduction of depreciation. Net earnings for the first nine months of last year amounted to $195,000, so that current earnings are running at the rate of four times larger than the preceding year.

The following is a statement of earnings of the United States Rubber Co. for the six months ended June 30, 1920: Total sales, $129,588,986; net income before interest, but after provision for depreciation and for Federal, Canadian and British taxes, $15,596,831; interest, $1,905,907; net income, $13,690,924; dividends first preferred stock, $2,600,000; dividends to minority stockholders of sub-companies, $9,359; total dividends, $2,609,359; balance, $11,081,565; dividends common stock, including provision quarterly dividend payable July 31, 1920, $3,240,000; surplus, $7,841,565; previous surplus, $52,310,162; total surplus, $60,151,727; less 12½ per cent common stock dividend, $9,000,000; total surplus, $51,151,727; additions to surplus account, $338,308; final surplus, $51,490,034.

The consolidated general balance sheet as of June 30, last, shows:

Assets—Cash, $14,333,748; accounts receivable, $50,938,776; notes and loans receivable, $2,953,238; United States Liberty Bonds, etc., $44,876; notes receivable of employes given for purchase of capital stock, $7,758,564; manufactured goods and material, $127,846,245; securities owned and held in insurance fund, $2,331,778; securities owned, including stock of United States Rubber Co. held by subsidiary companies, $5,098,096; plants, properties and investments including rubber plantations, $161,243,873; prepaid and deferred assets, $3,371,649; total, $375,920,847.

Liabilities: Total capital stock, $146,277,400; accounts payable and accrued liabilities, $24,113,347; acceptances payable for importation of crude rubber, $1,644,485; notes and loans payable, $41,255,000; United States Rubber first and refunding mortgage bonds, etc., $67,026,800; general reserves, $16,021,666; insurance fund reserve, etc., $2,705,367; reserve for depreciation of property, $15,757,469; reserve for preferred dividend payable July 31, 1920, $1,300,000; reserve for dividend on common stock payable July 31, 1920, $1,620,000; fixed surpluses subsidiary companies, $6,709,275; surplus, $51,490,035; total, $375,920,847.

The Goodyear Tire & Rubber Co.'s sales for August exceeded $19,000,000, according to announcement by the company. This is $2,000,000 more than sales of July, which totaled $17,185,000, and brings the total sales for the first ten months of the fiscal year to more than $180,000,000 or $13,000,000 in excess of total business for the entire fiscal year of 1919.

RUBBER STOCK QUOTATIONS

The following quotations on the Cleveland Stock Exchange, September 20, of stock of the principal rubber companies were supplied by Otis & Co., Cuyahoga Building, Cleveland, Ohio.

	Last Sale	Bid	Asked
Firestone T. & R. Co.	117	...	...
Firestone T. & R. Co., 1st pfd.	93	...	...
Firestone T. & R. Co., 2d pfd.	85¾	85½	...
General T. & R. Co., pfd.	102	...	102½
The B. F. Goodrich Co.	52¼	...	...
The B. F. Goodrich Co., pfd.	87	87	...
The Goodyear T. & R. Co.	100¼	99	100
The Goodyear T. & R. Co., 1st pfd.	83	82½	83¼
Kelly-Springfield T. & R. Co.	156⅛	...	...
Kelly-Springfield T. & R. Co., pfd.	120	...	...
The Miller Rubber Co.	120	118	...
Portage Rubber Co.	59½	50	58
Portage Rubber Co., pfd.	60	...	70
Star Rubber Co.	350¾	...	...
Swinehart T. & R. Co.	80	...	...
Victor Rubber Co.	29	25	29

NEW YORK STOCK EXCHANGE QUOTATIONS

September 23, 1920

	High	Low
Ajax Rubber Co., Inc.	46	45½
The Fisk Rubber Co.	24⅜	23⅞
The B. F. Goodrich Co.	53	51¼
The B. F. Goodrich Co., pfd.	86⅝	86½
Kelly-Springfield Tire Co.	66	61½
Kelly-Springfield Tire Co., pfd.	82½	82½
Keystone T. & R. Co., Inc.	15⅞	15
Lee R. & T. Corp.	21⅛	21⅛
United States Rubber Co.	85½	82⅞
United States Rubber Co., pfd.	106½	106½

NEW INCORPORATIONS

Alastic Tire Cushion Co., February 11 (Missouri), $25,000. G. G. Giese, president and treasurer; R. E. Lee, vice-president; I. Mayer, secretary. Principal office, 1419-21 Locust street, St. Louis, Missouri. To manufacture and distribute punctureless tire cushions and auto specialties.

Allen Tire & Rubber Sales Co., August 30 (Delaware), $25,000. S. H. Baynard, Jr.; A. S. Bishop; R. H. Ochletree—all of Wilmington, Del.

Arrowstar Tire & Supply Co., Inc., September 11 (New York), $10,000. H. Aronson, 15 West 123rd street; S. Starkman, 22 Convent avenue; H. Bernett, 197 Lenox avenue—all of New York City. To deal in auto accessories.

Commonwealth Rubber Corp., The, September 4 (Massachusetts), $150,000. M S. Donahue, president, Ayer; C. M. Riddock, treasurer and clerk, Haverhill; G. A. Loud, director, 24 Milk street, Boston—all in Massachusetts. Principal office, Boston, Massachusetts. To buy, sell and deal in all kinds of rubber and rubber goods.

Condon Tire Co., Inc., September 10 (New York), $2,000. O. Pershitz; I. Rothstein; F. Lenitz—all of 834 Eighth avenue, New York City. To deal in tires and tubes.

Cumberland Tire and Rubber Co., August 18 (Kentucky), $3,000,000. F. W. O'Brien, Elyria, Ohio; A. L. Henry, Indianapolis, Indiana; S. J. Dant, Louisville, Kentucky. Principal office, Louisville, Kentucky. To buy, sell and manufacture all kinds of rubber goods.

E. L. M. Tire & Rubber Co., July 17 (Wisconsin), $200,000. Lawrence E. and Marion McKimm, both of 1725 Center street; O. E. Ahrens, 504 Main street—both in Racine, Wisconsin. Principal office, Racine, Wisconsin. To manufacture and sell tires and inner tubes, also rubber heels, cement, etc.

Eastern Tire Supply Co., August 20 (Massachusetts), $50,000. H. F. Whitcomb, North Brookfield; C. F. Peters, 4 Dix street; H. D. Whitcomb, 8 Harvard street both of Worcester—both in Massachusetts. Principal office, Worcester, Massachusetts. To manufacture, repair and deal in automobiles and accessories.

Fiberlock Leather Co., The, August 17 (Delaware), $1,100,000. L. L. Storrs, president; G. Hammond, vice-president; F. A. Johnson, secretary; W. O. Stowell, Jr., treasurer; F. R. Hendryx, assistant treasurer. To manufacture artificial leather.

Hannibal Rubber Co., April 24 (Missouri), $1,000,000. W. J. Richards, president; H. M. Still, vice-president; A. E. Gibson, secretary, general sales manager and advertising manager; S. O. Osterhout, treasurer. Principal office, 305-306 Hannibal Trust Company Building, Hannibal, Missouri. To manufacture tires, inner tubes and other rubber products.

Harrington Tire Corp., September 8 (Massachusetts), $100,000. M. H. Finerty, president, 19 Vine street, Roxbury; A. H. Harrington, treasurer, 17 Fayette street, Cambridge; H. B. Roberts, clerk, 176 River Road, Winthrop—all in Massachusetts. Principal office, Boston, Massachusetts. To manufacture and deal in automobile and truck tires.

Kokomo Rubber Co., Sept. 15 (Delaware), $6,500,000. A. L. Ream; J. Simons; H. C. Kebe—all of Omaha, Nebraska.

La Chappelle Co., August 13 (Massachusetts), $30,000. J. N. McDonald, 39 Richards street, Brighton; C. M. Supple, 409 Marlboro street; F. A. McDonald, 11½ Belvidere street, both of Boston—both in Massachusetts. Principal office, Boston, Massachusetts. To manufacture and sell hose supporters, etc.

McNaull Tire & Rubber Co., September 14 (Delaware), $3,000,000. T. L. Croteau; S. E. Dill; A. M. Hooven—all of Wilmington, Delaware.

National Tire & Rubber Co., August 11 (Massachusetts), $75,000. A. Palder, 144 Rothven street, Roxbury; H. M. Clifford, 51 Palmer street, Arlington; J. E. Crowley, 86 Dean Road, Brookline—all in Massachusetts. Principal office, Boston, Massachusetts. To manufacture and deal in automobile tires and accessories, etc.

New Standard Rubber Co., July 15 (California), $100,000. C. L. Larzelere, 404 Merchants Trust Building, Los Angeles, California. Principal office, 404 Merchants Trust Building, Los Angeles, California. To manufacture rubber goods.

Paul Tire & Rubber Co., May 28 (North Carolina), $1,000,000. H. Clement; W. E. McWhirter; E. C. Bramard—all of Salisbury, North Carolina. Principal office, Salisbury, North Carolina. To manufacture tires.

Rubber Supplies Company of Dayton, Inc., August 26 (New York), $10,000. P. M. Hooven, 117 West 46th street, New York City; J. A. MacMillan, Dayton; C. E. Hooven, Hamilton—both in Ohio. To deal in tires, etc.

Simplex Pneumatic Tire Co., September 8 (Massachusetts), $100,000. W. H. Emeno, president, 32 Tudor street, Chelsea; C. B. Sherwood, treasurer; E. Worthington, clerk, both of 43 Tremont street, Room 305, Boston—both in Massachusetts. Principal office, Boston, Massachusetts. To manufacture and deal in tires, automobile accessories, etc.

Sox Lox Co., September 7 (New York), $10,000. C. W. Egerton; J. W. Hauf; H. A. Gill, Jr.—all of 191 Halsey street, Brooklyn, New York. To make hose supporters.

Standard Tire & Tube Works, Inc., August 28 (New York), $25,000. S. A. Lifshutz, 2061 Berget street; M. Sherman, 277 Glen street; E. Lifshutz, 147 Saratoga avenue—all of Brooklyn, New York. Principal office, Brooklyn, New York.

Stuart Bell Corp., September 14 (New York), $40,000. D. Stein; I. Baurmash, both of 1076 Bryant avenue; A. Joseph, 92 William street both in New York City. To manufacture tires and automobile accessories.

U-Wanta-Tire & Rubber Co., July 27 (California), $250,000. B. Vale, 57 Post street, San Francisco. Principal office, San Francisco, California. To manufacture tires.

Vetter Rubber Company of Philadelphia, Charles L., September 8 (Delaware), $150,000. C. L. Vetter; H. B. Fox; W. B. Zern—all of Philadelphia, Pennsylvania.

West Coast Rubber Co., January 24 (California), $100,000. H. K. Asherm, 110 Sutter street, San Francisco, California. Principal office, San Francisco, California. To do a general rubber business.

TREASURER OF THE KLEISTONE RUBBER CO.

Joseph Everett Stone, treasurer and one of the principal moving spirits of the newly organized Kleistone Rubber Co., Warren, Rhode Island, is well fitted for his new undertaking by long experience in the footwear and rubber business.

Pierce, Boston

Joseph E. Stone

Born at Marblehead, Massachusetts, in 1876, he was educated in the public schools of that town and began his business career in a general store, where he remained two years. He then entered the shoe jobbing and findings business in Boston and became cashier. After five years he joined the Hood Rubber Co., Watertown, as cashier and assistant treasurer. Fourteen years with this progressive firm gave him an intimate knowledge of rubber footwear manufacture, which was further augmented by seven years as treasurer and a director of the Plymouth Rubber Co., Canton, Massachusetts, where proofed fabrics, artificial leather and rubber heels were the principal products.

Early this year Mr. Stone resigned to organize the Kleistone Rubber Co. in association with M. S. Klein, E. H. Bell and Robert J. Holmes. The modern, well-equipped factory of the Lynn Rubber Co. at Warren, Rhode Island, was taken over and the Spri-Foot rubber heel, the well-known Lynco arch support and sponge rubber heel cushion are being successfully manufactured. The Lynco foot appliances have been on the market for some time and their high standing in the trade will help materially in merchandising the new heel. Output has increased 600 per cent in four weeks and orders are coming in ahead of production.

Mr. Stone enjoys a wide acquaintance in the rubber and shoe trades and has made many friends through his membership in numerous clubs, associations and fraternal organizations, which include the Boston City Club, Boston Chamber of Commerce, Rubber Association of America, and several Masonic bodies and clubs in Boston, Marblehead, Lynn, Swampscott and Belmont

PERSONAL MENTION

Ralph Starr Butler has been appointed advertising manager of the United States Rubber Co., New York City, succeeding R. W. Ashcroft, who resigned some months ago. Mr. Butler has been connected with the United States Rubber Co., for three years, having been first identified with the development department to gather and collate data on market conditions. Previous to this, Mr. Butler was professor of advertising and marketing at New York University.

Harry F. Masman, formerly in charge of the Charleston Traffic Bureau maintained by the city of Charleston, South Carolina, and the Charleston Chamber of Commerce, has taken charge of the traffic work of the National Association of Waste Material Dealers, Inc., whose headquarters are at New York City.

H. Deuster has been appointed manager of the traffic department of the Motor & Accessory Manufacturers' Association. Mr. Deuster brings to his new work eighteen years of railroad experience, twelve with the Erie and six with the Ontario & Western. For four years he was chief clerk of the general

freight department of the last-mentioned railroad and since 1918, chief of the tariff bureau with headquarters in New York City.

John D. Carberry, assistant secretary and assistant treasurer of the United States Rubber Co., has returned from a month's vacation spent at his farm in Vermont and at various points in New England.

Dr. M. L. Axelrod, rubber technologist of the Synthetic Products Co., Cleveland, Ohio, called on the eastern rubber trade last month.

John Young, chief chemist of the Firestone Tire & Rubber Co., Akron, Ohio, was in London, England, last month on a business and pleasure trip.

THE RUBBER TRADE IN THE EAST AND SOUTH

By Our Regular Correspondent

NEW YORK NOTES

The annual Electrical Show will be held in Grand Central Palace, New York City, October 6-16. George F. Parker, who is manager, is confident this year's exposition will surpass any of previous years.

The Compression Tube & Tire Corporation, 318 West 39th street, is the New York City branch of the U. S. Compression Tube & Tire Co., of Tulsa, Oklahoma.

The Auto Pedal Pad Co., Inc., has removed its offices from 794 Seventh avenue, New York City, to 318-20 West 52d street. At a recent meeting, Daniel Sinclair was elected president; Charles Willsmore, vice-president; James Lovegrove, treasurer; and Jessie J. Sinclair, secretary.

The Mesta Machine Co., West Homestead, Pennsylvania, has opened an office in the Singer building, New York City, from which point all its foreign business will be handled. All foreign correspondence should be addressed to the company at the New York office, which will also be the sales office for the New York and Eastern States territory. M. M. Moore, the export sales manager, who has just returned from a several months' European trip, will be in charge.

Dunlop America Limited, Buffalo, New York, has changed its name to Dunlop Tire & Rubber Corporation of America.

The officers of the County Seat Tire Co., Inc., 174 Martine avenue, White Plains, New York, are Fletcher Brush, president and secretary, and Charles Rosenberg, treasurer. During the past ten years Mr. Brush has been tire salesman with the Michelin Tire Co. Ajax Rubber Co., Inc., and Pennsylvania Rubber Co. Mr. Rosenberg is proprietor of the Standard Guarantee Tire Co.'s store at Mt. Vernon, New York.

The Regent Tire & Rubber Co., Inc., 8 Stuyvesant street, New York City, is officered by Henry O. Kahan, president and treasurer; Joseph M. Saunders, secretary; Irving L. Jacobson, vice-president. The company deals in tires, tubes and accessories.

Only the approval of stockholders and completion of the organization work is now required to make effective the merger of the General Chemical, Solvay Process, Semet-Solvay, Barrett and National Aniline & Chemical Companies, five of the country's largest chemical concerns, under the name of the Allied Chemical & Dye Corporation. The outstanding capitalization of the new company is estimated at $175,000,000.

French & Handy, Inc., becomes established October 1 in the business of crude rubber brokers at 347 Madison avenue, New York City, with a branch office at 513 Second National Building, Akron, Ohio. The members of the company are Harold W. French and John L. Handy.

Gove & Co., Inc., will be established October 1 as a brokerage concern dealing in crude rubber, at 25 Beaver street, New York City, by Frederick G. Gove, William Liddell, Jr., and Frank L. Byrne.

The former partnership of Duffy & Sears, crude rubber brokers, 133 Front street, New York City, has been dissolved, S. H. Sears withdrawing from the partnership September 20, 1920. The business will be carried on by Louis A. Duffy under the name of L. A. Duffy, Inc., at the same address. Officers of the new company are Louis A. Duffy, president and treasurer; Ferdinand A. Bonstedt, Akron, Ohio, vice-president; Guy C. Parsons, Greenwich, Connecticut, secretary.

An attractive and useful desk ruler showing the calendar for 1920 and 1921 on one side and the name of the donor on the other is supplied to the trade by George W. Kavanaugh, Inc., 346 Broadway, New York City, dealer in cotton goods for rubber manufacturers.

PENNSYLVANIA NOTES

The B. F. Goodrich Rubber Co., Akron, Ohio, has promoted C. D. Robinson, former manager of tire accessory sales at the Philadelphia branch, to the position of manager of tire sales of the Philadelphia branch territory, covering part of New Jersey, Pennsylvania and Delaware. Mr. Robinson has been connected with the tire industry since 1912, when he became tire salesman with the Diamond Rubber Co. He was successively district representative for the Southern States, the New England territory, and in 1919 took over the position which he relinquished at his recent promotion.

Charles S. Smith, Inc., Philadelphia, Pa., has been appointed distributer for the Amazon Rubber Co., Akron, Ohio.

The F. J. Stokes Machine Co., Seventeenth and Cambria streets, Philadelphia, manufacturer of therapeutical and chemical machinery, was incorporated in July with a capital of $200,000. A new shop, 90 by 300 feet, independent of the original plant, has been erected at Cedar Grove near Philadelphia and soon will begin manufacturing heavy machinery.

The H. H. Robertson Co., Pittsburgh, Pennsylvania, has elected C. D. Mercer, vice-president in charge of sales, W. S. Tallman vice-president in charge of operations, and D. W. Jasper purchasing agent to succeed William E. Coe, who has resigned to enter the railroad supply business with the Buck-Hill Corporation, of New York City.

To facilitate the handling of its business, the Fawcus Machine Co., Pittsburgh, Pennsylvania, has consolidated all departments in its new office building at 2818 Smallman street, adjoining the Pittsburgh works. A downtown office for meetings by appointment will be maintained in suite 1501, Peoples Savings Bank building, where its allied company, the Schaffer Engineering & Equipment Co., is located.

The new officers of the New Castle Rubber Co., New Castle, Pennsylvania, are: W. E. Duersten, president and general manager; H. H. Crosby, secretary; H. W. Smith, treasurer; L. C. Sturgis, general superintendent; W. J. Russel, comptroller. The Lehigh Tire & Rubber Co., Inc., of the same place, operates as sales organization of the New Castle Rubber Co.

Willson Goggles, Inc., formerly named T. A. Willson & Co., Inc., Reading, Pennsylvania, has recently acquired the patents, good will, etc., of Walter Soderling Inc., which manufactured the "Dust'te" respirator. This will now be manufactured at the Willson company's plant at Reading under the personal charge of Mr. Soderling.

SOUTHERN NOTES

The Du Bois Rubber & Tube Co., Chattanooga, Tennessee, has increased its capital stock to $2,000,000. The directorate was increased to 15 members to allow stockholders outside the city more direct representation. Plans for the erection of a modern plant are being furthered rapidly.

THE RUBBER TRADE IN NEW JERSEY

By Our Regular Correspondent

TRENTON NOTES

While the tire industry in Trenton is suffering to some extent, as is the case in other sections of the country, manufacturers are hopeful that conditions will soon reach normal again. The Ajax Rubber Co., Inc., one of the largest tire manufacturing concerns in this section, has laid off nearly 500 hands during the summer.

The United & Globe Rubber Co. felt the slump in its tire branch, but placed the majority of its tire makers at work in the various mechanical departments. The hose, belting and packing departments are very busy at this time and the tire makers were needed to help out. John S. Broughton, president of the company, says conditions are getting brighter and that he believes business will reach normal late in the fall or in the early winter. The Zee Zee Rubber Co., Yardville, laid off about one-third of its working force a few weeks ago. Conditions have begun to improve and the company is gradually taking the tire makers back again. Officials of the company say they do not fear any further lay off from now on.

The Luzerne Rubber Co. will shortly begin work on the erection of the first unit of a new rubber plant adjoining the present works on Muirhead avenue, Trenton. The new unit will be one-story, 60 by 60 feet, of steel, brick, timber and concrete. Plans for the other units will be drawn later. The Luzerne company some time ago purchased a parcel of land adjoining the present plant measuring 200 by 208 feet. The growth of the business has prompted the owners to decide upon additions.

Trenton dealers announce a twenty per cent increase in the prices of all motorcycle and bicycle tires. Motorcycle tires took a jump a few weeks ago and the prices of bicycle tires were recently advanced. The demand for bicycle and motorcycle tires has been greatly increased during the latter part of summer.

The Trenton School of Industrial Art will establish a department of rubber technology. For many years through its course in chemistry and mechanics the school has served the rubber industry indirectly, but as the rubber industry in Trenton has grown to such large proportions it was decided that a course more closely allied with the industry should be offered. J. B. Wishart, a chemist employed by the United & Globe Rubber Manufacturing Co., has been appointed instructor of elementary chemistry. This action on the part of the school authorities has met with the hearty approval of the rubber manufacturers, who contend that rubber workers can gain a thorough knowledge of the business at little expense at the Trenton school and not have to attend institutions in other cities.

MISCELLANEOUS NEW JERSEY NOTES

The Michelin Tire Co., Milltown, New Jersey, has awarded a contract for the erection of a two-story reinforced concrete factory building, 60 by 125 feet.

The Watson-Stillman Co., 190 Fulton street, New York City, manufacturer of pumping machinery, brass and other metal castings, etc., has awarded a contract to H. Wilhelmes & Son, Elizabeth, New Jersey, for a one-story addition at Aldine, New Jersey, to be used as a pattern storage building. The structure will cost about $12,000.

The Howe Rubber Corporation, New Brunswick, New Jersey, which has been cutting down production somewhat for several weeks past, is resuming its normal output and more employes are being placed at work. It is said that the factory will be running on a maximum basis shortly.

The United States Rubber Co. is making a number of improvements to its plant on Little Burney street, New Brunswick, New Jersey. A new plant for refrigeration and circulation of drinking water is being installed. A new sixty-inch, electrically driven, three-roll lining calender is being set up in the mill. A big switchboard is being installed to control the electric power and lighting system, and there will also be a large steam turbine driven generator to produce current for light and power at 550 volts. The power-house equipment will also include a series of transformers. When the work is finished the production capacity of the plant will be about doubled.

The J. Claude English Rubber Co., Asbury Park, New Jersey, suffered a serious loss by fire recently, estimated at more than $15,000 in automobile tires, tubes, etc., which was partially covered by insurance. The upper floor was divided into three store rooms and two other rooms were used as offices. Valuable records and papers were lost. The origin of the blaze is unknown.

The Tru-Matis Tube & Tire Co. has leased the building at 484 Central avenue, Newark, New Jersey, for a term of several years and will use it for showrooms and storage purposes.

THE RUBBER TRADE IN MASSACHUSETTS

By Our Regular Correspondent

In the presence of 1,000 or more persons, a new movement in education was both launched and dedicated with impressive and picturesque ceremonies at Plymouth Rock, September 17, by the State Department of Education and the Associated Industries of Massachusetts.

Following these ceremonies there occurred in the Hotel Pilgrim the first serious conference on the problem of educating non-English-speaking adult immigrants who are employed in the industries of Massachusetts. About 350 representatives of educational institutions and various industries were present to hear addresses by prominent educators in schools and factories. Among those who read papers at the morning session were Mortimer H. Millen, educational director of the General Electric Co. at West Lynn, and A. G. Warren, director of education of the American Steel and Wire Corporation at Worcester. These papers and the discussion which followed showed that the industrial representatives were fully as enthusiastic regarding the movement as the educators and indicated with what encouraging results many big industrial establishments have already begun this educational work. All of the speakers maintained that the education of the adult immigrant was not a one-sided affair by any means, and that much was to be learned from the immigrant.

The industrial representatives had a separate conference in the afternoon at which Cyrus S. Cling, in charge of industrial relations for the United States Rubber Co., presided. The speakers included T. J. Dwyer, superintendent of labor for The Fisk Rubber Co., Chicopee Falls, and Harold L. Robinson, manager of the service department of the Crompton & Knowles Loom Works, Worcester.

John J. Mahoney, State Supervisor of Americanization, submitted a list of propositions from the educators to the industrial leaders for discussion. The educators were also asked to consider eight propositions which embodied what industry expects from the public schools. There was much discussion as to the time to be devoted to the educational work and the cost. Most of the industries seemed willing to allow the workers the necessary time without loss of pay if it was deemed best to conduct the schools in the plants during working hours.

Despite adverse manufacturing conditions common to all New England the close of the factory output of the Boston Woven Hose & Rubber Co., Cambridge, for the fiscal year 1919-20, recently ended, reached a greater volume than ever before. The total poundage reached something over 37,000,000 pounds, as compared with 22,000,000 pounds for the previous year. The best previous mark was 30,000,000 pounds in the year 1917-18.

To encourage employes in production departments not holding executive positions to suggest changes in working methods, equipment, or working conditions that will result in time saving, labor saving, or in improving quality, the Converse Rubber Shoe Co., Malden, is offering cash awards ranging from $5 to $200 for acceptable ideas. Decisions and awards are promptly made by the operating board and rejections are accompanied by the reason why the suggestion cannot be adopted. It is a plan that makes for greater efficiency, more interest and a better spirit of co-operation.

The Mechanical Rubber Manufacturing Co., Andover, is now in production on a small scale and will specialize in the manufacture of small rubber covered rolls for the textile trade. The company was organized in June with the following operating personnel: E. Reed, president, formerly of the United States Rubber Co., New York City; and M. F. Foxon, assistant treasurer and general manager, formerly of the United States Rubber Co., Boston.

The executives and foremen of the Tyer Rubber Co., Andover Massachusetts, held a very successful outing at Marblehead Saturday, August 28, making the trip by automobiles immediately after the factory closing hours. Upon arrival luncheon was served, followed by athletic contests, for which prizes were awarded, and an interesting game of baseball between teams representing the foremen and the office executives was won by the latter team. The outing closed with an old-fashioned clambake.

The Alfred Hale Rubber Co., Atlantic, Massachusetts, has increased its capital stock to 100,000 shares of no par value. Irving M. McQuiston was recently elected vice-president and appointed general manager, effective September 1.

J. W. Hood has succeeded M. S. Connelly as advertising manager of the Hood Rubber Co., Watertown. Mr. Hood is not new to the company, having previously been associated with Mr. Connelly in charge of the firm's tire advertising.

As in other parts of the country tire production is being curtailed in Massachusetts and several hundred tire builders have been temporarily laid off or transferred to other departments. Footwear output is normal, and the demand for mechanicals is reported good.

BOSTON NOTES

Frank A. Vanderlip, one of the directors of the United States Rubber Co., former president of the National City Bank of New York, and one of the nation's leading financial authorities, has consented to conduct a question-box and round-table discussion of financial matters at the Banking and Credit Section conference in connection with the fifth annual meeting of the Associated Industries of Massachusetts at the Copley-Plaza Hotel, Boston, October 29. There will be no set speeches. Mr. Vanderlip will sit down with the members, answer their questions and discuss with them informally the various problems of banking, finance and credit with which they are faced as managers of industrial enterprises.

W. O. Rutherford, vice-president in charge of sales, was a recent visitor at the Boston branch of The B. F. Goodrich Rubber Co. and gave the staff a helpful business talk in which he painted an optimistic picture of the future of the automobile industry.

The Boston office of Charles T. Wilson Co., Inc., crude rubber broker, 516 Winthrop Building, has been closed and the New England business of the firm will be conducted from the main office, 56 Wall street, New York City.

The Davidson Rubber Co., Boston, in order to concentrate and standardize its work, has eliminated certain numbers among its former products and, contrary to report, has to dispose of complete equipment for the manufacture of the discontinued items, especially a dipped goods plant for the manufacture of rubber gloves, including all the necessary outfittings.

The Uehling Instrument Co., New York City, is now being represented in New England by the Smith Engineering & Supply Co., 89 State street, Boston, specializing in power plant equipment. S. W. Smith is president of the concern.

JOHN R. GAMMETER, MECHANICAL ENGINEER

Everybody who studies rubber machinery through the medium of patent specifications is familiar with the name of John R. Gammeter, engineer in charge of mechanical inventions for The B. F. Goodrich Rubber Co., Akron, Ohio. An exceptionally ingenious and prolific designer of labor-saving devices for most branches of the rubber industry, his remarkable career in his chosen field has been that of a self-made man possessed of alertness, initiative, ample capacity for hard work and the determination to succeed.

John R. Gammeter

Mr. Gammeter is a native of Akron, where he was born May 19, 1876. Following a common school education, he first engaged in the plumbing and heating business. When about twenty years old, however, he returned to Akron and obtained employment with the Goodrich company, with which he has since been identified except for some nine months spent with the Pennsylvania Rubber Co. about 1900.

Dropping off a freight train with only fifty cents in his pocket, the best job he could obtain was pushing a truck at ten cents an hour. But right away he began to search for opportunity. Noticing a number of girls trimming the overflow from rubber stoppers at about $1.50 a day, he set to work making a small machine trimmer. While experimenting with this he carried untrimmed stoppers home in his dinner basket. When alighting from an express wagon one day he slipped and spilled them on the street. The expressman reported the supposed theft to Mr. Gammeter's foreman, who at once began to make inquiries. Mr. Gammeter's reply was an invitation to look at his machine, which was brought to the plant and put in successful operation.

Since then Mr. Gammeter has devoted himself to the improvement of mechanical methods and devices in rubber manufacture. He has invented dozens of important machines, and now has associated with him a large corps of engineers who constitute what is known as the Goodrich experimental department. While in recent years tire machines have had much attention, Mr. Gammeter early became interested in aviation, and during the war invented a balloon valve which was adopted by the United States Army and Navy. He is an enthusiast regarding the future of aviation and was recently named by the Governor of Ohio to serve as a member of the State Aviation Commission.

An ardent sportsman, Mr. Gammeter has a game preserve of two thousand acres near Akron. He is also very much interested in amusement parks and is the owner of the largest tile-lined outdoor swimming pool in the world. He is a keen business man, a good reader of character, and has exceptional control of labor.

His membership in clubs and societies includes the Engineering Society of Akron, American Society of Automotive Engineers, Akron Flying Club, Masonic Club, Fairlawn Heights Golf Club, Portage Fish and Game Association, and the Associated Aviation Clubs of Ohio, of which he is president.

THE RUBBER TRADE IN OHIO

By Our Regular Correspondent

AKRON NOTES

Akron rubber industries have gone back to the solid business of producing merchantable goods without any frills or interesting accompaniments. The industrial slowing up throughout the United States, which in time made itself felt in Akron to some extent, has made industrial heads look closely over the books and compare overhead charges during the past few years in the rubber industry as compared with similar charges in other industries.

The result has been that when it was found necessary to curtail to meet the demands of bankers, a large part of the men and women on the payrolls of the factories were doing non-essentials as far as actually producing merchandise to be placed in freight cars was concerned. Business had been so good that men were added to the payrolls whenever they could be found, and in time, systems became bulky and heady, and several men were doing work which could have been done by one man.

During the rush, when it was impossible to get half of the work done which was needed to fill the demands of a strong market, there was no time to talk of getting rid of overhead. The demands of business made it necessary to get out goods at any cost. Then came the demands from the bankers that an era of conservation be inaugurated, and as the factory heads went over the books, it was found that thousands of men and women in the factories and offices were non-producing. The factory heads decided that they must either produce or leave.

Many of the men who intended to leave Akron during the periods when the factories were culling were offered positions in the mills. Some of the wiser ones, knowing that in time industry would return to its former level, took advantage of the offers and are to-day working in overalls, awaiting the day when they will again return to their former places. Others decided that the work of producing goods was not to their liking, and they left the city with the stories that have become current in almost all parts of the United States, that the slump was killing Akron.

The culling process has added materially to the efficiency of the factories in Akron. Many factory managers in the city have told the correspondent of The India Rubber World that efficiency has increased from 15 to 20 per cent in the production departments and the percentage is even higher in non-production departments. The men now at work in the Akron factories realize that they must produce a fair day's work for a fair day's pay, and the result has been a general speeding up all along the line.

The stories that wages have been cut in the factories can be branded as untrue. The fact is, men who were working in the high wage tire departments have been transferred to other departments and there they have been started at the beginner's wage. In a short time they will reach the highest prices paid in these departments, which of course are not as high as in the tire departments, where the work is heavier.

Strange to say, factory heads reported recently that the sundries, heel, sole and belting business took a remarkable spurt forward at the time the tire industry slackened, and as a result many of the workers were transferred. This is believed by factory heads to have resulted in the stories that wages have been materially cut in the city.

Manufacturers assert that business for the year will show a large increase over business last year when the fiscal year reports are published in November.

Goodyear sales for August amounted to $18,962,009, and for the first eight months of the year totaled $181,115,964, which is more than $12,000,000 in excess of the business done during the same period last year. The sales for the month of August were more than $1,000,000 than in August of last year, when they were $17,925,193. Predictions are made by Goodyear officials that the total business for the year will amount to more than $200,000,000.

The business of Akron's rubber factories is well reflected by other industries in the city. Men in Akron know conditions and would not invest money in building unless they believed the condition of the basic industry of the city to be sound. Building reports at the city hall show that permits have been issued this year to the amount of approximately $17,000,000, as compared with approximately $14,000,000 last year. In these totals are commercial and factory buildings amounting to $3,123,620 for the first eight months as compared with $1,443,435 during the same period last year.

Steam shovels are excavating for two hotels to cost close to $10,000,000. One new hotel has been opened in the city with 175 rooms. The building undertaken last year is going forward. The city state employment bureau finds difficulty in obtaining men for construction work for the city and the county. More than $3,000,000 worth of high-class apartment houses have been financed and are under construction in the residential district and several terraces are being completed for small-salaried people.

These things merely indicate what business men in Akron think of Akron's industries, and it is well known that men with money do not invest good dollars to create sentiment.

The new ten-acre athletic field which The B. F. Goodrich Company is constructing as a playground for its employes ranks with the finest in the country. It is equipped for all leading sports, including trap shooting, canoeing, two baseball diamonds, cricket and soccer fields, 10 tennis courts, hand ball courts, modern running tracks and other features. A concrete stadium is projected, to seat 3,300, with bleacher accommodations for 3,000 more, overlooking the new baseball diamond, which is graded down to professional lines that rival the big-league greens.

The running track encircles the field and has a 25-foot width on the straight-away with 15-foot curves and measures three laps to the mile. Scientific construction enables the track to drain fit for use almost instantaneously after a pouring rain.

Plans include a canoe clubhouse to be built along the adjoining canal. The field will probably be completed in the fall of 1921.

The fifth annual Labor Day outing of The B. F. Goodrich Co. at Goodrich Field, Akron, was attended by fully 15,000 enthusiastic picnickers, the largest attendance so far recorded. Concerts morning and afternoon by the Goodrich band, directed by Clark Miller, were an enjoyable feature of the picnic and much fun was aroused by the efforts of three amateur clowns to mimic the entrants in the various events. Prizes of money and merchandise certificates were awarded the winners in the contests, which included foot races of all kinds, shot put, broad and high jumps, horseshoe tournament, boxing contest, tug-of-war, greased pig chase, and girls' baseball game. Chick Mears captured prizes in seven events and also drew the lucky entry number, winning a $50 merchandise certificate.

Statisticians of The B. F. Goodrich Rubber Co. have estimated that Goodrich tires today cost 25 per cent less and give approximately 100 per cent greater average mileage than they did ten years ago. This good news to tire users is based on comparative price lists and an adjustment basis of 8,000 miles for Goodrich cord and 6,000 miles for their fabric tires. In 1910 a 30 by 3-inch fabric cased tire cost $25.45. Today that size can be bought for $19.10. The 32 by 4-inch tire of 1910 cost $48.65 as against $36.80 in 1920. The 35 by 5-inch tire that sells today at $65.33 cost the user $82.75 in 1910.

More than 50 events with about 1,000 entries made up the Labor Day outing program of The Goodyear Tire & Rubber Co. at Seiberling Field, Akron. A picnic dinner and supper were the main features of the day, with band concerts and community singing in the evening, followed by a dance in Goodyear gymnasium.

The Akron Seamless Rubber Tube Co., 126 West South street, Akron, was incorporated November 7, 1917, under the laws of Ohio, with a capital of $250,000, to manufacture rubber inner tubes for tires. Its present officers are: G. C. March, president; T. E. Barry, secretary; R. B. McReady, treasurer. The board of directors includes also J. W. Hassenflue, Carl Myers and John Hausch.

Recreation at the Miller Rubber Co., Akron, will not slow up during the winter months as plans are being made for a record-breaking bowling season. In addition to having a team in the Akron Industrial Bowling League and the company's Inter-Department League of eight teams, a plan is on foot to organize a second "Class A" league throughout the factory, so that anyone who likes bowling may have a chance to enjoy the game.

John R. Gammeter, head of the experimental department of The B. F. Goodrich Co., who spent the summer in Europe, has returned to Akron. After going through Germany and the other Central Powers he expressed the opinion that it will take many years for these countries to recover from the effects of the world war.

The average American working man is far better off than a millionaire in Germany and the members of the so-called middle classes in France and England, he said in telling of the food shortage which confronts the European nations this winter. In Germany the rationing system is in full force.

There is a better feeling in Germany towards the United States than any of the other Allied nations. This he attributed to the work being done by the Red Cross and other relief agencies. There will be no coal in German homes this winter. All of the fuel is being shipped to France and England, while German business men are in this country buying coal to run their industries at $35 a ton.

Of all the countries he visited, Spain is the best situated economically. There is an abundance of foodstuffs in that country and little industrial trouble. Switzerland is in bad shape, due to its inability to obtain imports. Holland is much better off, while Italy, due to the falling down of her financial structure, is in an even worse situation.

Industrial disputes in France and England are retarding re-adjustment in those countries. The crops in England are practically all failures, due to excessive rainfall. France will have a bountiful harvest, nearly all of the devastated war regions being replanted.

Frank Busbey, formerly in the publicity department of The Goodyear Tire & Rubber Co., has resigned his position to take charge of the "Cleveland Plain Dealer" bureau in Akron.

H. S. Firestone, president of the Firestone Tire & Rubber Co., Akron, who spent the larger part of the spring and summer in Europe, has returned to his office. He insisted upon coming home when the depression in business felt throughout the country affected Akron, although a number of bankers in New York assured him his presence at the factory was not imperatively required.

The aeronautical department of The Goodyear Tire & Rubber Co., Akron, recently launched "The Navy," a balloon built for the United States Government. It is one of the largest lighter-than-air craft of its kind built by the company here since entering the air field.

Reports from Detroit received in Akron, showing that the automobile manufacturers in that city will produce more automobiles the coming year than have been produced in any year for the past three years, is looked upon by Akron business men as an indication that a revival of the automobile and tire industries is at hand.

Ground has been broken for the new $1,000,000 Wellman-Seaver-Morgan Tractor Co. plant west of Akron near Copley. The company is a subsidiary of the Wellman-Seaver-Morgan Co., manufacturers of boilers and heavy machinery. It will manufacture the "Akron Tractor," according to present plans. Approximately 10,000 men will be employed when the plant is placed in operation.

That thousands of men are not leaving Akron weekly and filing forwarding address, the Akron post office records show. Only 3,784 forwarding addresses to other cities have been filed with the Akron post office since July 1. This number is no higher than during preceding months, and does not exceed the average of about 50 a day.

The Akron Chamber of Commerce has been successful in having the Interstate Commerce Commission modify its rule compelling shipment of all coal available for northern Ohio to the Great Lakes and then to the Northwest, and will receive 40 cars of coal a day for emergency purposes until lake navigation closes. Akron homes were faced by a coal shortage worse than any winter since before the war.

Registration for entrance to the University of Akron took place September 18. Courses for teachers, working people and citizens in general are offered.

The Americanization School of The B. F. Goodrich Co., Akron, opened September 13. All non-English-speaking employes of the company are encouraged to take advantage of its classes.

The structural engineering and architectural work on the new tire plant of the Phoenix Rubber Co., at East Akron, Ohio, has recently been completed under the direction of R. G. Brown, structural engineer of The Associated Engineers Co., Cleveland, Ohio.

MISCELLANEOUS OHIO NOTES

The new plant of the Denman-Myers Cord Tire Co., Warren, Ohio, is now complete and fully equipped. In construction, arrangement and machinery it is one of the most modern tire factories in the country. It will be devoted exclusively to the manufacture of Denman cord tires, and increased production was started September 15. Walter R. Denman is secretary and general manager and Walter E. Myers is president of the company.

Dwight P. Robinson & Co., Inc., New York City, with which Westinghouse, Church, Kerr & Co., Inc., was recently consolidated, has established a branch office in the Home Savings & Loan Building, Youngstown, Ohio, in charge of C. I. Crippen. The company recently moved its Cleveland office from the Leader-News Building to the Citizens Building, in charge of H. P. Clawson who was transferred from Chicago for the purpose.

The Canton Rim Company, Canton, Ohio, which was incorporated for $100,000 on April 27, 1917, increased its capital to $500,000 in March of the present year. The officers are F. G. Graber, president; J. J. Litsinger, vice-president; Grover C. Allison, treasurer; Charles Doerschuk, general manager. The company has just completed an addition, 88 by 120 feet, to its factory at Louisville.

The annual sales convention of the Mason Tire & Rubber Co., Kent, Ohio, was held at the company's home office September 9th and 10th. Several hundred branch managers and salesmen were entertained at a banquet in the new Franklin Hotel. The conference took place in the new addition to the administration offices into which the company is about to move. The new type of cord tire, the "Mason Junior," was introduced to the salesmen, who followed its construction in the factory from raw materials to finished product. This included inspection of the textile division, which now produces from the raw cotton all the cord used in Mason cord tires.

The Mason Tire & Rubber Co., Kent, Ohio, has a large tract of land in the southern part of the city which will be developed by the Mason Housing Co. within the next few years with the building of homes for company employes. The Mason Housing Co. is under the direction of Mason Tire & Rubber Co. officials,

and all the homes built are owned and occupied by Mason employes. The houses are of the most modern type with every convenience. Besides detached houses the Mason Housing Co. has recently overseen the construction of a large 23 apartment terrace located near the textile plant, which will be completed early in the fall.

C. W. McCone has been appointed consulting engineer for the Columbia Tire & Rubber Company's plant at Mansfield, Ohio. Mr. McCone was formerly with The B. F. Goodrich Co., Akron.

The Greenwich Rubber Co., Greenwich, Ohio, maintains a sales office at 27 High street, Akron. This company was incorporated October 29, 1919, under the laws of Ohio, with $250,000 capital, to manufacture Greenwich green tubes, men's and women's belts, and imitation leather. The officers of the company are: C. E. Foutts, president; W. I. Foutts, vice-president; H. H. Taylor, secretary and treasurer. F. M. Newall is general sales manager, and G. E. Whalon, superintendent. W. W Firestone is one of the directors.

The Hercules Rubber Corporation, Cincinnati, Ohio, manufacturer of the "Hercules Airless Punctureless" inner tube mentioned elsewhere in this issue, was incorporated May 27, 1919, with a capital of $1,000,000, to manufacture, compound, sell and purchase rubber products, make tires and tubes, etc. Its present officers are: Edward H. L. Haefner, president; Theodore Heck, first vice-president; Gordon L. Heck, second vice-president; Charles H. Adams, secretary; Elmer W. Vossler, treasurer.

CLEVELAND NOTES

The McElrath Tire & Rubber Co., Cleveland, Ohio, has made application to increase its capital stock from $515,000 to $3,500,000.

The Synthetic Products Co., Cleveland, Ohio, dealer in raw materials for the rubber trade, is prepared to supply standard mineral rubbers in pulverized form to its customers and to give unprejudiced technical advice as to the best hydro carbon to use for a particular purpose.

The Associated Engineers Co., Cleveland, Ohio, announces the opening of a new consulting department intended to serve tire and rubber manufacturers having limited engineering organizations, or those who feel the need of supplementing the work of their own staff with that of specialists of wide acquaintance with current practice.

Oliver Grosvenor

The new department will be under the direction of Oliver Grosvenor who brings to the company the results of many years' experience as a rubber technologist and engineer. He is a graduate in chemical engineering of the University of Michigan and has served in the capacity of technologist and engineer with the United States Rubber Co., general laboratories, New York City; Morgan & Wright, Detroit, Michigan; Mechanical Rubber Co., Cleveland, Ohio, and the Miller Rubber Co., Akron, Ohio. Mr. Grosvenor is the inventor of a method of curing cord tires and of several devices for use in tire manufacture.

Widely circulated reports that the Federal Reserve Board had classed automobiles with "non-essentials" and ordered member banks to restrict the financing of automobile accounts were emphatically denied by Governor William P. G. Harding at the meeting in Cleveland of credit and advertising sections of the Motor and Accessory Manufacturers Association.

"Nothing has been done by the Federal Reserve Board," said Governor Harding, "that reflects in any manner upon one of the greatest industries in the country. It would be a serious thing for any body of men to attack or attempt to destroy a business as firmly rooted and having as many elements of essentiality as the automotive industry. So far as the Federal Reserve Board is concerned, no such attempts have been or will be made."

BUCKEYE RUBBER PRODUCTS ABSORBS POLACK TYRE

The Buckeye Rubber Products Co., Willoughby, Ohio, incorporated last November, has purchased the entire business of the Polack Tyre & Rubber Co., New York and Bridgeport, Connecticut.

Plant of the Buckeye Rubber Products Company

The Polack Tyre & Rubber Co. manufactured exclusively Polack solid truck tires which have been favorably known to truck users since 1899. The manufacture of Polack tires will be continued at the factory in Bridgeport until arrangements are completed to move the equipment to the Buckeye plant at Willoughby, Ohio, where good progress is being made in the installation of equipment for the manufacture of heavy mechanical rubber goods and molded specialties in addition to solid tires.

Charles H. Roth, formerly of the Federal Tire & Rubber Co. and sales manager for The Mason Tire & Rubber Co., is president and general manager. The officers and directors of the company were formerly with The United States Rubber Co., The Racine Rubber Co. and other well-known companies in the rubber industry.

Edwin L. Stimson is general superintendent of the Buckeye plant, coming to the company from the United States Rubber Co., where he spent over 20 years—11 of them as general superintendent.

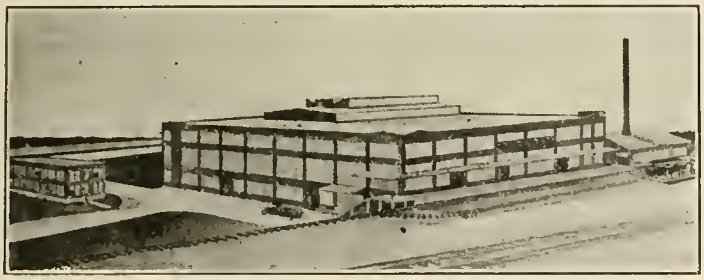
COLUMBIA TIRE & RUBBER CO.'S NEW PLANT

The Columbia Tire & Rubber Co., Columbiana, Ohio, has grown beyond the capacity of its building in that city, and recently recapitalized and increased its capital stock to build a plant at Mansfield, Ohio, for the construction of cord tires exclusively.

The Mansfield plant is constructed according to the newest and most approved design for factories of its type. It is built "U" shaped with open court in the center covered by a dormer roof, this lofty space being used as a mill and calender room. A 15-ton traveling crane here installed handles all heavy material from this department to any one of the three adjacent floors without resorting to the use of the elevator, which will be used only in emergency. The plant is so designed that raw material entering the storeroom on the first floor will pass through the manufacturing process without confusion or crossed operation. Throughout the plant especial attention has been given to healthful working conditions. This is especially noticeable in the curing department, which in many factories is unbearably hot for the workers. This unpleasant feature has been overcome in the Mansfield plant. The power plant is equipped with the latest steam and electric devices to secure economy, and is so arranged

that the engineer in charge has a view of the entire mechanism from any point in the plant.

The new building is located on the main line of the Baltimore & Ohio railroad and has access by industrial switching arrangement to the main lines of the Erie and Pennsylvania railroads, thus giving three main arteries for the shipment of its product. The Columbia Tire & Rubber Co. expects to move its general offices from Columbiana to Mansfield as soon as the new plant starts operations, which will be about November 1. The plant at Columbiana has been in existence for five years and will now be known as Plant No. 2, while the Mansfield plant will be Plant No. 1. The Columbiana plant has been building 700 tires and 1,000 tubes daily. The new plant will add 500 to 1,000 cord tires and 3,000 tubes to the company's daily production.



The Columbia Tire & Rubber Co.'s Plant No. 1, Mansfield, Ohio

THE RUBBER TRADE IN THE MID-WEST

SEPTEMBER MEETING OF MID-WEST RUBBER MANUFACTURERS' ASSOCIATION

The September meeting of the Mid-West Rubber Manufacturers' Association, held at the Chicago Athletic Association September 14, was attended by 42 members. From the standpoint of discussion it was one of the most interesting meetings held by this association.

The feeling expressed by most of the tire manufacturers was that the worst had already been experienced in the depression in the tire business, that conditions had already improved somewhat and that they would gradually improve until the first of the coming year when normal business was again looked for. President Christie called for expressions of opinion from tire manufacturers representing all parts of the country, and all of them in general agreed with this view. The opinion was also expressed that real salesmanship was again to play a part in the tire business and that hard work would be the solution of selling problems. The opinion was also expressed that tire prices were soon due for a radical revision downward, although there was considerable difference of opinion on this point, as some manufacturers felt that the manufacturing trade at large would not reduce prices on account of their raw material having been purchased at such high price levels.

Group of Rubber Men at the Mid-West Outing, held at Cedar Point During August

New associate members were elected as follows: The Electric Motor & Repair Co., Akron, Ohio, and The India Rubber World, New York City.

MID-WESTERN NOTES

The annual convention of the National Association of Purchasing Agents will be held at Chicago, October 11-13. A conference of the Standardization Committee of the Association, of which C. H. Money of the Federal Rubber Co., Cudahy, Wisconsin, is a regional chairman, will meet the day preceding the opening of the convention to pass finally upon the recommendation to be made to the association regarding a standardized invoice form.

The Goodyear Tire & Rubber Co., 258 Milwaukee street, Milwaukee, Wisconsin, is authorized to do business in that state as a branch of The Goodyear Tire & Rubber Co., Akron, Ohio, capitalized at $200,000,000. J. C. Sears is manager of the Milwaukee branch.

Briggs & Stratton Co., Milwaukee, Wisconsin, manufacturers of the Briggs & Stratton motor-wheel for attachment to bicycles, etc., has issued $300,000 additional 8 per cent preferred cumulative participating stock par value $100 per share, free from normal Federal tax and entirely free from the state income tax.

Elton S. Boerstler, consulting rubber engineer, Denver, Colorado, was born at Loyal Oak, Ohio, March 27, 1889. Upon graduating from the Barberton High School in 1908, he entered the Ohio State University, from which in 1912 he received a degree of bachelor of science in chemical engineering.

Elton S. Boerstler

Immediately he joined the technical staff of The B. F. Goodrich Co., Akron, Ohio, and was presently in charge of the chemical and physical testing laboratories under the supervision of Dr. William C. Geer. From 1914 to 1917 he was associated with Edwin C. Shaw, works manager, in solving efficiency problems, then followed a year in the cord tire manufacturing and experimental departments.

In May, 1918, he resigned to become technical engineer in charge of compounding and development work of the boot and shoe plant of the Firestone Tire & Rubber Co., Akron, Ohio. The following year, while sojourning in Colorado, he saw an opportunity there for the services of a consulting rubber engineer and opened an office in Denver, where he is now associated with rubber experts from Akron.

He is a member of the American Chemical Society, Alpha Chi Sigma Fraternity, and was a member of the University Club while in Akron.

The Ocotillo Products Co. has its main office at 1016 Merchants' Bank Building, Indianapolis, Indiana, and, besides D. M. Bechtel, president, is officered by William M. Jones, vice-president; Charles J. Murphy, secretary-treasurer; and James R. Fleming, counsel.

The American Auto Top Co., Inc., Delphi, Indiana, has been incorporated, with a capital of $200,000, to manufacture glass-enclosed, demountable winter tops for automobiles. The officers are: F. C. Martin, president and manager; J. C. Smock, vice-president; H. B. Wilson, treasurer; W. O. Hefleng, secretary. The factory, which is equipped with modern machinery, has a capacity of about 5,000 tops a year.

Curtis Gray of Muskegon, Michigan, originally appointed receiver for the Palmer Tire & Rubber Co. of St. Joseph, was

appointed trustee of the bankrupt concern at the first meeting of the creditors of the company.

The Ford Motor Co., Detroit, Michigan, are now making all the hard rubber parts used on Ford cars from a compound known as Fordite.

Harry Kessinger Co., Joplin, Missouri, importing and manufacturing chemist and manufacturer of toy balloons, has removed from Sixth and Kentucky avenue to Main street at 12th.

The Marion Insulated Wire & Rubber Co., Marion, Indiana, is erecting a three-story-and-basement plant addition, 35 by 60 feet, to accommodate additional equipment recently purchased. The officers of the company are: Robert J. Spencer, Sr., president; C. A. Michaels, vice-president; Robert J. Spencer, Jr., treasurer, and L. A. Lillard, secretary. J. F. Auten is general manager. This company manufactures rubber-covered wires and cables and maintains a Chicago office and warehouse at 541 West Washington Boulevard, Chicago, Illinois.

THE RUBBER TRADE ON THE PACIFIC COAST

By Our Regular Correspondent

Decidedly improved conditions in the rubber trade, particularly in the automobile tire line, are reported by general sales agents who have recently toured the section betwen the Rocky Mountains and the Pacific Coast. After three successive years of poor crop conditions, farmers have been successful this year, and their good fortune will be shared by automobile tire dealers and manufacturers. A slight business depression in Portland, Seattle, and Spokane districts, due largely to gasoline shortage, has now been quite cleared up; and tire dealers anticipate a great rush of tourists to the Coast this fall, which will mean a large demand for tires. All the Pacific tire branches are very optimistic over the trade outlook.

LOS ANGELES NOTES

The pony blimp of the Goodyear Tire & Rubber Company of California made two notable trips recently. It delivered to Douglas Fairbanks at Beverly Hills the first four cord tires made at the new Los Angeles factory, and also conveyed Mr. and Mrs. Philip Wrigley twenty-five miles overseas from Catalina Island to Los Angeles. Mr. Wrigley is the son of William Wrigley, Jr., the chewing gum magnate and chief owner of the island. The Goodyear cord tire production is now over 200 a day and will be soon increased.

Football and basket-ball teams have been picked by the employes of the big Goodyear works in Los Angeles, and intensive training was begun last month on the new athletic field north of the factory.

Because of the increased volume of business in aeronautics and the need of increased supervision in the work, the Goodyear Tire & Rubber Company of California has established an aeronautics department with P. K. Coe as manager. Simultaneously a government sales department has been established and will also be under Mr. Coe's supervision. The new manager of Goodyear's Pacific Coast aeronautic activities has had a wide experience in similar lines with the Akron organization. In addition he was in the navy aviation service during the war and holds a pilot's certificate from the Aero Club of America. Since his arrival in Los Angeles in April, he has staged many unique exhibition flights and has greatly stimulated aviation along the Pacific Coast.

The Lap-Lock Tire Co., with an authorized capital of $1,000,000, has been incorporated in Los Angeles by H. L. Averill, Dr. Ross Moore, H. O. Averill, Harry J. McLean and L. A. Cadwalader. The concern plans to build a factory soon in the San Pedro harbor section of Los Angeles and to make rubber tires and tubes. Later it expects also to manufacture other goods of rubber and gutta percha. The company's temporary office is that of its attorney, Mr. McLean, 602 Merchants' National Bank Building, Los Angeles.

What is regarded as a long step taken toward making Los Angeles a great concentration center for cotton is the city's compliance with the Federal Government's requirement that a bond be furnished for the privilege of issuing standardized municipal warehouse cotton receipts Not only are local bankers thus relieved of the responsibility of supplying funds for the cotton trade on an ordinary mercantile credit basis, but, by the use of bank acceptances under a Federal guarantee that the goods are securely in bond, the credit facilities available for cotton marketing become country-wide rather than local. This is an advantage, it is pointed out, to growers, merchants, exporters and mill men, and will particularly encourage planters of the staple to extend the scope of their operations.

An index of the extent of the rubber tire sales and needs in California is afforded by the latest registration figures issued by the motor vehicle department, showing 450,155 passenger cars, 31,195 trucks and 17,750 motorcycles listed.

E. S. Foljambe, widely known throughout the automotive industry, has joined the forces of the Goodyear Tire & Rubber Company of California, Los Angeles, as a special representative of the motor truck tire department. He will devote himself to educational speech making in "motorize the farm campaigns" and to special sales promotion work. Mr. Foljambe was recently directing editor of the Chelton publications, including the *Automobile Trade Journal* and the *Commercial Car Journal*. A member of the Society of Automotive Engineers since its inception, he became vice-president and a member of the council in 1916, and also holds many honorary memberships in various automobile and trade associations.

E. S. Foljambe

The Goodyear Tire & Rubber Company of California has just opened at its new factory in Los Angeles a free school of tire repairing, in charge of J. R. Wells, manager of the repair materials department, and G. H. Irwin, chief instructor. A complete practical three weeks' course with shop work, lectures and instruction in business methods will be given. Any Far Westerner is eligible to enter the school, which is modeled somewhat after the big Goodyear tire repair school in Akron.

The Goodyear Tire & Rubber Company of California has increased the working force at its Los Angeles plant to over 2,500, working six days a week and twenty-four hours a day in three shifts, and production now runs over 1,500 tires and 2,500 tubes a day. Officials say that by January 1, the plant will be turning out 3,000 tires and 5,000 tubes daily. Construction work on the mills is nearly complete, and the company expects to have installed within a very short time all the machinery ordered from the East. The general offices, which had been for the past ten months on the eighth floor of the Washington Building, Third and South Spring streets, have been moved to the new factory, where the third floor of the warehouse building had been set apart for the corps of 750 workers.

The George W. Eno Rubber Co., of 1026 South Los Angeles street, Los Angeles, is now making red inner tubes in all sizes. The company also makes continuous liners known as Eno Inso tires, and Eno Exso tires to completely cover casings by being vulcanized over treads and sidewalls. The Eno Exso tire-vulcanizing machine is also distributed by the company for applying the "cover-all" to worn casings.

SAN FRANCISCO NOTES

At the recent convention of the National Traffic Officers' Association in San Francisco, Fred S. Wilson, Pacific Coast branch manager of the Thermoid Rubber Co., Trenton, New Jersey, urged the importance of properly-lined brakes and regular compulsory inspection in order to reduce the number of automobile accidents.

The Dutch ship "Arakan," bringing from Batavia a cargo of Far Eastern products including rubber valued at over $200,000, all consigned to the Spreckels Importing Co., went upon a sandspit in a fog off the Point Reyes beach near San Francisco on August 29. The greater part of the rubber was jettisoned, but salvage of the vessel had to be abandoned, as the pounding seas buckled the vessel amidships.

T. H. Wilkinson, manager of the San Francisco branch of the United States Rubber Co., returned early last month from a national conference of the company's branch managers at a New Hampshire summer resort. On his return he attended a conference here of the company's branch managers from Seattle, Portland, Spokane, Salt Lake City, and Los Angeles. Much satisfaction with the present state of the trade in manufactured rubber goods in the West Coast territory was expressed by the sales heads.

The Pioneer Rubber Mills, Pittsburg, California, is extremely busy trying to fill the domestic and foreign demand for its mechanical rubber goods. It has been operating at full capacity twenty-four hours a day for the past three years, and has just completed another large extension to its plant.

SOUTHWESTERN NOTES

"Indian" Miller, a full-blooded Apache, veteran of the Spanish-American war, artist and historian of the Southwest, has joined the advertising department of the Spreckels "Savage" Tire Co., of San Diego, California.

A Boston concern took the first lot of Pima long-staple cotton grown in 1920, paying 85 cents a pound for 200 bales at a recent sale in Phoenix, Arizona. The Arizona crop, which has been almost wholly harvested, had been largely contracted for long in advance by leading automobile tire manufacturers. When cotton was tried out first in Arizona in 1912, only 400 acres were grown. Last year the acreage increased to 87,000, and this year the cotton acreage is 230,000, much more attention being given to Anglo-Egyptian than to short-staple cotton. The average lint cotton yield for the past eight years has been 242 pounds per acre, or a trifle less than half a bale.

That the Southwest cotton-growing district is not immune from the attacks of the boll-weevil and the boll-worm was the warning given by W. H. Robison, secretary of the Arizona Agriculture and Horticulture Commission at a recent conference of such commissions of Arizona and California held in Los Angeles. Mr. Robison, in urging vigilance, said that, contrary to many claims, there is no good reason for believing that the pests which came from Mexico in 1893 and have caused such havoc since in southern plantations may not attack the cotton plants in the reclaimed desert sections of the Southwest. As a result of the conference an active organization will be formed to standardize plant pest prevention and elimination in California, Arizona and New Mexico, as well as to promote the extension of cotton and other areas.

A Phoenix, Arizona, branch has been established, with C. W. McKinley in charge, by the Pacific Rubber Co., of Los Angeles, one of the largest tire distributors on the west coast.

The Spreckels "Savage" Tire Corporation, of San Diego, reports a steady increase in sales, as well as the establishment of several new agencies in the West and Southwest during the past few weeks. The employes of the big rubber concern made a notable record in baseball games during the summer, and the company is planning to aid its workers in a campaign of winter sports.

NINTH ANNUAL SAFETY CONGRESS OF THE NATIONAL SAFETY COUNCIL

RUBBER SECTION MEETING

The Ninth Annual Safety Congress of the National Safety Council was held at Milwaukee, Wisconsin, September 27 to October 1, 1920, at which ways and means for promoting sanitation and freedom from accident, particularly to industrial workers, were considered along many lines, through the medium of sectional meetings devoted to individual branches of industry.

The Rubber Section, under the chairmanship of Sidney M. Schott, held three sessions. Several interesting papers were presented by the safety engineers of several leading rubber manufacturing companies containing much practical information evolved from first-hand study and application of safety methods and devices in actual factory practice. Brief abstracts of certain of the papers are given in the following paragraphs.

Present and Future of Safety in the Rubber Industry

The author summarized the work of the Rubber Section as developing along the following lines: (1) Standardization of accident statistics; (2) education of workmen by means of bulletins; (3) formulation of standard safety rules; (4) engineering standards to ensure safety through construction of plant and machinery; (5) interest and ideas resulting from good programs to be presented at future meetings of the Rubber Section.—Sidney M. Schott, chairman, Morgan & Wright, Detroit, Michigan.

Safety and Sanitation for Rubber Mills and Calenders

In addition to a valuable code of rules for the instruction of mill and calender operatives the paper discussed the most approved practice in the matter of mechanical safeguards, such as quick-stop devices, non-slip floors, proper lighting, ventilation and cleanliness of machines and surroundings.—C. B. Mitchella, The B. F. Goodrich Co., Akron, Ohio.

Vulcanizing Apparatus

The importance of using only vulcanizers of approved modern construction and setting was emphasized. The best practices in their equipment and operation were referred to in detail, also the importance of frequent inspection of all pressure vulcanizers. Proper precautions were given relative to safe handling of carbonic acid gas when employed in the vulcanization process.—F. Scott, superintendent of inspections, Hamlin & Co., New York City.

Industrial Sanitation

The author discussed methods of securing light and pure air as the prime essentials in efficient plant operation. Reference was made in detail to drinking water, cuspidors, toilets, wash room, showers, locker facilities and lunch room accommodations.—W. N. Fitch. Department of Safety and Hygiene, The B. F. Goodrich Co., Akron, Ohio.

Selling Safety in the Factory

In this paper stress was laid on the value of safety to the individual, and the necessity for its consistent adoption through the leadership of the plant manager, assisted by personal work on the part of his department heads and foremen. Effective methods of advertising the importance and value of safety to the individual worker were treated at length. These include bulletins, moving pictures, foremen's meetings, "No Accident" days, safety contests and a court of inquiry on all accidents conducted by the factory manager.—H. T. Martin, manager, Health and Safety Department, The Fisk Rubber Co., Chicopee Falls, Massachusetts.

A Broader Field for Safety Work

The effective agencies for covering the field for safety work in factory operation include (1) the institution of good industrial relations between the management and the employes, (2) maintaining a clean plant, (3) a plant layout department for the standardization of plan, equipment, and internal transportation, (4) industrial engineering department for the control of production

standards and methods of remuneration, such as piece-work rates, bonus plans, etc., (5) employment department, (6) health and safety department in charge of safety campaigns and training operatives in use of safety methods.—A. A. Frank, factory manager, Federal Rubber Co., Cudahy, Wisconsin.

Other papers presented were: Address by J. Newton Gunn, vice-president, United States Rubber Co., New York City, covering the importance and general features of safety in modern rubber manufacturing practice; "Health Hazards in the Rubber Industry," by C. F. Horan, Hood Rubber Co., Watertown, Massachusetts; "Safe Methods of Handling Material," by P. B. Martens, manager, Safety Department, Firestone Tire & Rubber Co., Akron, Ohio.

OFFICERS AND COMMITTEES OF THE S. A. E. TIRE AND RIM DIVISION

The personnel of the Tire and Rim Division of the Society of Automotive Engineers for the current year, of which S. P. Thacher is chairman, is given herewith:

Pneumatic Tires for Passenger Cars Subdivision: S. P. Thacher, chairman; W. H. Allen, C. I. Bradley, E. G. Hulse, J. C. Tuttle, W. S. Wolfe.

Pneumatic Tires for Commercial Vehicles Subdivision: W. S. Wolfe, chairman; W. H. Allen, C. I. Bradley, L. R. Davis, E. G. Hulse, J. C. Tuttle.

Pneumatic Tires for Airplanes Subdivision: W. H. Allen, chairman; C. I. Bradley, A. H. Petersen, S. M. Schott, J. C. Tuttle, W. S. Wolfe.

Solid Tires Subdivision: A. Hargraves, chairman; W. H. Allen, C. I. Bradley, L. R. Davis, Hugo Hoffstaedter, A. H. Petersen.

Pneumatic Tire Rims Subdivision: C. C. Carlton, chairman; W. H. Allen, E. K. Baker, W. N. Booth, Lewis Fine, J. E. Hale, J. W. Holt, S. M. Schott, J. G. Swain, J. H. Wagenhorst.

Solid Tire Bands and Rims Subdivision: W. N. Booth, chairman; W. H. Allen, E. K. Baker, C. C. Carlton, L. R. Davis, Lewis Fine, J. E. Hale, A. Hargraves, J. W. Holt.

STORAGE BATTERIES FOR INDUSTRIAL TRACTORS AND TRUCKS

Electric motor vehicles as applied to army use are a comparatively new development of transportation. During the war electrically driven motor trucks were used in this country by the Government for special purposes. That they survived the severe tests to which they were subjected was due in great measure to the rigid specifications under which all their parts were built.

The Government specifications for storage batteries for trucks and industrial tractors call for dependable storage batteries, of the lead-acid type, with normal capacity or service rating of each battery not less than 220 ampere-hours at the five-hour discharge rate. For tractors each battery must consist of 24 lead-acid cells; for trucks, one-half that number. The battery jars are made of hard rubber, nominal thickness 3/16-inch (minimum, 0.175 inch), of compound having a nominal tensile strength of 5,000 pounds per square inch, with an elongation of 6 per cent. The minimum tensile strength permitted is 4,000 pounds per square inch, with an elongation of 7½ per cent. Minimum elongation 5 per cent with a tensile strength of not less than 6,000 pounds per square inch. (For intermediate values of tensile strength, the product of the figures of tensile strength and per cent elongation shall be not less than 30,000.) Covers of jars are of the same hard rubber compound, with molded flat top, not recessed and not below the top of the jar, and are provided with combination filling aperture and gas vent. A minimum amount of sealing wax is used to make the cover gas tight. It is necessary that this wax shall not be ignited easily and shall not flow when heated to 120 degrees F.

Leads from end cells to tray terminals are of No. 0, B. & S. gage, extra flexible rubber-covered cable. The connections between individual cells are burned onto terminals and must be capable of carrying continuously 125 amperes without injury. Bolted intercell connections may be furnished at the option of the purchaser. Tray terminals or connectors when used are of the wing nut type.

The electrolyte is sulphuric acid of 1.275 to 1.290 specific gravity at 80 degrees F. when fully charged. The cells are assembled in trays, each of four cells arranged end to end, with a single tie partition across the center. The trays are of hard wood, painted with two coats of protective paint, fitted with one chest handle on each end and with four lifting irons.

Each battery must be capable of giving not less than either 250 cycles of charge and discharge, or one year of life to not less than 80 per cent of its rated ampere-hour capacity, when operated under service conditions and maintained in accordance with instructions from the manufacturer.

A PLAN TO INCREASE FREIGHT FACILITIES

An urgent appeal to manufacturers and business men to join in making better use of existing railroad equipment as a means of providing an immediate improved transportation service has been issued by the Railroad Committee of the Chamber of Commerce of the United States. The committee points out that shippers can add 535,000 freight cars to the available car supply by loading cars more heavily and loading and unloading them promptly.

As a rule the railroads allow 48 hours free time to load cars and 48 hours to unload them before making any charge for demurrage. If receivers of freight will use only one-half of this time, thus releasing cars in one day instead of two, and in addition will order according to loading capacity, restrict car orders to today's program, avoid the duplication of car orders, and avoid the use of cars for storage purposes, the time that the average freight car spends in the hands of shippers and receivers should be reduced from the present 37 per cent to 22 per cent of its total time, and thus add 360,000 cars to the available car supply.

In 1919 the average load per car was 27.8 tons—only 67 per cent of capacity. If shippers will cooperate with the railroads to attain an average of 30 tons per car, nearly 175,000 cars will be added to the available car supply.

JOSEPH STOKES RUBBER CO. BUILDS IN CANADA

The Joseph Stokes Rubber Co., Trenton, New Jersey, has purchased a site at Welland, Ontario, Canada, having a frontage of 651 feet on the Grand Trunk Railway, upon which a new factory will be located. The contract for the building has been awarded, and the first building is now under roof. The first unit of the new factory will be 120 by 160 feet with a separate power house and office. A spur track will be laid the entire length of the property to serve additional buildings which will be erected as required. The power plant will be 50 by 50 feet, one story brick and timber, and will contain 4 150-horsepower boilers, water heater, two pumps, air compressor and iron tank. There will also be a transformer room and three-story tower, 20 by 22 feet. The products of the company will be hard rubber goods, cells and plates for batteries. It is expected that manufacturing operations will be started by December 1, of this year, at which time 75 people will be placed at work. This number will be increased to 150 by February, 1921. The first unit of the factory will cost $100,000 and it is the intention of the company to erect a big plant later. An Ontario charter has been taken out. The first shipment of machinery is now en route.

Imports into Malaga, Spain, from the United States during 1919 included 25 kilos of oil and rubber cloth (kilo 2.2046 pounds). American manufactured goods are favorably considered in Spain. The main difficulty to their increased sale in that market is the lack of proper sales agencies and delays in the ocean freight service between the United States and Spain.

CANADIAN MARKET FOR RUBBER GOODS[1]

BRITISH COLUMBIA

There is only one firm interested in the manufacture of rubber goods and this is situated at Coquitlan, British Columbia. It has a fully equipped plant and intended to commence operations September 1. The firm has received orders aggregating $1,000,000 in value, largely for shipment to New Zealand. While principally interested in the manufacture of automobile tires, certain side lines will also be made.

HALIFAX

There are no manufacturers of rubber goods in the Halifax consular district, and, as far as can be ascertained, no raw, scrap, waste, or reclaimed rubber is imported for manufacture. The market for rubber tires in Nova Scotia, where there are some 12,000 automobiles and trucks, is good, as the poor roads call for frequent replacements. The tires used are almost wholly of Canadian manufacture. The size most generally used is 30 by 3½ inches, clincher type. Terms of payment are 25 per cent off for cash, net 30 days.

The market for rubber boots and shoes, on account of climatic conditions and such industries as the fisheries and lumbering, is most excellent. This class of goods has, in the past, been obtained from two sources, American and Canadian, but the present tendency, on account of unfavorable exchange, is to place all possible orders with Canadian manufacturers. Rubber boots and shoes are ordered from traveling salesmen, or purchased direct. No statistics of imports or exports are available, but it is known that at present very few rubber boots or shoes are imported. The terms of payment usually given are 30 days, with 2 per cent discount for cash.

There is also an excellent market for belting, and a fair market for other rubber goods used for industrial purposes. Credit is given by the manufacturers for 30 or 60 days, depending on the size of the order and the credit standing of the purchaser. The larger industrial plants buy direct from the manufacturer.

KINGSTON, ONTARIO

In the Kingston district in 1920 there will be a great demand for automobile tires. The prosperity enjoyed by the farmers during the past five years enables them to have a car or two and in consequence the demand for small-sized tires is large. Sizes in demand are 30 by 3½, 31 by 4, 32 by 4, 34 by 4½, 35 by 5 and 37 by 5 inches. Clincher 30 by 3½ and 31 by 4 inches are most popular, while the straight side comes next.

Over two-thirds of the tires sold in this district are made in Canada and those of American make are sold through distributing houses in Toronto. Terms of payment are cash 30 days, varying from 2 to 5 per cent.

The demand for rubber boots and shoes is in the spring and fall of the year. Shipments are made to the retail trade in July and August and payments met in November, when a discount of 2½ per cent is allowed. Owing to the duty and unfavorable exchange American goods are practically shut out of the Canadian market, the only source of supply being Canadian goods. The rubber boots sold are in the following sizes: Men's, 6 to 11; boys', 1 to 5; youths', 11 to 13; and children's, 6 to 10½. Heavy rubber shoes find a sale only in the agricultural sections of the district.

NEW BRUNSWICK

The rubber industrial centers in Canada are Montreal and Quebec. Adverse exchange conditions have practically closed the market to rubber goods from the United States, but there are many kinds of goods that must be imported because Canadian manufacturers are not so far advanced in the making of insulated rubber, scientific apparatus, and miscellaneous rubber goods included under druggists' sundries, but the list is narrowing down and may before long exclude these also.

The market for rubber tires is considerable. Over 50 per cent of the tires sold in this district are of the 30 by 3½-inch size. Other sizes of tires range from 32 by 4 to 35 by 5 inches, fabric and cord, straight side and clinchers. The usual terms are 30 days and 2 per cent for cash.

It is the general opinion among dealers that rubber clothing of American manufacture is superior to the domestic articles, and that there will be a demand for this class of goods in spite of the added cost on account of duty and adverse exchange. There is a stable market here for American-made rubber packing and fruit-jar rings, because of superiority.

MANITOBA

No rubber goods of any description are manufactured in the Province of Manitoba, the source of supply being the rubber-manufacturing centers of eastern Canada and the United States. The bulk of the tire business consists of Canadian manufactured goods from Ontario factories operated by both American and British capital. Factory branches and warehouses maintained in Winnipeg by the manufacturers handle the retail and jobbing trade and maintain accounting and selling organizations, and a stock of tires. The Provinces of Manitoba, Saskatchewan and Alberta are controlled by the branches at Winnipeg, as a rule, jobbers being found in the larger cities. Terms of payment generally quoted to retail dealers are 2 per cent on the 10th of the following month, or 30 days, net, with the same terms to jobbers, who, in addition, receive a jobber's discount.

The retail price in Manitoba of a Canadian-made tire is approximately 20 per cent higher than the retail price in the United States of an American tire of equal quality. However, American tires are subject to an import duty of 35 per cent, a 2 per cent sales tax recently imposed, and an adverse rate of exchange. A number of well-known American tires are on the market, selling for about 45 per cent higher than in the United States. However, due to increased cost of production, all Canadian tires advanced in price about 20 per cent during the last year.

The most popular sizes in general use are 30 by 3½ clincher, 32 by 4 straight side, the first-named size comprising about 60 per cent of the number sold. In conformity with the action of the Rubber Association of America, the Canadian manufacturers will at once reduce the number of odd and oversize tires now being made and concentrate on three or four standard sizes. The tire market in the province is reported to be very good, but factory branches say there is no unprecedented growth in the volume of sales.

The rubber boot and shoe trade in this province is locally controlled. There was a time when American rubber footwear found a market here, due to distinction and variety of style, but the improvement of Canadian manufactures has resulted in swinging the trade balance. In some lines of footwear Canadian products excel American manufactures in points of workmanship and finish. The market for rubber footwear in this locality is said to be unlimited, some factories being unable to meet the demands of trade, and an ever-increasing demand is expected, particularly for overshoes and rubbers, as many residents of the British Isles now coming to Canada, unused to rubber footwear, will follow the custom of the country, as have thousands of laboring classes from Central Europe.

Rubber goods for industrial purposes are manufactured in eastern Canada and distributed by factory branches and sales managers in Manitoba. Terms of payment are similar to those given jobbers in other rubber lines, and the market is reported as being good.

It is estimated that about one-third of the druggists' sundries made of rubber is imported from the United States. This class of goods includes hot-water bags, air cushions and mattresses, bathing caps, toys, and some surgical bandages. Rubber cement and elastic are also received from the United States.

[1]Consular reports to the Department of Commerce, No. 215, 1920.

The Rubber Trade in Great Britain

By Our Regular Correspondent

In reply to inquiries from America regarding the use of the Peachey cold cure process commercially I now refer to the formation of the Peachey Process Co., Limited. The company, which has the nominal capital of £250,000, acquires the patent rights, which cover all important countries of the world, from a syndicate consisting of W. T. Bartholomew, of London; A. H. Shaw, of Blackpool, and J. Higginbotham, of Manchester, who some months ago obtained an option from the patentee to take it up in a specified time. There are eight directors, inclusive of the three above-named, the chairman being Sir John P. Hewett, G. C. S. I., K. B. E., C. I. E. For £20,000 in cash the syndicate sells to the company 27,000 shares of £1 cumulative participating preference shares, credited as fully paid; 43,000 shares of one-pound ordinary shares credited as fully paid; and 100,000 shares of fully paid one-shilling deferred shares. It is stated that the new company is not at present making any public issue of shares and the first work to be undertaken is to enter into negotiations with rubber manufacturers as well as manufacturers of linoleum, leather substitutes, imitation leather goods, upholstery, wall coverings, etc., with respect to their adoption of the new process.

A prominent feature of the company's initial procedure is the acquisition of a suitable building where a demonstration plant will be operated and an experimental laboratory fitted up. Here the patentee, whose exclusive services have been engaged by the company, will carry on the research work which will naturally for some time be necessitated. Sir Arthur Colefax, K. C., on whom the mantle of Lord Moulton seems to have fallen in regard to patent work, has expressed the opinion that the patent is valid. The temporary address of the company is given as at W. J. Bartholomew's offices, 40 Gerrard street, London, W. 1, and no doubt any communications from across the water will receive attention and be passed on to the permanent offices which, it has been stated, will be in the Manchester district.

SOLVENT RECOVERY

The illustrated description of the Lewis solvent recovery system in the June number of The India Rubber World has no doubt interested many readers, as the subject is one which is attracting a good deal of attention at the present time. The percentage recovery of solvent is not stated, though a reference is made to maximum recovery. Of course in the development of the impregnated canvas business for cord tires a recovery plant is essential for safety in working, whether it really pays to recover the naphtha or not, but the case is different in, say, a small proofing works. The various systems of recovery now on the market fall into two classes: the first, where the solvent vapors are condensed by compression, and the second, where they are absorbed in creosote or other heavy oil and recovered by distillation.

The main novelty about the Lewis system, which is one of compression, is that the work takes place in an atmosphere which will not support combustion, and therefore all risks of fire or explosion are eliminated. This inert atmosphere consists of flue gas from the boilers, which is stated to consist almost entirely of nitrogen and carbon dioxide. I am afraid that the average flue gas contains more oxygen, carbon monoxide and unburned hydrocarbons than the above statement would lead the uninformed to imagine, but this is not an important matter as regards naphtha recovery, as the nitrogen will always be sufficiently in excess to prevent the formation of an explosive atmosphere. It is not often that any serious accident occurs with naphtha vapors in England, but the sad affair at the Dunlop works in Birmingham last May has brought home to manufacturers the necessity for constant care and supervision.

PROPRIETARY CHEMICALS IN AMERICA

The position which the Rubber Division of the American Chemical Society has taken with regard to the use of trade names for accelerators and compounding ingredients is one which is of considerable import to both sellers and buyers, and it may be taken for granted that divergent views will be expressed as to its tenableness. In selling an article it is, of course, a great pull to be able to say that it cannot be obtained elsewhere, and presumably this is the reason why a special name is adopted for a similar article sold by competitors. Merely to use a short name for a long one when the correct composition of the substance is at the same time disclosed will not appeal to the astute seller who seeks to dispose of an ordinary article at a special price. There always have been specialties on sale to the rubber trade, but the business in these has been by no means of late as in former days because now that chemists are so common in the industry the simple nature of many presumed complicated chemical mixtures or compounds has been easily brought to light. The advent of the organic accelerators with their very long names has, it appears, caused a revival of the proprietary article nomenclature and if, as it has been stated, thiocarbanilide has been offered for sale under six different names and presumably by each seller as a specialty distinct from what could be obtained elsewhere, it certainly seems a course of procedure against the best interests of the rubber industry. At the same time it is not easy to see how any drastic action can be taken.

The invitation to manufacturers and jobbers of proprietary articles to make statements to the Rubber Division on the subject seems unlikely to meet with a ready response, unless it is an expression of opinion that no alteration in existing procedure is desirable. With regard to the invitation to rubber chemists to submit results of their analyses to the secretary of the Division, it may be objected that many of such analyses have been made professionally and that the figures were not intended for the information of all and sundry, though this would not apply to information given by works chemists. The analysis of some proprietary articles sold to the rubber trade is a matter of extreme difficulty, perhaps designedly so.

SELENIUM AND RUBBER

The American Chemical Society has been discussing the possibility of increasing the consumption of selenium and tellurium, two erstwhile rare elements whose chemical characteristics closely follow those of sulphur. According to Victor Lenher the United States in existing plants can produce over 300,000 pounds of selenium and about 125,000 pounds of tellurium annually, figures far beyond the annual consumption, hence the desirability of new markets. One is reminded in this connection of other more or less rare elements, uranium for instance, when it was proposed to open a mine which would produce ten times the amount used in the whole world. At the moment it does not seem as if the rubber trade would remedy the overproduction of selenium, although interesting experiments have been recorded which seem to indicate the similarity of the action of this element to that of sulphur. It is pointed out in the American Chemical Society discussion that much remains to be done, especially along the lines of the use of the chlorides or bromides of selenium and tellurium as accelerators. So far, tellurium does not seem to have received serious attention in the rubber industry. At first sight the harassed rubber manufacturer, seeing selenium quoted at about 12 shillings per pound and tellurium at about 90 shillings per pound, may not wax enthusiastic at the suggestion that he should help in absorbing the surplus production, but in these days of research associations it would be premature to assume that the matter is at an end.

EXPLOSIVES TRADES LIMITED

This amalgamation, effected towards the close of the war between the various hitherto competitive companies making explosives, has invested its surplus capital amounting to about 60 per cent of the whole, in such a variety of undertakings that its title is incongruous and to some extent misleading. Therefore it is shortly to be changed. Substantial holdings have been acquired in the Dunlop Rubber Co., Limited, and its subsidiaries, in the Rotax Motor Accessories Co., Limited, and the business of John Marston, Limited, two makers of the Sunbeam cycles, has been bought outright. A large sum has also been invested in the General Motors Corporation, Inc., of America. Substantial holdings have also been taken in the British Dyestuffs Corporation and the British Cellulose Co., Limited. The latest move is the acquisition of the whole of the shares of the British Pluviusin Co., Limited. This concern was founded about fifteen years ago, if my memory is correct, to make artificial leather at Monton Green, seven miles from Manchester, and the business has made continuous progress. The works are situated close to those of the important Winterbottom Book Cloth Co., Limited, the two, it is understood, having joint financial interest.

A BRITISH RUBBER CLUB

Following an article appearing in the August issue of our new trade periodical *The Rubber Age* (London), I understand that the suggestion to form a rubber club on the lines of that which has now been established some years in America has met with a good response from the trade. A Manchester rubber manufacturer has promised a gift of £100 towards the necessary expenses, to which *The Rubber Age* will add 100 guineas. It is proposed to hold a preliminary meeting during September, either in London or Manchester, and to appoint an executive committee to formulate the scheme which will afterwards be submitted to the trade. Although names of supporters of the scheme are now being enrolled, no one sending his name in will be considered bound thereby in any way until the full scheme is laid before him. I do not know how long the process of formation of the American club took, but I rather imagine that the many matters which are bound to come up for consideration in such a move connected with an old established and withal conservative industry will necessitate an adjournment of the first meeting if the attendance is large and representative as it promises to be.

TRADE NOTES

Among works which have been established in the last few years is that of the Chorley Rubber Co., Limited, of Wildbank Works, Chorley, Lancashire. The promoter was Mr. Bolton, late of the Leyland & Birmingham Rubber Co., Limited, and he is the moving spirit in the enterprise which is concerned with the manufacture of mechanicals, molded and surgical rubber goods. London offices have recently been opened at 103 Cannon street, E. C., under the management of G. E. Watson, late of the North British Rubber Co., Limited.

H. S. Firestone, of Akron, Ohio, recently spent three months in England, occupying a furnished mansion near East Grindstead, Sussex. He has been also a guest of Marshall Stevens, M. P., at Bowdon, Cheshire. Mr. Stevens is chairman of the Trafford Park Estates Co., Limited, and the Xylos Rubber Co., Limited, and his guest has had good opportunities of seeing the great industrial developments which have taken place in the Trafford Park suburb of Manchester.

W. A. Williams, presumably he of the North British Rubber Co., Limited, Edinburgh, contributed an interesting and important article to the "Journal of the Society of Chemical Industry" for August 16, pointing out that for the immediate requirements of the trade there are undoubtedly sufficient supplies of crude rubber, despite the great development of the motor trade. Further with regard to the next few years, he does not predict any real shortage, though there will be a tendency for demand to overtake supply. He deals authoritatively with the cotton position, pointing out the important effect the Arizona output of long-staple cotton will have in steadying the market in Egyptian cotton. He thinks that tire manufacturers will be forced to the new departure of using a proportion of short-staple cotton in these fabrics and any reduction in the life of the tires could be compensated for by a corresponding decrease in the selling price. Naturally the influx of American tires comes up for consideration, and he foresees that the time will shortly come when the American surplus output will be sent over here if our markets are still open, producing a condition of affairs outside the control of the British manufacturer, who will have to depend upon government assistance against this class of competition.

MISCELLANEOUS FOREIGN NOTES

According to *The Financial Times*, London, the British Pluviusin Company (1920), Ltd., was registered as a private company on August 27, with a capital of £1,250,00, in £1-shares. The company is to enter into an agreement with Explosives Trades, and to carry on the business of waterproofers, manufacturers of imitation leather, leather cloth, linoleum, paper and cloth combined, tarpaulins, surgical bandages, waterproof cloth, mackintoshes, etc. The registered office is at 12 Newton street, Manchester.

Declared exports of crude rubber from the consular district of Liverpool, England, to the United States for the month of June, 1920, were valued at $74,848.

The British Industries Fair will be held in London from February 21 to March 4, 1921. The Birmingham and Glasgow organizations are cooperating and exhibits will be on view at the former place during the same time as in London. In Glasgow the dates will be from February 28 to March 11. Of the sections interesting to the rubber trade may be noted those of mechanical rubber goods, machinery belting and accessories for motor vehicles, bicycles and airplanes, all in Birmingham.

Reexports of rubber from Great Britain during the first six months of 1920 advanced to £11,237,476, or gains of £5,873,697 over the corresponding period in 1919 and £2,725,377 in 1913.

The decided rise in prices of articles is responsible for the greatly enhanced values of reexports to the United States, including rubber, of which 177,031 centals, valued £2,789,477 were reexported in the first six months of 1913, and 499,088 centals, valued £6,236,086, in the corresponding period of 1920.

Trade between Great Britain and Germany in the first six months of 1913 included exports of rubber totaling 125,899 centals, valued £2,144,704; in the corresponding period of 1920 the quantity was 50,175 centals, valued £541,584.

India rubber goods, not including tires, to the value of $166,381 were imported into New Zealand during the first six months of 1920, as against $112,450 in the corresponding period of 1919, and $177,554 during the first half of 1918.

Walter A. Robinson, general sales manager of the Skipper Rubber Co., Calcutta, India, recently visited an Akron rubber factory. His company is now one of the largest Goodrich distributers in India.

The B. F. Goodrich Co. will operate in Japan under the name of The Yokohama Rubber Co., producing belting, tires, tubes, hose and packing. Belting is already being manufactured, O. K. Butler supervising the work.

The *Gummi-Zeitung* reports from Riga that the rubber industry in that city is still very quiet. It is proposed to resume work in the well-known Prowodnik plant at Riga with the aid of French capital, and the activity of French and English financiers in Letvia indicates a considerable influx of French and English capital in that country. The English financial group of Fortington demanded concessions as to the supply of hemp and wood as security for its credits. The negotiations, however, have not been settled and proposals are now made by a French group which offers better terms, but no agreement has been reached in either case.

During the first five months of 1920 France imported rubber goods valued at 100,000,000 francs; England supplied 55,000,000, America 33,000,000, Italy and Belgium the rest.

THE RUBBER TRADE IN NORWAY

As REPORTED by C. L. Paus, Commercial Secretary to the British Legation, Christiania, Norway, in *The India-Rubber Journal*, London, Norwegian stocks of raw rubber, balata and gutta percha were very scanty at the commencement of the war. As fresh supplies were very difficult to obtain, Norwegian factories were at various times compelled to reduce their production and even to cease operations. After the conclusion of the Norwegian-American Agreement in 1918 the position gradually improved and the manufacturers were once more able to operate upon normal lines. Estimations place Norway's annual requirements at about 150 tons of rubber and 200 to 250 tons of balata and gutta percha, practically all of which is purchased from firms in the United Kingdom. At the end of 1919 there was reported to be little demand for new supplies, as the factories were subsisting on old stocks. One reason for the diminishing demand is the fact that Norwegian production of insulated cable is restricted because of competition from British and American cable manufacturers.

MOTOR CARS AND MOTOR TIRES

Prior to the war, Norway imported motor cars from all European countries in which they were made, and also from the United States of America, which even then held the largest portion of the trade. During 1919 the bulk of the cars imported were supplied by America. On December 31, 1919, the number of motor cars registered in Norway totaled 5,390, in addition to 2,703 motor cycles.

Before the war Norway imported tires mainly from America, Germany, France, Russia and the United Kingdom. It is reported that the British trade was smaller than that of France, Germany and America, and that the American trade was largest. Germany and Russia disappeared from the market early in the war, and supplies were drawn chiefly from France and the United Kingdom. Later, when shipments from France and the United Kingdom became more difficult, the bulk of the trade went to America, which now occupies the leading position. The demand for tires has naturally increased in proportion to the number of motor vehicles in the country, and most of these vehicles were American and therefore equipped with American tires.

Germany supplied most of the bicycle tires imported by Norway prior to the war. A fairly large number were also received from the United Kingdom, while smaller quantities came from France and Denmark. Owing to the increased demand for bicycles Norway's importations of bicycle tires and inner tubes at the end of 1919 is estimated to have been 300,000 of each. Of these the bulk came from the United Kingdom with large shipments also from France. Imports from the United States were not so large.

GALOSHES

On the outbreak of the war, Norway had one galosh factory, namely, Den Norske Galoge og Gummifabrik, A/S., of Mjöndalen, near Drammen. This factory was able to maintain a limited production during the war, but it was burned down last April, and Norway is now dependent entirely upon imported galoshes. It is reported, however, that a new galosh factory, A/S Askim Gummifabrik, has recently been established and will probably begin to produce in 1920.

Norway's total annual consumption of galoshes is estimated to be 800,000 to 1,000,000 pairs. During 1919 imports took place chiefly from America, for neither the United Kingdom, Sweden or Russia has been in a position to export. Imports from England are reported to amount to a few thousand pairs only, as compared with 500,000 or 600,000 pairs from America, while for 1920 large orders have been placed in Sweden and America. It is estimated that owing to the high prices of leather the consumption of galoshes in 1920 will increase very markedly.

MACHINE BELTING

The production of the two Norwegian belting factories is sufficient to supply Norway with balata and leather belting, and with the exception of a British-made balata belting which is said to have an old market in Norway, it is not anticipated that leather and balata belting will be imported to any large extent. Beltings of hair, cotton and india rubber are not produced in Norway, and it is considered probable that there will be a good demand for such goods.

DIVING MATERIALS

The only diving materials manufactured in Norway are canvas overalls, hose couplings and submarine telephone outfits. Complete sets of diving materials of very high quality are stated to be supplied by America, and as quality is of primary importance, price being a secondary consideration, American goods are in demand.

THE RUBBER TRADE IN GERMANY

By a Special Correspondent

THE GERMAN RUBBER INDUSTRY begins to be dissatisfied with the restrictions controlling foreign trade in Germany, and with the necessity of appealing to trading bureaus before articles can be exported, as some of the regulations are entirely out of date and made obsolete by the rapidly changing situation. German rubber manufacturers object to billing goods in foreign money values. This was an advantage while the price of the mark was low but is now a decided disadvantage when mark prices are improving. The bureaucratic control of foreign trading is an impediment to the enterprise of German manufacturers who desire to compete with the other manufacturers of the world. Attempts, therefore, are being made to remove these restrictions and to return to the German manufacturer full liberty of trading abroad.

THE PRIVILEGE OF INTERROGATION

One of the reforms brought about by the recent revolution is the privilege of interrogating ministers which adds so much to the interest of parliamentary proceedings in England. Delegates to the Reichstag are permitted to ask ministers any questions whatever, but it is left to the Secretary of State if a difficult situation should result. The German rubber industry has been concerned for several months over the alleged large imports of rubber tires into Germany, and is now employing ministerial interrogation as a vent to its grievances. It is argued by the manufacturers who are supported in this matter by the factory workers that the wholesale importation of tires creates serious competition, with the result that tire factories have been compelled to curtail production, and for that reason the German rubber industry demands the embargo of tire imports. The representative of the German Department of Commerce, in answering this question, said that the conditions were not serious and that few tires were imported in the ordinary manner while steps had been taken to prevent the illicit trading in smuggled tires. The Government would not place an embargo on the importation of tires unless the German rubber manufacturers would reduce the present price for tires. The hint was taken by the manufacturers and a considerable cut has been made in the

price of tires. As the various reductions that were made in the past have invariably led to a general disorganization of the market, the tire manufacturers decided to bring German tire prices down to the level of the world's markets and thereby avoid the necessity of further reductions in the near future.

THE TRANSPORTATION STRIKE

The rubber industry has suffered together with other industries from the transportation strike which was started with a view to prevent the shipment of military material to the Poles by way of Germany. The strike has spread all over Germany and has compelled the postponement of the merchandise fair in Koenigsberg, Prussia, which was scheduled for the middle of August. This will be held at the end of September provided the transport strike is settled by then. The strike has caused considerable loss to many rubber manufacturers who have not been able to make shipments of goods, the delay and declining prices constituting an inducement for the dealer to cancel his orders.

PRICE REDUCTIONS

The general strike of the consumer which has been employed as a weapon to bring down the cost of living all over Germany has been most effective, being supported by the increased value of the mark which has given the purchaser better value for his money. While the rubber industry is still comparatively busy there are signs of a general decline in the size of the orders and manufacturers see great difficulties ahead to keep their factories going. Some branches of the industry are still working with full time, especially the jar ring manufacturers and those making goods for the electrical industry. To bring the consumer again in the market a reduction of prices has been made by various branches of the industry. The tire prices have been reduced as reported elsewhere in this article and now the hemp hose manufacturers have followed suit. The new reduction brings the cost of this article to a level where it can withstand the competition of the rubber hose which had seriously encroached upon the hemp hose field.

THE LUXURY TAX

The luxury tax is affecting the rubber industry as various articles are subjected to this tax. Pneumatic tires, tire covers and inner tubes for the use of private automobiles are subject to the tax, while tires for airplanes, motorcycles, and bicycles are free from taxation. An exception is made for tires which are used for racing cycles, exhibition cycles and covers and inner tubes executed in colors. Bathing caps, sponge bags, tobacco bags, rubber mats, impregnated cloth, are subject to taxation if made entirely or partly of rubber. Fountain pens are free of taxation if for ordinary use. Ornamented fountain pens and those with gold nibs are taxed. The tax is supposed to be applied without giving special trouble to the taxpayer, and the keeping of ordinary books is regarded as sufficient evidence for the purpose.

TRADE NOTES

The Hamburg rubber market which has been very active during the last few weeks is suffering severely from the irregularity of the exchange values of the mark. When the mark falls in value, up goes the price of rubber; if it should increase, down go rubber prices. As the price differences are sometimes as much as 15 per cent from one week to the other it may easily be understood that rubber importers are not bedded upon roses and the desire is expressed for an early rectification of the German exchanges. All prices are quoted practically upon the basis of immediate payment and delivery of the goods to the buyer.

The Leipziger Gummiwaren Fabrik, formerly Julius Marx, Heine & Co., has distributed a 6 per cent dividend as the result of last year's trading. The annual report states that the factory was busy during the largest part of the year, and there was sufficient raw material available but the coal supplies were insufficient. The export demand has been satisfactory. The directors expect an improvement during the present year.

THE RUBBER TRADE IN SCANDINAVIA AND DENMARK

By a Special Correspondent

The rubber industry in Sweden, Denmark, and Norway has been very active all through the war and many new factories were added to those already in existence. With few exceptions the rubber industry of northern Europe is mostly carried on in comparatively small establishments. The necessities of the war and the complete separation from the usual sources of supplies, however, have forced considerable expansion of the existing plants, with the result that the industry has added largely to its productive capacity. Both foreign and domestic capital are employed in these factories. Although foreign competition has increased since the coming of peace the domestic factories find it comparatively easy to hold their own against imports, especially since the market was practically stripped of many articles when peace was declared. This was due less to the lack of manufacturing facilities than to the difficulty of obtaining raw materials, including coal. Sufficient rubber was obtainable during 1919 and the factories succeeded in covering their requirements even in excess of their immediate needs, leading in some cases to reductions in this year's orders.

The first half of the present year shows, for instance, a decline in the imports of raw rubber into Denmark from 367 tons to 273 tons. An increase is reported in the import of most other articles. So the import of pneumatic covers rose from 451 tons to 959 tons; 71 tons of rubber shoes were imported against 40 tons during the first six months of 1919. General all-rubber goods show an increase from 92 tons to 139 tons.

American rubber goods are now in evidence in all three countries, American tires especially being in demand. German rubber goods are being sold again; but not in the same volume as before the war.

The firm of H. Astrup & Co., in Christiania, Denmark, has been sold to a corporation and will be continued under the same name. This firm was formed during the year 1914 to deal in automobile tires and other rubber goods.

The Amerikanska Gummiaktiebolaget, dealer in rubber goods, has increased its capital to 800,000 kroner.

Swedish rubber manufacturers are rejoicing over the discontinuation of the private postal stamps used until now by government offices for franking governmental mail. It appears that in the future postal stamps will be replaced by an imprint of the various offices, made with a rubber stamp. This should bring many new orders to the Swedish rubber stamp manufacturers.

FOREIGN TARIFFS

CANADA

An act to amend the special war revenue act, 1915, passed June 30, 1920, includes a tax on wholesalers of 1 per cent on all parts sold for repairs of automobiles, accessories, tires or repair parts, etc., purchased from Canadian manufacturers or from importers and sold to the ultimate consumer or subdealer or garage.

ARGENTINA

A new Argentine tariff law (No. 11022) was promulgated by executive decree on July 6 and went into effect on July 7, 1920. This law provides for important changes in Law No. 4933 and its supplements, the most important being that included under article 4, which increases by 20 per cent the old official valuations (appraisements), the rates of duty remaining the same. This horizontal increase, which is equivalent to an increase of 20 per cent in duty, does not apply to the articles included in the table below, for which higher increases are specified. In the case of articles for which no appraisement or official valua-

tion is given, the ad valorem duty being assessed on invoice value, as automobiles, for instance, the increase does not apply. Nor would it apply in the case of goods subject to specific duty.

The following table shows the articles for which changes in rate of duty, as well as in official valuation, are provided for by the new law. The previous rates and valuations are given for purposes of comparison. Attention should be invited to the fact that while the rates are ad valorem in form, they are really specific, in view of the fixed character of the valuations, which are not affected by market fluctuations.

Equivalents.—Peso, $0.965; kilo, 2.2046 pounds; liter, 1.05668 U. S. liquid quarts.

Tariff No.	Article	Old Tariff: Valuation in Pesos Per Kilo.	Old Tariff: Rate of Duty P. Ct.	New Tariff: Valuation in Pesos Per Kilo.	New Tariff: Rate of Duty P. Ct.
	Pipes, tubes, hose, elbows, and joints:				
933.	Of rubber, not combined with cloth, except those of English sheets and the like	1.00	25	1.30	30
934	The same, combined with cloth, with or without wire	60	25	.90	30
935.	Of rubber, in pieces, especially for the manufacture of match boxes	1.50	25	2.00	30
	Rubber:				
1121.	Cushions for billiard tables	1.50	25	2.00	30
1122.	Soft, in sheets, valves, belting, cords, and mats	1.00	25	1.30	30
1123.	The same, combined with cloth or metal	.60	25	.90	30
1124.	Horseshoes, rings, carriage and wagon tires, saw bands, and others	1.50	25	2.00	30
1125.	Tires for automobiles	2.00	25	2.50	30
2536.	Toys, of soft or vulcanized rubber	1.20	25	1.50	30
	Rubber:				
2940	Refined or soft	1.20	25	1.40	30
2941.	Vulcanized (English sheets and the like, black or red) in the form of bags, belts, cloth, bandages, nipples, trusses, pumps, single or double bulbs for atomizers, sponges, tubes less than 5 millimeters in diameter, and all other unspecified articles used for medicinal use	5.00	25	6.50	30
		Each.		Each.	
2942.	Urethralsounds	0.10	25	0.20	30
		Per kilo.		Per kilo.	
2943.	Tubes, 5 millimeters and upward in diameter, stoppers, teething rings, syringes, etc	3.00	25	4.00	30
2944.	Lined or combined with cotton, linen, or wool, in the form of belts, hosiery, bandages, and other articles for surgical use	5.00	25	6.50	30
2945.	Lined or combined with silk or mixed silk fabric	$7.00	40	$9.00	50
2946	Rubberized cloth, such as raincoat silk, etc.	2.00	25	2.50	30
2947.	Hard (ebonite and the like) in the shape of surgical tubes, syringes, pessaries, or any other article for surgical use	3.50	25	4.00	30

GREECE

A bill to modify certain headings in the Greek customs tariff has been introduced. According to the new law, No. 2152, the duties on rubber goods will be as follows:

Equivalents.—Drachma, 19.2 cents (nominal value); oke, 2.8 pounds avoirdupois; dramion, 0.111 ounce.

Tariff No.		General Tariff, Drachmas	Conventional Tariff, Drachmas
72*b*.	Metal wires covered with rubber or gutta percha ......per 100 *okes*	10.00	5.00
325*c*.	Pieces, sheets, bands, bars, pipes, etc., of rubber and gutta percha, mixed or not with other materials, and hat rim of cotton steeped in gum ......per 100 *okes*	280.00	140.00

In addition to the above amendments, the law provides for a municipal tax to be levied and collected on imported goods at the same time as the customs import duty. Imported goods, having once paid municipal (octroi) tax, are not again subject to such tax when transported to other municipalities.

The municipal tax on goods subject to import duty (the above, therefore, too) is fixed at 25 per cent of the State import duty.

Below is a list of rubber goods exempt from import duty, but liable to municipal taxes at the specified rates:

Tariff No.		Municipal Tax, Drachmas, per 100 okes
221*d*.	Packing of asbestos mixed with other substances	20.00
325*a*.	Rubber and gutta percha, raw and refined	50.00
b.	Threads of rubber and gutta percha	75.00
d.	Diving suits	10.00

POLAND

Among the articles classed as "luxury" goods, of which importation is prohibited, are mentioned waterproof and rubbered garments, caps, overcoats, mantles, etc.

GERMANY

A German law of July 21 authorizes the German Government to apply the conventional tariff rates to goods of any origin. A government proclamation issued under the above law, dated July 28, and effective August 6, provides that where the customs treatment of imported goods is established by a treaty or convention, this conventional treatment is to be applied to similar goods from whatever country they may be imported.

THE RUBBER INDUSTRY IN THE NETHERLAND EAST INDIES

By a Special Correspondent

The *Archief voor de Rubbercultuur* of December, 1919, publishes a comparison of production costs in West Java and the Federated Malay States. Although the figures in the first case are for 1917 and in the latter for the first half of 1918, they may prove interesting particularly as the conclusions give food for thought at a time when Malayan planters are fighting for higher prices for their rubber.

Data for the Federated Malay States cover 193 estates; the average cost price for 107 was about fl. 1.06 (florin=$0.40 United States currency), and for 86, fl. 1.61 per kilo of rubber.

Placed side by side the average costs for West Java and the Federated Malay States are as follows (one bouw equals 1.75 acres; one kilo equals 2.2 pounds):

		West Java	F. M. S.
(1)	Average yield per bouw per annum.........*kilos*	302	225
(2)	Average costs per kilo of rubber for upkeep of bearing area	fl. 0.1388	fl. 0.2942
(3)	Tapping, preparation, packing, transportation per kilo of rubber	0.5477	0.5902
(4)	General expenses	0.2537	0.4222
	Average cost per kilo of rubber	fl. 0.9402	fl. 1.3066

Special taxes due to circumstances have not been included in the above figures. The cost given above is the f. o. b. price to the nearest port and does not include insurance, freight and office overhead.

In the above costs, the points to be noted are: general estate labor is cheaper in Java; tappers in Java will tap only and not do extra work as the contract workers in the Federated Malay States do. On the other hand, the planter in Java has no recruiting costs, while salaries for the European staff are higher in the Federated Malay States and, last but not least, the yields in Java appear to be higher than in Malaya.

Now the number of West Java estates considered was only 26, and then there was about a year's difference in time. As production increases each year, the figures for West Java would have been still more favorable if they had been given for 1918 as was the case in the Federated Malay States.

The writer of the article concludes with the significant remark that since costs are much lower in Java, the rubber industry is on a firmer economic basis than is the case in Malaya; consequently if prices should decline, Java estates would still have a margin of profit, whereas the Malayan estates would not.

PLANTERS' DEMANDS

The Planters' Union here has asked for a general increase in salaries amounting to 100 per cent. The employers have suggested that since a good many estates have already raised salaries, and as it is difficult to lump estates varying greatly in situation, climate, etc., where conditions consequently differ greatly, minimum salaries should be fixed.

RUBBER TREE SELECTION

Of late, much attention has been given to selection in order to increase the production. Highest producers have been selected as sources of seed or budded stock for new plantings. However, it has been found that a good many of the best yielding trees develop brown bast, and their offspring would naturally inherit the same tendency. In this connection Dr. R. D. Rands read a paper before the annual meeting of the Union of Experiment Station Personnel, held at Buitenzorg, Java.

To eliminate such susceptible trees, Dr. Rands proposes tapping superior trees as often as 5 to 6 times a day. This severe overtapping would naturally induce brown bast in the susceptible trees, and those trees remaining healthy would serve as a source of resistant propagating stock. Experiments were carried out which resulted in the isolation of a high-yielding tree resistant to brown bast. A section of the Economic Garden has been planted with offspring from this tree for the purpose of future study.

NETHERLAND INDIES RUBBER FACTORY

The 1919 report of the above concern shows that the company has not had a very favorable year. The capital has been increased from fl. 750,000 to fl. 2,500,000, in order to permit of expansion, as at present the general expense is too high for the amount of goods produced.

Conditions brought about by the armistice were responsible for fewer sales, while prices had to be lowered in order to permit competition with imported articles, of which there were large quantities in the Netherland East Indies. Further, large sums had to be turned over to buyers of automobile tires and tubes, as it was shown that factory defects developed. In fact, the manufacture of automobile tires had to be temporarily stopped from January 1, 1919. Although many defects were found in solid tires, it has been found that the quality is improving and therefore the manufacture of these will continue.

IMPORTS OF TIRES

The following figures show the quantities of automobile and bicycle tires imported into Java and Madura.

Automobile Tires

From—	April 1919	April 1920	Four Months Ended April 1919	Four Months Ended April 1920
Netherlands ....(*number*)	300	253	325	454
Great Britain	614	2,152	1,269	4,237
France	9,437	4,154	17,426	6,326
Canada	....	....	....	1,022
United States	6,910	3,217	15,505	13,705
Singapore	389	578	3,150	3,761
Japan	270	3,616	17,477	14,195
Elsewhere	728	9,626	4,232	6,699
Totals	18,648	23,596	59,384	50,399

Bicycle Tires

From—	April 1919	April 1920	Four Months Ended April 1919	Four Months Ended April 1920
Netherlands ....(*number*)	948	....	948	6,495
Great Britain	....	588	441	1,673
United States	650	215	1,004	736
Singapore	200	50	200	5,207
Japan	295	30,504	15,058	158,701
Elsewhere	8,000	208	8,110	208
Totals	10,093	31,565	25,761	173,020

THE RUBBER INDUSTRY IN THE STRAITS SETTLEMENTS

According to the report of Consul Edwin N. Gunsaulus, Singapore, the steadily increasing foreign trade of the Straits Settlements, both in imports and exports, during recent years is to a large degree traceable to the remarkable industrial development that has been taking place in Malaya, especially in the cultivation and sale of rubber, which now far outrivals tin as one of the two basic industries of this country.

The great bulk of the rubber production originates in the Malay Peninsula. The Straits Settlements derives its importance as a market for plantation rubber from the fact that practically the entire rubber trade of the Federated and Non-Federated Malay States is conducted through its ports, Singapore and Penang, and is included on this account in the trade statistics of the colony.

As illustrating the development of the rubber industry, it only needs to be mentioned that the Malayan exports of this product increased from 430 tons in 1906 to 108,305 tons in 1918, and the value from $1,200,000 to $87,758,729. Imports into and exports from the Straits Settlements of Pará rubber in 1917 and 1918 were (1 picul = 133⅓ pounds):

Countries	1917 Piculs	1917 Value	1918 Piculs	1918 Value
Imports from—				
Malay States	928,000	$59,903,578	1,351,000	$54,413,409
Dutch East Indies	124,000	7,568,674	328,000	12,693,169
All other countries	40,000	2,387,021	59,000	2,336,498
Totals	1,092,000	$69,859,273	1,738,000	$69,443,076
Exports to—				
United Kingdom	251,000	$18,201,397	159,000	$7,573,316
United States	1,162,000	84,338,741	1,334,000	64,712,734
All other countries	210,000	15,930,196	348,000	15,472,679
Totals	1,623,000	$118,470,334	1,841,000	$87,758,729

The following table gives the values of raw and manufactured rubber imported into the Straits Settlements in 1917 and 1918:

Article	1917 Quantity	1917 Value	1918 Quantity	1918 Value
Raw Materials				
Gutta, inferior ....*pounds*	7,258	$692,342	4,901	$533,156
Rubber, Pará	57,483	68,859,205	91,496	69,443,015
Manufactured Articles				
India rubber goods	......	121,551	....	158,040

By countries, imports of india rubber manufactures were as follows:

Articles and Countries	1917	1918
India rubber goods, including tires:		
United Kingdom	$304,164	$348,414
Japan	181,616	399,854
Siam and Siamese States	1,561	5,365
United States	69,534	298,627
France	252,750	154,941
Italy	201,538	78,209

In imports from the United States appreciable gains appear in rubber tires.

The outstanding feature of the export trade of the Straits Settlements as concerns the buying countries is the premier position held by the United States as a purchaser of Straits products and shipments for 1917 and 1918. This is due to a large extent to the extensive buying of crude rubber by American manufacturers.

The qauntities and values of raw rubber and gutta percha exported during 1917 and 1918 are given below:

Articles	1917 Tons	1917 Value	1918 Tons	1918 Value
Gutta-percha	3,875	$1,557,328	3,140	$2,610,073
Gutta, inferior	5,148	432,767	1,178	124,960
Rubber, Pará	95,476	118,470,176	108,305	87,758,729

A large advance in value is found in gutta percha, while there is a decrease in rubber. In the instance of gutta percha the export value has increased while the quantity exported shows material decrease.

The following table shows the value of rubber and gutta percha exported during 1917 and 1918 and the principal countries to which these products were shipped:

Articles and Countries	1917	1918
Gutta percha:		
United Kingdom	$850,000	$2,124,057
Canada	....	44,895
France	23,000	43,909
Italy	20,000	11,445
Japan	30,000	22,755
United States	600,000	362,736
Gutta, inferior:		
United Kingdom	5,476	5,717
Canada	....	6,365
Japan	18,124	16,010
United States	399,480	89,959
Rubber, Pará:		
United Kingdom	18,201,000	7,573,186
Canada	6,554,000	5,499,199
Australia	....	852,562
France	1,034,000	1,438,670
Italy	1,236,000	2,234,450
Japan	3,610,000	5,365,920
United States	84,000,000	64,719,596

Declared exports of rubber and gutta to the United States from Singapore for the years 1917 and 1918 were as follows:

Articles	1917 Quantity	1917 Value	1918 Quantity	1918 Value
Gutta, Hongkong *pounds*	....	....	67,469	$14,647
Gutta, Jangkar	45,733	$5,398	1,598	9,861
Gutta, Jelutong	10,108,209	871,969	4,043,625	338,916
Gutta percha	2,212,719	281,940	848,506	173,446
Gutta, reboiled	304,659	30,008	19,661	4,648
Gutta, siak	2,346,405	314,286	1,429,397	201,912
Gutta, untreated	764,169	51,950	....	....
Rubber, Pará	167,742,830	87,232,774	173,968,167	62,372,809

The United States was the largest purchaser of rubber from the Straits Settlements, while the United Kingdom led in the purchase of gutta percha.

Exports of rubber to the United States as declared at Penang, were 25,474,672 pounds valued $14,103,936 in 1917, and 21,472,640 pounds valued $5,479,827 in 1918. The decrease in export values was largely due to the sharp slump in the price of rubber during the year.

THE RUBBER INDUSTRY IN MALAYA

By a Special Correspondent

THERE is a general feeling of soreness here among rubber producers over the fact that whereas most articles have risen in price, rubber is a great exception. The opinion is that this has been caused by outside control of the market, many openly saying that America is controlling the market and is refraining from buying until prices suit her.

Various remedies have been offered by those that feel most strongly about the matter. All clamor for some kind of combination. One suggests that "the Rubber Growers' Associations obtain the combination of all members of their association to fix a minimum price of 2*s.* 6*d.* per pound for the lowest grade of rubber." Another wants to fix the price at 4*s.* per pound, yet another calls in the help of the Government which is to buy up all rubber at a fixed price, ranging from 80 cents (Straits) downwards and is to refuse to let a single pound out of the country under 5*s.* per pound. This latter scheme reminds us somewhat of the famous Brazilian rubber valorization scheme, which cost the government a mint of money and was such a ghastly failure.

After all this feverish agitation, the thoughtful editorial in the issue of July 31 of the *Malayan Tin and Rubber Journal* is particularly gratifying. The editor points out that if the two-thirds of Malayan planters belonging to the Rubber Growers' Association formed a combine, an equally strong combine of buyers, watching proceedings, would buy up as much rubber as possible before the planters' combine had a chance to operate, and would be able to go on for several months with these purchases. Meanwhile, the producers' combine would not find a market for their high priced rubbers; the planters would have on hand an increasing stock of rubber—an article extremely liable to deterioration. Thus after four or five months, they would be only too glad to sell at any price.

Of course, all producers are not joining the alarm; the following extract from a recent company report is further proof that there are still people capable of seeing things as they are:

> The really remarkable thing is that, with the world in its unsettled state, the demand for rubber should have kept pace with the greatly increased production. Here, I think, the low prices have been an aid to the industry; at least they have scotched the synthetic bogey. . . . . Low prices have led to the most careful thought being given to working expenditure, until today well-managed estates can produce at a price never thought of in the good old days of 5-shilling rubber.

SELANGOR RUBBER COMPANY'S MAJORITY

The Selangor Rubber Co., Ltd., has just celebrated its 21st birthday. Begun in 1899, it claims to be the first British company formed to cultivate Pará rubber on a commercial scale. It bought 3,927 acres of land in Malaya, approximately 200 acres of which had been planted by the former owners in 1898. At present the company owns 2,631½ acres, of which all that could be used for rubber, 2,511½ acres, has now been planted.

The first rubber sold was a small consignment of 342 pounds, which brought 6*s.* 1¼*d.* per pound. The costs and yields of so old a company are undoubtedly interesting. The total yield was 888,830 pounds of dry rubber during 1919; the cost of production alone was just over 6¼*d.* per pound, against 6½*d.* per pound the year before. As for yields per acre, some of the 21 year old rubber gave up to 500 pounds an acre, and none of it gave less than 350 pounds. Some of the newer rubber fields yielded well over 650 pounds per acre.

Against these figures it is interesting to put those of another well-known company—the Seafield Rubber Co. Here the production costs, including export duties, was about 8*d.* per pound, against 8⅛*d.* the year before. The older portion of the estate covering about 826 acres yielded 634 pounds per acre, one field giving 816 pounds per acre. The new portion with an acreage of 1,248 averages 501 pounds per acre.

Production on most estates in Malaya ranges from about 450 pounds to 250 pounds, while all-in costs are generally around 1*s.* per pound. On some of the newer estates all-in costs run as high as 1*s.* 5*d.* per pound.

ALTERNATE DAILY TAPPING

Together with prices, the labor shortage and alternate daily tapping are being discussed a good deal at present. The number of planters using the alternate method is far greater than many have thought. Their reasons for favoring the method coincide pretty well; the general opinion is that by this system the amount of labor required is reduced, while the percentage of first latex rubber is considerably higher, one planter giving his percentage of first latex as over 87.6. Then there is a reduction in costs, while it is further pointed out that lighter tapping favors the health of the trees.

NEW RUBBER PACKING CASES

A new solid fiber telescopic chest for packing rubber is being introduced into the Far East by the Zellerbach Paper Co., of San Francisco, California. These chests are sent out in the shape of sheets and are riveted, packed, wired, and made ready for shipment at the plantation.

At a demonstration held in Singapore, 250 pounds of sheet rubber were packed in such a chest without much pressure. In a Borneo, Momi or Venesta chest but 200 to 250 pounds can be packed. To show the durability and resistance to breakage of these packages two fully packed chests were thrown to the ground from a height of 21 feet. They proved to be resilient as a rubber ball, and except for a small clip flying off, showed no damage. The same test applied to a Borneo chest resulted in the chest being smashed to pieces. Two Venesta cases thus tested were also badly damaged. Although the new case, which is made of a composition of fiber and jute, is somewhat more expensive than the other cases, it is felt that its advantages outweigh this objection.

THE RUBBER INDUSTRY IN THE FEDERATED MALAY STATES

According to the reports of Consul Edwin N. Gunsaulus, Singapore, Straits Settlements, while the import and export trade figures of the Straits Settlements embrace practically all the foreign trade transactions of the Federated Malay States and the entire Malay Peninsula, as well by reason of the fact that essentially all of the incoming and outgoing products having to do with the Malay States pass through Singapore, Penang, and Malakka, the commercial and trade importance of the Straits Settlements depends to a great extent upon the development and progress of the hinterland, known as the Malay Peninsula. The development of the Malay Peninsula, particularly that portion included in the Federated Malay States, is well known and

for several years the Peninsula has led all other countries in the production of crude rubber.

The exports of rubber from the Federated Malay States were as follows for the last five years:

	Tons
1914	30,697
1915	44,523
1916	62,764
1917	79,831
1918	78,283

Stocks in the Federated Malay States at the end of the year were still somewhat heavy.

An outstanding feature of the year was the success attending the extraction of gutta percha by native methods from taban trees.

THE RUBBER INDUSTRY IN CEYLON

Special Correspondence

The campaign begun by F. S. Elson to organize some kind of union of planters to improve the lot of the working planter has given the Planters' Association of Ceylon a much-needed jolt. Once fully aroused to the real need of reforms, this association has lost no time in getting into immediate and sympathetic touch with Mr. Elson and his associates. As a result it is gratifying to learn that discussions to reconstitute the Planters' Association have been under way, and that the need for a separate organization to fight for the working planters' interests has practically vanished.

It has been proposed to divide the interests at present represented by the General Committee of Planters' Association of Ceylon into four heads: (1) The interests of the companies; (2) interests of private proprietors; (3) interests of working planters, including assistant superintendents; (4) a general committee to watch over, as at present, politics in its widest sense.

Furthermore, resolutions have been passed with regard to salaries, pensions and furloughs. With reference to the latter, the opinion was that all planters should be entitled to six months' leave with full pay after five years' service in an up-country district, or four years' service in a low-country district; employers should be asked to pay annually to the Ceylon Planters' Association a sum equal to one-fifth, in the case of an up-country planter, and one-fourth in the case of a low-country planter, of the six months' furlough full pay; that a similar method should be adopted for payment of the cost of passages to England.

RUBBER CONTRACT CASE

Graham McPhillips, Limited, of Singapore, which, during the latter part of 1919 had a branch office at Colombo, sued the General Rubber Co., also having a branch office at Colombo, for the recovery of 32,340 rupees as damages suffered by plaintiff in consequence of an alleged breach of the terms of a contract dated September 12, 1919, for the sale of rubber. By the terms of this contract the General Rubber Co. was to supply 75 tons of rubber, to be delivered in October, November and December, 1919, at the rate of 25 tons per month. Payment was to be made by bank demand drafts on London. Any alteration in method of payment which might come into force during the period of contract would be applicable to the contract.

The plaintiff company claimed that, for the delivery of the 50 tons during November and December, defendants insisted on payment in rupees and refused to accept demand drafts on London. Plaintiffs paid in rupees under protest and were compelled to cancel the cross-exchange contract with the bank, thereby suffering a loss of 32,340 rupees.

Judgment was that after October, under the altered conditions of payment at public sales, the option of payment in sterling draft was no longer in force. Consequently, the defendants were entitled to payment in rupees, and plaintiffs could not claim damages. Plaintiffs' action was dismissed with costs.

PASDUN KORALE SHOW

At this recently held agricultural and horticultural show, planters of the Kalutara district lent their aid. Among the exhibits were rubber sheets. The gold medal for unsmoked diamond sheet was won by the superintendent of Millekanda.

DEFECTS IN PLANTATION RUBBER

SPOTS ON SHEET RUBBER

The spots that are sometimes noticed on plantation sheet appear as clear, transparent and rather darker places on the sheets, varying greatly in size, form and number, but distinctly visible, particularly when held up to the light. With a few exceptions, both sides of the sheet are similarly spotted, showing that the defect extends through the sheet.

Experiments show that these spots occur when sulphite or bisulphite or a combination of both is used. Small amounts of these chemicals do not affect the appearance of the sheet; but when larger amounts are employed, the spots become evident. When a greater amount of curdling or coagulation of the latex takes place, more of the sheets are spotted and the spots are larger and darker.

The use of anti-coagulants other than sulphite and reduction or avoidance of bisulphite prevent spots from appearing.

RUSTINESS IN SMOKED SHEET

A damp atmosphere is particularly favorable to the development of rustiness, which is indeed most prevalent during wet weather. The degree of moisture in which sheets hang shortly after rolling is of the greatest importance. In wet weather, sheets taken immediately after rolling into a drying room at a temperature of 104 to 140 degrees F. never become rusty, while air drying (at room temperature) sometimes produces rustiness. It is also increased by rolling the sheet a longer time after coagulation. An increase in rustiness was caused in several experiments by rolling sheets twenty-four hours after coagulation instead of directly.

One experimenter recommends soaking the sheets in water to prevent rustiness. However, another finds that this promotes rustiness. Even on sheets soaked in water for seven days rustiness can be produced. Rapid surface drying is regarded as the best method to prevent rustiness caused by the decomposition of serum substances.

MOULDY RUBBER

Of late there has been considerable complaint about rubber that has left the estate quite dry and arrives in a mouldy condition or covered with colored spots. A few years ago, the remedy was sought in oversmoking. At present, however, with an overstocked market, buyers have been able to pick and choose and oversmoking means losses, so that a new remedy must be found.

Mouldiness is caused by damp conditions of packing or dampness during transportation. Thorough smoking and care in keeping the rubber dry afterward is the best method for preventing mould. Cases should never stand on a cement floor, but be placed at least three or four inches off the floor. Other remedial suggestions are: the separation of factory and packing room; packing rubber in lead-lined cases; redrying the rubber at the coast; the making of black rubber instead of sheet and baling this. It is said that soaking unsmoked sheet for 48 hours will prevent mould. In the case of smoked sheets, soaking 5 to 20 hours before smoking is advised.

Rubber and manufactures of rubber were imported into the Dominican Republic during 1918 from the United States to the value of $137,804; from the United Kingdom, $116; from France, $60; from Porto Rico, $5,904; and from all other countries, $92, a total of $143,976 for the year.

Recent Patents Relating to Rubber

THE UNITED STATES

ISSUED APRIL 13, 1920

No. 1,337,009* Hard rubber dye stick with soft rubber plugs for ends. W. V. Foley, assignor to India Rubber Co.,—both of New Brunswick, N. J.

ISSUED AUGUST 3, 1920

1,348,163 Rubber outer sole for shoe, with heel rest intended to be concealed when heel is attached. G. Ferguson, Wollaston, Mass., assignor to United Shoe Machinery Co., Paterson, N. J.
1,348,165 Cushion wheel. F. A. Frommann, Chicago, Ill.
1,348,200 Tire composed of rubber of different degrees of hardness for the main portion and for the edges of the tread, integrally combined. W. W. Beaumont, London, England.
1,348,211 Fountain-pen-filling device for bottles, with rubber bulb. A. T. Cross, Providence, R. I.
1,348,313 Water reservoir to be used in tidal movement power system, having tubular connection to outside motor. V. Paesano, Isola Siri Superiore, Italy, assignor of one-half to P. Di Milla, Boston, Mass.
1,348,401 Rubber udder attachment for milking-machines. P. A. Frimand, Wilmette, assignor to the Burton Page Co., Chicago—both in Illinois.
1,348,412 Syringe nozzle tip. G. V. Harriman, New York City.
1,348,466 Tire-patch. W. C. Wood, Minneapolis, Minn.
1,348,516 Inflatable hand cushion for plasterers' hawks. E. J. Peck, Portland, Ore.
1,348,522 Spring-tire. M. O. Sweiven, Olivia, Minn.
1,348,614 Resilient tire. L. W. Wood, Fontanelle, Iowa.
1,348,706 Flexible and resilient shoe sole with intermediate layer of rubber. J. B. Frechette, Valparaiso, Ind.
1,348,728 Pessary. L. Martocci-Pisculli, New York City.
1,348,754 Elastic dress-shield supporter. E. Schrader, Salina, Kansas.
1,348,796 Syringe. C. E. A. Gronbech, New York City, assignor to Charles J. Tagliabue Manufacturing Co., Brooklyn—both in New York.
1,348,818 One-piece waterproof garment. D. L. MacCallum, Cambridge, Mass.
1,348,819 Gas mask. E. W. Miller, Washington, D. C.

ISSUED AUGUST 10, 1920

1,348,950 Aviator's helmet with similarly shaped outer container for water or air. A. Kaminski, Uniontown, Pa.
1,348,954 Cushion tire. C. D. Macropoulos, New York City.
1,348,971 Toy airplane operated by rubber band. A. F. Thurnau, assignor to Lawrence Airplane Model & Supply Co.—both of Chicago, Ill.
1,348,975 Vehicle-wheel with demountable rim. L. V. Annable, assignor, by mesne assignments, to The Standard Parts Co.—both of Cleveland, Ohio.
1,349,055 Tire tread. W. N. Forbes, Dartmouth, Nova Scotia, Canada.
1,349,124 Tire carcass. G. F. Fisher, Plainfield, N. J., assignor to Revere Rubber Co.
1,349,163 Resilient cushion tire. C. LaCour, Dixon, Ill.
1,349,206 Bathing cap. O. R. Jeffers, assignor to General Patent Manufacturing Co.—both of Chicago, Ill.
1,349,263 Gum and mint case. L. W. Buchenau, Stockton, Calif.
1,349,295 Metal-studded fabric band antiskid for tires. W. Reinl, Secaucus, N. J.
1,349,296 Rubber footwear and method of manufacture. J. M. Rice, F. A. Joseph, and A. D. Rupp—all of New Haven, Conn.
1,349,335 Balloon valve. J. R. Gammeter, Akron, Ohio, assignor to The B. F. Goodrich Co., New York City. (See THE INDIA RUBBER WORLD, August 1, 1919, page 637.)
1,349,339 Spring wheel. H. M. Horne, assignor of one-half to W. J. Sudderth—both of Sulphur Springs, Tex.
1,349,366 Tire abrader. F. J. Cordell, St. Louis, Mo. (See THE INDIA RUBBER WORLD, February 1, 1920, page 297.)
1,348,441 Milking machine with rubber teat-cup linings. W. A. Shippert, Chicago, Ill.
1,349,463 Dust cap for pneumatic tire valves. J. W. Laird, Pasadena, Calif.
1,349,474 Syringe. O. O. R. Schwidetzky, Hasbrouck Heights, assignor to Beckton, Dickinson & Co., Rutherford—both in New Jersey.
1,349,513 Parachute. Z. Koza, Akron, Ohio.
1,349,517 Fountain brush. J. Lukaszewski, Chicago, Ill.

ISSUED AUGUST 17, 1920

1,349,572 High rubber boot with laced foot portion. C. W. Hubbell, assignor to The Goodyear's India Rubber Glove Manufacturing Co. both of Naugatuck, Conn.
1,349,593 Apparatus for mooring dirigibles and the like. E. S. Ullmann, New York City.
1,349,744 Rubber-soled canvas shoe. H. Westling, assignor to Apsley Rubber Co.—both of Hudson, Mass.
1,349,745 Rubber-soled shoe. H. Westling, assignor to Apsley Rubber Co.—both of Hudson, Mass.
1,349,767 Rubber-dam clamp forceps. J. W. Ivory, Philadelphia, Pa.
1,349,779 Recoil pad for firearms. W. L. Marble, Gladstone, Mich.
1,349,902 Tire bead. T. Midgley, Springfield, assignor to The Fisk Rubber Co., Chicopee Falls—both in Massachusetts.
1,349,922 Tire valve cap. R. H. Simpson, Berkeley, Calif.
1,350,016 Low-pressure signal for subnormal tires. C. T. Ewing and A. Ewing—both of Los Angeles, Calif.
1,350,083 Car hose-coupling. E. A. Schreiber, assignor to Vapor Car Heating Company, Inc.—both of Chicago, Ill.
1,350,190 Non-slip heel for footwear. G. W. Watson, Boston, Mass.
1,350,192 Dress shield. H. Weeks, assignor of one-half to S. E. Durant—both of New York City.

*Omitted from our issue of June 1, 1920.

1,350,205 Hose reel. J. E. Anderson, Jamestown, N. D.
1,350,211 Sea dirigible. D. Corson, Jr., Mount Union, Pa.
1,350,216 Shoe heel with rubber plug. G. F. Fischer, Rochester, N. Y.

THE DOMINION OF CANADA

ISSUED JULY 27, 1920

202,146 Tire casing. H. E. Grabau and A. C. Schwartz, coinventors, both of New York City, U. S. A.
202,222 Overshoe retainer. V. E. Langhardt, Fresno, Calif., U. S. A.
202,251 Demountable rim for tires. S. M. Saltzman, Brooklyn, N. Y., U. S. A.
202,288 Tire casing. The Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, Canada, assignee of DeC. Neal, Charlotte, N. C., U. S. A.
202,303 Rubber heel with attaching device. The Hill Rubber Heel Co., assignee of R. I. Hill—both of Elyria, Ohio, U. S. A.
202,325 Rubber glove with constricted finger portions to take up slack. The Sterling Rubber Co., assignee of J. B. Abler—both of Guelph, Ont.
202,339 Composition cord fabric and rubber sole for boots and shoes. J. E. Grosjean, assignor, and F. L. Maire, assignee of a half-interest—both of Lima, Ohio, U. S. A. (See THE INDIA RUBBER WORLD, June 1, 1920, page 590.)

ISSUED AUGUST 3, 1920

202,363 Sanitary mattress cover pad with rubber insert. J. W. and M. E. Callahan, coinventors—both of El Paso, Texas, U. S. A.
202,368 Breast pump. A. E. Anderson, Saskatoon, Saskatchewan.
202,438 Adjustable skirt with elastic belt. T. La Maida, New York City, U. S. A.
202,439 Celluloid fountain pen with rubber washer. F. La Boeuf, Belleville, N. J., U. S. A.
202,447 Pneumatic tire. C. L. Marshall, London, E. C. 4, England.
202,482 Spring wheel with cushion tire. T. Rozankovich, Galveston, Texas, U. S. A.
202,483 Wheel cushion and means for mounting same. A. L. Runyan, Omaha, Nebraska, U. S. A.
202,510 Tire carrying rim for automobile wheels. J. H. Wagenhorst, Jackson, Michigan, U. S. A.
202,511 Tire carrying rim for automobile wheels. J. H. Wagenhorst, Jackson, Michigan, U. S. A.
202,526 Fountain pen. The Autopoint Pencil Co., assignor of C. R. Keeran, both of Chicago, Illinois, U. S. A.
202,539 Radio operator's helmet. The International Western Electric Co., Inc., New York City, U. S. A., assignee of The Western Electric Company, Montreal, Que., assignee of F. D. Waldron, Brooklyn, N. Y., U. S. A.
202,551 Apparatus for transmitting selected sounds and excluding others, for use of aviators. The Stentor Electric Manufacturing Co., Inc., assignee of J. L. Spence—both of Long Island City, N. Y., U. S. A.
202,568 Bottle closure or cover with two openings and inside gasket. E. Deighton and E. Islip, assignee of a half interest—both of Toronto, Ont.

ISSUED AUGUST 10, 1920

202,659 Reinforced resilient tire. J. H. Douglas, Norfield, Mississippi, U. S. A.
202,688 Undergarment having an outside elastic band adjacent to the waist portion. K. Heitler, New York City, U. S. A.
202,698 Life preserver. S. Kelso, Toronto, Ont.
202,703 Reinforced tire. F. W. Kremer, New York City, U. S. A.
202,742 Resilient tire filler. A. L. Runyan, Omaha, Neb., U. S. A.
202,753 Hose coupling. W. E. Smith, Gainesville, Ga., U. S. A.
202,833 Demountable split tire rim. A. O. Vanzandt and A. J. Sperber, each an assignee of a half interest—both of Toledo, O., U. S. A.

ISSUED AUGUST 17, 1920

202,903 Rubber tobacco pouch. L. T. Adelman, LaKemp, Okla., U. S. A.
202,912 Cushion tire. M. E. Baxter, East Liverpool, O., U. S. A.
202,918 Child's comforter with sponge rubber inside rubber teat. R. Briggs, St. Kilda, Victoria, Australia.
202,951 Pneumatic tire with armor having pieces of vulcanite reinforced with metal plates embedded in its layers. J. E. Dysart, Cadiz, O., U. S. A.
203,003 Pneumatic tire. C. L. Marshall, London, E. C. 4, England.
203,048 Garment supporter. M. Starmer, Newport News, Va., U. S. A.
203,060 Inner tube having bead with countersink for valve. H. B. Wallace, St. Louis, Mo., U. S. A.
203,075 Submarine sound-detecting device having unstretched and unstrained soft rubber diaphragm. The Canadian General Electric Co., Limited, Toronto, Ont., assignee of W. D. Coolidge, Schenectady, N. Y., U. S. A.
203,076 Submarine sound-receiving device with an enclosed chamber for microphone having at least one wall of soft rubber. The Canadian General Electric Co., Limited, Toronto, Ontario, Canada, assignee of C. W. Rice, Schenectady, N. Y., U. S. A.
203,077 Submarine sound-detecting device with rubber diaphragm and microphone attached. The Canadian General Electric Co., Limited, Toronto, Ont., assignee of I. Langmuir, Schenectady, N. Y., U. S. A.
203,104 Kite balloon with ballonet separate from envelope with automatic inlet and outlet valves. The Goodyear Tire & Rubber Co., assignee of R. Upson—both of Akron, O., U. S. A.
203,118 Tire pressure gage. A. Schrader's Son, Inc., New York City, assignee of H. Keyton, North Bergen, N. J.—both in U. S. A.
203,119 Tire pressure gage. A. Schrader's Son, Inc., New York City, assignee of J. A. Bowden, Los Angeles, Calif.—both in U. S. A.

Chemical Patents will be found on pages 29, 30. Machinery Patents on pages 33, 34.

203,127 Dirigible mooring device. Vickers, Ltd., Westminster, London, assignee of Sir J. McKechnie, K. B. E., of Barrow-in-Furness, and B. N. Wallis, of Grange-over-Sands, both of Lancaster—all in England.

THE UNITED KINGDOM

ISSUED AUGUST 5, 1920

143,959 Pneumatic tire reinforced by overlapping metal plates between casing and tube. J. E. Wilkes, 24 Horseley road, Tipton, Staffordshire.
143,966 Games employing rubber bulbs. J. L. Palmer and H. M. Smith—both of 16 Great George street, Westminster.
144,033 Tire valve. T. A. Low, Renfrew, Ontario, Canada.
144,042 Safety feet for ladders. J. Paterson, Laurel Bank, Burneside, near Kendal, Westminster.
144,043 Safety inner pocket closed by a broad band of elastic. G. Dickson, 21 Cedar street, Cheetham, Manchester.
144,046 Parachute. A. Merchant, Bobbin Works, Forres, Morayshire.
144,053 Rubber-lined tobacco pouch. R. Lyons, 60 City Road, Manchester.
144,133 Tank for coagulating rubber. T. Burney, Holland House, Bury street, London.
144,178 Detachable rubber heels. W. J. Sellars, 213 Tinakori road, Wellington, New Zealand.
144,188 Boot protectors consisting of three rubber pads of special shape. T. W. Green, 179 Forest road, Walthamstow, London.
144,219 Suction denture. A. L. Davis, 2 Devonshire street, Chesterfield, Derbyshire.
144,222 Pocket respirator. C. Rosling and R. H. Davis—both of 187 Westminster Bridge road, London.
144,224 Artificial legs with rubber cords. P. A. Ingold, 8 Johannvorstatt, Bâle, Switzerland.
144,237 Moustache trainer with rubber band. L. Doubnikoff, 65 Hallam street, London.
144,241 Resilient wheel with intermediate pneumatic chamber. A. A. A. Derche, Edith Cavell road, Alger, Algeria. (Not yet accepted.)
144,262 Fabric-covered metallic patch for repairing tires. E. M. Steel, Washington, U. S. A. (Not yet accepted.)
144,275 Reinforced pneumatic tire. P. A. Sawyer, 78 North Main street, and W. C. Burton—both in Memphis, Tennessee. (Not yet accepted.)
144,279 Rubberized tobacco pouches. I. B. Kleinert Rubber Co., assignee of V. Guinsburg—both of 725 Broadway, New York City, U. S. A. (Not yet accepted.)
144,312 Pneumatic supports. H. Seibel, 572 Folsom street, San Francisco, California, U. S. A. (Not yet accepted.)
144,345 Sound detecting and locating apparatus for hydrophones, aerophones, etc., of which the complete receiver may be fitted within a rubber sphere. D. N. Browning, 4 Clayton terrace, Dennistoun, Glasgow, Scotland.

ISSUED AUGUST 11, 1920

144,435 Deformable blocks of rubber, etc., used in spring wheels, couplings and vibration-dampers. C. Reuse, 18 Quai au Charbon, Halle, Belgium.
144,454 Stoppers for hot-water bottles, etc. Ioco Proofing Co., Netherton Works, Anniesland, Glasgow, and H. D. Watt, Drumchapel, Dumbartonshire.
144,554 Device for securing heelpads. E. M. Hamilton, 10 Chester Crescent, Newcastle-on-Tyne.
144,646 Resilient tire. F. W. Kremer, 116 West 39th street, New York City, U. S. A. (Not yet accepted.)
144,683 Tire valves. Payne Valve Corporation, assignee of M. J. Payne—both of Witz Building, Staunton, Virginia, U. S. A. (Not yet accepted.)
144,696 Pneumatic tire. H. L. Ochs, 1520 Grand avenue, Kansas, Missouri, U. S. A. (Not yet accepted.)

ISSUED AUGUST 18, 1920

144,799 Submarine sound filters or resonators. J. A. Burgess, Grand place, Washington, and G. B. Hutchings, Box 10, Richmond, Virginia—both in U. S. A.
144,848 Dust caps for tire valves. D. H. Webster, New York City, U. S. A.
144,892 Spring tire with run enclosing air tube. G. Negri, 31 via XX Septembre, Genoa, Italy.
144,941 Knee pads containing insert of rubber, gutta percha, etc., to provide warmth. R. Walsh, 5 Clifford street, Nelson, Lancashire.
144,954 Reinforced tire filler with inflatable and non-inflatable chambers. R. Blakoe, 46 Bryanston street, Marble Arch, London.
144,986 Rubber sole with upstanding rubber pads secured to boot by adjustable pieces of leather. B. A. Thornhill, Single Tree, Newera Eliya, Ceylon.
145,091 Pneumatic milking-machine. De Laval Separator Co., 165 Broadway, New York City, assignee of M. Leitch, Kingwood Park, Poughkeepsie, N. Y.—both in U. S. A. (Not yet accepted.)

ISSUED AUGUST 25, 1920

145,127 Land wheels with rubber springs for deadening shock of landing in a seaplane. Fairey Aviation Co. and C. R. Fairey—both of Clayton road, Hayes, Middlesex.
145,155 Repair vulcanizer. W. Frost and H. Frost & Co.—both of 148 Great Portland street, London.
145,175 Demountable rim for tires. C. F. Rubsam, 233 Broadway, New York City, U. S. A.
145,254 Apparatus for reclaiming rubber, etc., from waste. E. C. Marks, 57 Lincoln's Inn Fields, London. (Acushnet Process Co., 52 Vanderbilt avenue, New York City, U. S. A.)
145,269 Automatic valve for kite balloons. J. D. Mackworth, 17 Devonshire street, Portland Place, London, and A. P. Starkey, Dunsmore, South Hill avenue, Harrow.
145,296 Mine breathing-appliances. G. L. Brown, 159 Yorke street, Mansfield Woodhouse, Nottinghamshire.
145,298 Return balls of cork with elastic cord. H. C. Wood, 5 Bromfield terrace, Tadcaster, Yorkshire.
145,312. Wheel tires. C. L. Marshall, 27 Queen Victoria street, London.
145,333 Combined cushion and pneumatic tire. R. Blakoe, 46 Bryanston street, Marble Arch, London.
145,341 Pneumatic tire having rubber security-band to seat on rim. F. L. Rapson, Childwall Hall, London.
145,455 Portable respiratory apparatus. A. B. Drager, trading as Dragerwerk H. & B. Drager, Finkenberg, Lubeck, Germany. (Not yet accepted.)

TRADE MARKS

THE UNITED STATES

No. 110,636. Representation of a section of hose—rubber or rubber composition hose. Voorhees Manufacturing Co., Jersey City, N. J.

115,293. The words Snap Lox—dust caps for pneumatic tire valves. (See The India Rubber World, April 1, 1920, page 434.) Newson Valve Co., St. Louis, Mo.

120,516. The word Barco—composition asbestos and rubber gaskets, etc., Barco Manufacturing Co., Chicago, Ill.

122,220. The words McRae's Made Right worked into representation of a stencil, the initials M and R serving for both sets of words—inner tubes. McRae Wholesale Hardware Co., Helena, Ark.

123,740. Conventionalized representation of a bird with outspread wings standing on a tire across which is superimposed the word Jenckes, having large letters at both ends—tire fabrics in the piece. Jenckes Spinning Co., Pawtucket, R. I.

124,696. Representation of label bearing picture of a courtier and the words Duluth Standard—armbands, garters and suspenders. Slonim Brothers, Duluth, Minn.

125,774. The words Ne-Pac—rubber and balata belting and packing, pneumatic and solid rubber tires, rubber and fabric gaskets, rubber composition and fabric valves, and model-rubber ammonia rings. Capen Belting & Rubber Co., St. Louis, Mo.

127,453. Representation of an inner tube and the word Kantkumoff in white against a rectangular background—rubber patches for repairing rubber or fabric articles. Stearns Rubber Products Co., Chicago, Ill.

127,968. The word Gasmask—rubber sheeting in the piece or roll. H. L. Kaufmann, Louisville, Ky.

128,862. Representation of an eagle carrying arrows in his talons and in his beak a scroll bearing the word Rubberweld—cement for patching rubber, leather and fabric articles. Albert J. Tomlinson, Wichita, Kansas.

129,103. The word Heatherstone—fabric and rubber carriage cloth. United States Rubber Co., New Brunswick, N. J., and New York City.

129,104. The word Venteel—fabric and rubber carriage cloth. United States Rubber Co., New Brunswick, N. J., and New York City.

129,105. The word Yarntex—fabric and rubber carriage cloth. United States Rubber Co., New Brunswick, N. J., and New York City.

129,108. The word Millhyde—fabric and rubber carriage cloth. United States Rubber Co., New Brunswick, N. J., and New York City.

129,277. Representation of a tire encircling map of the State of Ohio and bearing the words The Ohio State Rubber Tire Co., Port Clinton, Ohio—pneumatic tires and inner tubes. The Ohio State Rubber Tire Co., Port Clinton, Ohio.

129,910. The word Naugatop—fabric and rubber carriage cloth. United States Rubber Co., New Brunswick, N. J., and New York City.

129,911. The word Raynbar—fabric and rubber carriage cloth. United States Rubber Co., New Brunswick, N. J., and New York City.

129,913. The word Supertex—fabric and rubber carriage cloth. United States Rubber Co., New Brunswick, N. J., and New York City.

130,289. The word Prudential—tires and tubes. The Prudential Rubber Co., Akron, Ohio.

130,323. The words Red Raven Rubber Company within a shaded oval—tires and tubes. J. H. Dwork, Newark, N. J.

130,470. The word Picher within a conventional line border—storage batteries and parts. The Eagle-Picher Lead Co., Cincinnati, Ohio.

130,520. The word "Macgregor" quoted—golf balls, etc. The Crawford, Macgregor & Canby Co., Dayton, Ohio.

130,527. The words Gold Seal—rubber tires and inner tubes. Dryden Rubber Co., Chicago, Ill.

130,755. The word SoxLox—hose supporters. C. W. Egerton, 191 Halsey street, Brooklyn, N. Y.

130,878. The word Atlantic—rubber tires. The Charles William Stores, Inc., Brooklyn, N. Y.

131,179. Conventionalized representation of a tire surrounding a bust portrait of Lincoln and bearing the words Honest Abe—rubber tires, casings and tubes. Lincoln Tire & Rubber Co., Youngstown, Toledo, Piqua and Troy, Ohio, and Miami, Florida.

131,372. Representation of a bulldog—dental rubber, dam and bulbs. Atlantic Rubber Manufacturing Corporation, New York City.

131,393. The word Leathereign—men's, women's and children's raincoats, etc. C. Kenyon Co., Brooklyn, N. Y.

131,487. Representation of a label bearing a silhouette of fir trees and the words Countri Mufti—men's and women's raincoats and rubber gloves. John Lurie, Inc., New York City.

131,570. The words Pony Blimp separated by a representation of a winged horse—motor-driven balloons. The Goodyear Tire & Rubber Co., Akron, Ohio.

131,714. The word Protecto—sanitary bloomers. Rubberized Sheeting & Specialty Co., Inc., New York City.

131,737. The word Leathereign—waterproof fabrics in the piece. C. Kenyon Co., Brooklyn, N. Y.

131,743. The words Teddy Pants—rubber baby-pants and diaper covers. The Miller Rubber Co., Akron, Ohio.

131,791. The words Pony Blimp—motor-driven balloons. The Goodyear Tire & Rubber Co., Akron, Ohio.

131,949. The word Edison—fountain pens and pen points. Edison Pen Co., Inc., Petersburg, Va.

132,086. The words Power Plus with the loop of the initial P containing the remainder of the word Power in staggered letters, and below the loop the word Plus, also in staggered letters—repair patches for tires and tubes. Darling, Miller & Co., New York City.
132,278. The word Huskie—rubber vehicle tire casings and tubes. The United Rubber Company, Akron, Ohio.
132,293. Conventional representation of two thistle blossoms on a stem between two leaves, above the words Steam Cured—dress shields. J. J. Beyerle Manufacturing Co., New York City.
132,294. The word Irene—dress shields. J. J. Beyerle, New York City.
132,347. The word Excello—rubberized mackinaws, mackintoshes, etc. Excello Clothing Company, Inc., Passaic, N. J.
132,597. The facsimile autographic signature Dorothy Dodd—men's, women's and children's boots, shoes and slippers of leather, rubber and fabric. Dorothy Dodd Shoe Co., Boston, Mass.
132,610. The words Queen Quality—men's, women's and children's boots, shoes and slippers of leather, rubber and fabric. Thomas G. Plant Co., Boston, Mass.
133,339. The letter H within two concentric circles—tires and tubes. The United Rubber Co., Akron, Ohio.
133,611. The word Dit vertically placed within conventional arrangement of lines—rubber boots. George F. Dittmann Boot & Shoe Co., St. Louis, Mo.
134,005. Representation of a seal bearing figure of an eagle perched on several rolls of belting, beneath the words Original Manufacturers of Mechanical Rubber Goods, Established 1828, all within a border bearing the words Boston Belting Company, Boston, Mass.—roller covers. Boston Belting Co., Boston, Mass.
134,116. Representation of a caravel beside the word Caravel—rubber elastic for garters and bands, notions, etc. Caravel Company, Inc., New York City.
134,498. Conventionalized star design within a circle, with the letter W in the center of the star—silk elastic garter-web, silk cable elastic web, lisle elastic, silk elastic, etc. George Williams Co., New York City.
134,992. The letter A within a spade spot outline—hard rubber knife and razor handles and hard rubber pumps. American Hard Rubber Co., Hempstead and New York, N. Y.

THE DOMINION OF CANADA

26,833. The words C. S. F. Shoe Findings and Novelties—rubber heels, foot appliances, etc. Canadian Shoe Findings Novelty Co., Toronto, Ont.
26,836. The word Valvene—washers for water taps. The Commercial India Rubber Manufacturing & Supply Co., Limited, 585 Commercial Road, London, Eng.
26,842. The words Natty Pad in fancy type with flourishes—garters. George Frost Co., Boston, Mass., U. S. A.
26,853. The word Tirometer—combined tire and tube valve and gage. Tirometer Valve Corporation of America, Charleston, W. Va., U. S. A. (See The India Rubber World, April 1, 1920, page 434.)
26,868. The word Premier—erasers, etc. Twigg & Beeson, 6-7 Ludgate Hill, Birmingham, England.
26,879. The word Firestone—pneumatic and solid tires. Firestone Tire & Rubber Co., Akron, O., U. S. A.
26,882. The words Twin and Wedge within a heel-shaped outline—rubber heels for men's, women's and children's shoes. Barva Heel & Tire Factory, Inc., Fort Wayne, Ind., U. S. A.
26,942. The word Sorbo—rubber sponges and other sponge rubber products, etc. Sorbo Rubber-Sponge Products, Limited, Sorbo Works, Mayhury Road, Woking, Surrey, Eng.

AUSTRALIA

TO AMERICANS

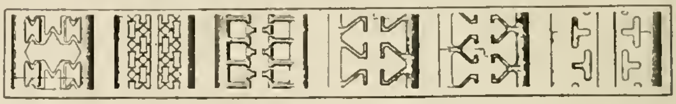
26,867. Representation of head of an Indian within a tire upon which are inscribed the words The Savage Tire Company—tires. The Savage Tire Co., San Diego, Calif., U. S. A.

26,689. The word Usco—hose and packing. United States Rubber Co., New York City, U. S. A.

DESIGNS

THE UNITED STATES

No. 55,947. Highway advertising and directing device formed by a representation of a tire through which an arrow passes from left to right. Patented August 3, 1920. Term 7 years. F. A. Horn, Denver, Col.
55,966. Tire tread. Patented August 3, 1920. Term 7 years. J. D. Tew, Akron, Ohio, assignor to The B. F. Goodrich Co., New York City.
55,975. Air-pump nozzle. Patented August 10, 1920. Term 7 years. C. M. Boyce, Westcliff-on-Sea, England.
55,987. Non-skid tire. Patented August 10, 1920. Term 14 years. W. E. Duersten, New Castle, Pa.
56,000. Rubber heel. Patented August 10, 1920. Term 14 years. S. B. Frederick, Detroit, Mich.
56,046. Tire. Patented August 10, 1920. Term 14 years. W. W. Wildman, assignor to The Wildman Rubber Co.,—both of Detroit, Mich.



55,966 55,987 56,046 56,103 56,104 56,105

56,067. Two-faced double-sided doll. Patented August 10, 1920. Term 14 years. F. Kaupmann, Jr., Brooklyn, N. Y., assignor to The Faultless Rubber Co., Ashland, Ohio.
56,071. Tire cover. Patented August 10, 1920. Term 7 years. P. M. Lockwood, Kansas City, Mo.
56,073. Advertising and toy balloon in shape of a tire with balloon basket suspended below. Patented August 10, 1920. Term 14 years. W. M. Madison, Cleveland, Ohio.
56,103. Tire. Patented August 17, 1920. Term 14 years. A. J. Pennington, assignor to U. S. Compression Inner Tube Co.,—both of Tulsa, Okla.
56,104. Tire. Patented August 17, 1920. Term 14 years. A. J. Pennington, assignor to U. S. Compression Inner Tube Co.—both of Tulsa, Okla.
56,105. Tire. Patented August 17, 1920. Term 14 years. A. J. Pennington, assignor to U. S. Compression Inner Tube Co.—both of Tulsa, Okla.

THE DOMINION OF CANADA

4,836. Badge, consisting of a representation of an automobile wheel with tire and three big letters: A. O. A., the letter O in the center of the wheel and an A on each side; also the words Automobile Owners' Association on the tire. Patented August 3, 1920. Automobile Owners' Association, Montreal, Que.

GERMANY

DESIGN PATENTS ISSUED, WITH DATE OF ISSUE

747,957 (July 15, 1920) Suspender made of a strip of rubber. Georg Stange, Koethener Strasse 49, Leipzig-Gohlis.
748,036 (July 15, 1920) Medical syringe. Robert E. Klett, Ridgefield Park.
748,150 (July 19, 1920) Toy made of soft rubber. Michael Hahn, Neubauser Strasse 12, Muenchen.
748,373 (June 15, 1920) Elastic heel insert. Heinrich Dresing, Lutgendortmund.
748,375 (June 21, 1920) Exchangeable rubber heel. Gustav Milse, Bremen.

EXPORTS OF INDIA RUBBER AND CAUCHO FROM MANAOS DURING JULY, 1920

Exporters	Europe Fine.	Medium.	Coarse.	Caucho.	Totals.	New York Fine.	Medium.	Coarse.	Caucho.	Totals.	Grand Totals.
Stowell & Co. ....kilos	83,153	3,216	23,136	145,127	254,632	2,104	4,750	24,700	....	31,554	286,186
General Rubber Co. of Brazil	141,818	20,064	6,078	40	168,000	8,160	10,030	6,114	43,096	67,400	235,400
Tancredo, Porto & Co.	43,130	7,763	2,893	891	54,677	4,104	1,214	42	29	5,389	60,066
Higson & Fall	....	....	683	100	783	2,118	245	2,153	....	4,516	5,299
	268,101	31,043	32,790	146,158	478,092	16,486	16,239	33,009	43,125	108,859	586,951
In transit from Iquitos	....	....	....	198	198	4,895	23,418	2,529	11,075	41,917	42,115
Totals ....kilos	268,101	31,043	32,790	146,356	478,290	21,381	39,657	35,538	54.200	150,776	629,066

Compiled by Stowell & Co., Manáos, Brazil.

EXPORTS OF INDIA RUBBER FROM PARA, MANAOS AND IQUITOS DURING THE MONTH OF JULY, 1920

Exporters	Europe Fine.	Medium.	Coarse.	Caucho.	Totals	New York Fine.	Medium.	Coarse.	Caucho.	Totals.	Grand Totals.
J. Marques ....kilos	86,852	600	466	....	87,918	14,580	10,103	37,243	36,450	98,376	186,294
Stowell & Co.	45,794	5,350	7,854	3,246	62,244	....	....	....	51,300	51,300	113,544
Bitar Irmãos	31,581	1,530	1,066	63,781	97,958	....	....	....	5,100	5,100	103,058
Ferreira, Costa & Co.	....	....	....	....	....	....	....	24,420	60,000	84,420	84,420
Berringer & Co.	5,270	1,700	360	700	8,030	10,977	....	27,666	30,711	69,354	77,384
General Rubber Co.	....	....	....	....	....	29,815	1,462	1,724	39,275	72,277	72,277
Suarez, Filho & Co.	23,970	....	5,197	....	29,167	....	....	....	....	....	29,167
Alfredo Valle & Co.	....	....	....	....	....	....	....	....	15,750	15,750	15,750
Sundries	55,203	5,759	3,358	1,348	65 668	....	....	....	....	....	65,668
	248,670	14,939	18,301	69,075	350,985	55,373	11,565	91,053	238,586	396,577	747,562
From Manáos	455,582	62,171	38,339	108,624	664,716	4,902	12,815	19,053	26,900	63,670	728,386
From Iquitos	....	....	....	198	198	28,130	183	2,529	11,075	41,917	42,115
Totals	704,252	77,110	56,640	177,897	1,015,899	88,405	24,563	112,635	276,561	502,164	1,518,063

Compiled by Stowell & Co., Pará, Brazil.

Review of the Crude Rubber Market

NEW YORK.

September witnessed the lowest prices on standard plantation rubber ever recorded in the New York market. Spot first latex crêpe sold for 24½ cents, smoked sheet ribbed 23½ cents and upriver fine 27 cents. Futures likewise made low records of 30 cents for January-June, first latex crêpe, and 28 cents for ribbed smoked sheet.

With practically no demand from the large manufacturers, the only market sustaining features were small factory replacements and the limited business of dealers covering short sales. As the month progressed the market became weak, and, lacking the support of the dealers, who had withdrawn, fearing greater losses, values continued to fall. That the bottom of the market has been reached is believed in many quarters, however, until the banks resume credits, the production of rubber goods returns to normal, and buying is again resumed by the manufacturers, uncertainty will cloud the crude rubber situation.

Arrivals of crude rubber during August were 13,564 tons, compared with 11,067 tons a year ago. Total arrivals for eight months ended August 31, 1920 were 181,337 tons, compared with 142,759 for the same period in 1919. It is estimated that 26,000 tons are in store in New York at the present time, including a large amount of mouldy rubber that is being sold at 21½ to 23 cents, according to quality.

Spot and future quotations on standard plantation and Brazilian sorts at the first and last of the past month were as follows:

Plantations. September 4, first latex crêpe, 29 cents; October-December, 30½ cents; January-June, 35½ cents.

September 27, first latex crêpe, 25½ to 26 cents; October-December, 26½ to 27½ cents; January-June, 30 to 31 cents.

September 4, ribbed smoked sheets, 27 cents; October-December, 29½ cents; January-June, 34½ cents.

September 27, ribbed smoked sheets, 23¾ to 24½ cents; October-December, 25 cents; January-June, 28 to 30 cents.

September 4, No. 1 amber crêpe, 29 cents.

September 27, No. 1 amber crêpe 21 to 23 cents.

September 4, No. 1 rolled brown crêpe, 25 cents.

September 27, No. 1 rolled brown crêpe, 17½ to 18 cents.

South American Parás and Caucho. September 4, upriver, fine, 28½ cents; islands fine, 28 cents; upriver coarse, 21 cents; islands coarse, 19 cents; Cametá coarse, 17 cents; caucho ball, 21 cents.

September 27, upriver fine, 25 to 26 cents; islands fine, 25 to 26 cents; upriver coarse, 16½ to 17 cents; islands coarse, 15 cents; Cametá coarse, 15 to 15½ cents; caucho ball, 14 to 19 cents.

NEW YORK QUOTATIONS

Following are the New York spot quotations, for one year ago, one month ago, and September 27, the current date:

	October 1, 1919	September 1, 1920	September 27, 1920
PLANTATION HEVEA—			
First latex crêpe	$0.49½ @	$0.31 @	$0.25 @ $0.26
Amber crêpe No. 1	.46½ @	.29 @	.21 @ .23
Amber crêpe No. 2	.45½ @	.28 @	.22 @
Amber crêpe No. 3	.44½ @	.27 @	.21 @
Amber crêpe No. 4	.43½ @	.26 @	.20 @
Brown crêpe, thick and thin	.44½ @	.26 @	.19 @ .23
Brown crêpe, specky	.42½ @	.25 @	.20 @
Brown crêpe, rolled	.37 @	.24½ @	.17½ @ .18
Smoked sheet, ribbed, standard quality	.48½ @	.30 @ .30½	.23¾ @ .24½
Smoked sheet, plain standard quality	.45 @	.29 @	.22 @
Unsmoked sheet, standard quality	.42 @	.26 @	.19 @
Colombo scrap No. 1	.38 @	.22 @	.15 @
Colombo scrap No. 2	.36 @	.21½ @	.14 @
EAST INDIAN—			
Assam crêpe	@	@	@
Assam onions	@	@	@
Penang black scrap	@	@	@
PONTIANAK—			
Banjermassin	.12 @	.09¼ @ .11½	.10 @ .11
Palembang	@	.10¼ @	.10½ @ .13
Pressed block	.24 @	.19 @	.18 @ .21
Sarawak	@	.08¾ @	.09 @
SOUTH AMERICAN—			
PARAS—			
Upriver fine	.54½ @	.31 @ .30	.25 @ .26
Upriver medium	.52 @	.29 @ .30	.23 @ .24
Upriver coarse	.33 @	.21½ @ .22	.16½ @ .18
Upriver weak, fine	.41 @	.27 @	.21 @ .22
Islands, fine	.47½ @	.28 @	.25 @ .26
Islands, medium	.45 @	*.26 @ .28	.23 @
Islands, coarse	.22 @	.19 @	.15 @
Cametá, coarse	.22½ @	.17 @	.15 @ .15½
Madeira, fine	.56 @	.35 @	.29 @
Acre Bolivian, fine	.55 @ .55½	.33½ @ .34	.28 @
Peruvian, fine	.52 @	.31 @	.26 @
Tapajos, fine	.53 @	.30 @ .31	.23 @
CAUCHO—			
Upper caucho ball	.33 @	.21½ @ .22	.19 @
Lower caucho ball	.31½ @	.18½ @	.14 @
MANICOBAS—			
Ceará negro heads	.38 @	.23 @	*.14 @
Ceará scrap	.28 @	.20 @	*.12 @
Manicoba, 30% guarantee	.35 @	.25 @	*.15 @
Mangabeira thin sheet	.38 @	.28 @	*.18 @
CENTRALS—			
Corinto scrap	.33 @	.18 @	.17 @ .18
Esmeralda sausage	.32 @	.18 @	.17 @ .18
Central scrap	.32 @	.18 @	.17 @ .18
Central scrap and strip	.29 @ .30	.15 @	.15 @ .17
Central wet sheet	.23 @	.13 @	.13 @
Guayule, 20% guarantee	.24 @	.27 @	.25 @
Guayule, washed and dried	.35 @	.37 @	.35 @
AFRICANS—			
Niger flake, prime	@	@	.18¾ @
Benguela, extra No. 1, 28%	@	@	.11 @ .15
Benguela, No. 2, 32½%	.25½ @	@	@
Conakry niggers	@	@	@
Congo prime, black upper	.39 @	@	@
Congo, prime, red upper	@	@	@
Kasai black	@	@	@
red	@	@	@
Massai sheets and strings	@	@	@
Rio Nunez ball	@	@	@
Rio Nunez sheets and strings	@	@	@
GUTTA PERCHA—			
Gutta Siak	.25 @	.20½ @ .22½	.19 @ .20
Red Macassar	@	2.00 @ 2.95	3.50 @
BALATA—			
Block, Ciudad Bolivar	.76 @	.67 @ .68	.63 @
Colombia	.56 @	.47 @	.48 @
Panama	.45 @	.40 @	.35 @
Surinam sheet	@	.75 @	.69 @
amber	@	.82 @	.84 @

*Nominal.

RECLAIMED RUBBER

Business in reclaimed rubber during September was of lesser volume than that for August. Owing to conditions in the automobile manufacturing industry resulting in a marked lessening of demand for tires and topping material the manufacturers of these goods have very generally asked reclaimers for deferred shipments on their contracts from two to four months. Practically no new business is being placed. Thus, reclaiming plants are operating at only fractional capacity. The long continued record low prices of crude rubber grades has affected the prices of reclaims generally, although it is stated as a matter of trade opinion that crude is not displacing reclaims in those goods for which the latter is specially suited.

The demand for red reclaim has entirely disappeared from the market.

NEW YORK QUOTATIONS

September 27, 1920

Prices subject to change without notice

STANDARD RECLAIMS:

Floating	$0.22	@	$0.24
Friction	.25	@	.30
Mechanical	.11	@	.12
Shoe	.14¾	@	.15½
Tires, auto	.14½	@	.15
truck	.12½	@	.13½
White	.20	@	.21

THE MARKET FOR COMMERCIAL PAPER

In regard to the financial situation, Albert B. Beers, broker in crude rubber and commercial paper, No. 1 Liberty street, New York City, advises as follows:

"During September there has been only a light demand for commercial paper, and almost entirely from out-of-town banks, rates ruling at 8¼ to 8½ per cent for the best rubber names, and 8¾ to 9 per cent for those not so well known."

COMPARATIVE HIGH AND LOW NEW YORK SPOT RUBBER PRICES

	September		
	1920*	1919	1918
PLANTATIONS—			
First latex crêpe	$0.30 @ $0.24½	$0.55½ @ $0.45½	$0.63 @ $0.60½
Smoked sheet ribbed	.28¼ @ .23½	.54 @ .44½	.62 @ .59½
PARAS—			
Upriver, fine	.30 @ .25	.55¼ @ .54½	.68 @ .68
Upriver, coarse	.21 @ .16½	.33 @ .32	.40 @ .40
Island, fine	.28 @ .24	.48 @ .47½	.59 @ .59
Islands, coarse	.19 @ .15	.22 @ .21½	.27 @ .27
Cametá	.17 @ .15	.22 @ .21½	.28 @ .28

*Figured to September 27.

ANTWERP RUBBER MARKET

GRISAR & CO., Antwerp, report [September 3, 1920]:

We can report no change in the tone of the market, which continues weak. America is not yet buying and stocks are gradually accumulating.

The market closed with prices slightly lower than the preceding week. Spot, September, 1*s.* 8½*d.*; October-December, 1*s.* 10*d.*; January-March, 1*s.* 11½*d.*; January-June, 2*s.* 0½*d.*; Pará, 1*s.* 9*d.*

Statistics for the week were as follows: Arrivals, 2,022 tons; sales, 508 tons; stock, 29,911 tons against 28,368 tons the year before.

Statistics for the close of August: London—imports, 8,112 tons; sales, 2,918 tons; stock, 30,548 tons against 28,368 tons in 1919. Stock on hand this day about 986 tons.

The quiet tendency of the futures market becomes more accentuated, with business limited. Transactions amounted to 50,000 kilos. Closing quotations, each month: September-November, 10.00 francs; December-May, 10.05 francs; June-August, 10.10 francs. Tendency, quiet.

AMSTERDAM RUBBER MARKET

JOOSTEN & JANSSEN, Amsterdam, report [September 3, 1920]:

The market again was quiet and inactive, with only small fluctuations, but a rather sharp decline at the end.

Business was only small in spot rubber, and the new arrivals are being reserved for the subscription sale of September 21st.

The turnover on the terminal market was fairly satisfactory, but finally demand was extremely poor, and *Hevea* crêpe per December could be offered down to f.1.12½, and January-March to f.1.15½ without finding buyers, while sheets bought at f.1.04 per October, and f.1.14 per January-March.

STRAITS SETTLEMENTS RUBBER EXPORTS

An official report from Singapore states that the export of rubber from Straits Settlements ports in the month of July amounted to 10,773 tons (transhipments, 2,355 tons), as compared with 11,663 tons in June and 7,818 tons in the corresponding month last year. The total export to the end of July was 90,208 tons, as against 90,543 tons in 1919 and 44,158 tons in 1918 for the corresponding period.

Appended are the comparative statistics:

	1918	1919	1920
January ....tons	4,302	14,404	13,125
February	2,334	15,661	17,379
March	8,858	20,908	5,931
April	6,584	10,848	15,720
May	13,587	15,845	15,617
June	6,515	5,059	11,663
July	1,978	7,818	10,773
Totals	44,158	90,543	90,208

FEDERATED MALAY STATES RUBBER EXPORTS

An official report from Kuala Lumpur states that the exports of rubber from the Federated Malay States in the month of July amounted to 8,043 tons, as compared with 9,049 tons in June and 8,640 tons in the corresponding month of last year. The total exports for seven months amount to 63,518 tons, as against 59,357 tons last year and 46,263 tons in 1918.

Appended are the comparative statistics:

	1918	1919	1920
January ....tons	7,588	7,163	11,119
February	6,820	10,809	9,781
March	7,709	10,679	9,524
April	7,428	7,664	8,375
May	5,851	7,308	7,627
June	5,161	7,094	9,049
July	5,706	8,640	8,043
Totals	46,263	59,357	63,518

SINGAPORE RUBBER MARKET

GUTHRIE & CO., LIMITED, Singapore, report [August 1-, 1920]:

The weekly rubber auction held yesterday and to-day opened quietly, bidding being very slow, and, though demand improved as the sale went on, prices of the leading grades show a decline. At the commencement, ribbed smoked sheet sold up to 62½ cents, and later advanced to 63½ cents, at which price it closed 1 cent down on the week. Fine pale crêpe was a difficult market, buyers' and sellers' ideas being too far apart. The top price of 69½ cents for this grade was exceptional, and not more than half a dozen lots sold at or near this figure, the average price being 67 to 67½ cents. There was a steady demand for off-quality lots of sheet. Browns were weaker, and dark and barky crêpes showed a slight improvement.

The quantity catalogued was 866 tons, of which 507 tons were sold.

The following is the course of values:

	In Singapore per Pound [1]	Sterling Equivalent per pound in London
Sheet, fine ribbed smoked	62c @ 63½c	1/ 7¾ @ 1/ 8½
Sheet, good ribbed smoked	50 @ 61½	1/ 4⅜ @ 1/ 7⅝
Crêpe, fine pale	67 @ 69½	1/ 9⅝ @ 1/10⅜
Crêpe, good pale	53 @ 66½	1/ 5¾ @ 1/ 9½
Crêpe, fine brown	55½ @ 58	1/ 6⅜ @ 1/ 7⅛
Crêpe, good brown	40 @ 55	1/ 2 @ 1/ 6¼
Crêpe, dark	34½ @ 44½	1/ 0½ @ 1/ 3⅜
Crêpe, bark	32 @ 37½	—/11¾ @ 1/ 1⅜

[1] Quoted in Straits Settlements currency; $1 = $0.567 United States currency.

PLANTATION RUBBER EXPORTS FROM JAVA

	June		Six Months Ended June 30	
	1919	1920	1919	1920
To Netherlands ....*kilos*	57,000	366,000	179,000	2,212,000
Great Britain	134,000	1,059,000	3,815,000	3,790,000
Germany	......	......	......	35,000
France	......	......	176,000	......
Belgium	......	......	......	14,000
United States	2,231,000	1,085,000	10,106,000	8,126,000
Singapore	427,000	417,000	2,963,000	2,302,000
Japan	......	......	179,000	184,000
Australia	......	3,000	*	49,000
Other countries	27,000	......	202,000	......
Totals	2,876,000	2,930,000	17,620,000	16,712,000
Ports of origin:				
Tandjong Priok	1,550,000	1,273,000	9,148,000	7,937,000
Samarang	17,000	52,000	260,000	246,000
Soerabaya	1,158,000	1,551,000	7,487,000	8,068,000

*Not elsewhere specified.

CRUDE RUBBER ARRIVALS AT ATLANTIC AND PACIFIC PORTS AS STATED BY SHIPS' MANIFESTS

PARAS AND CAUCHO AT NEW YORK

	Fine	Medium	Coarse	Caucho	Totals Pounds
August 21. By the S. S. *Manchurian Prince*, from Pará.					
H. A. Astlett & Co.	5,600	......	22,400	11,200	39,200
Poel & Kelly	55,681	......	11,149	......	66,830
August 26. By the S. S. *Gregory*, from Pará.					
Poel & Kelly	33,964	......	647	......	34,611
Paul Bertuch	......	......	13,095	......	13,095
Meyer & Brown, Inc.	64,960	......	2,240	44,800	112,000
H. A. Astlett & Co.	......	60,500	18,350	7,050	85,900
August 26. By the S. S. *Gregory*, from Manáos.					
H. A. Astlett & Co.	......	......	......	......	9,800
Paul Bertuch	......	43,308	......	9,275	52,583
J. Aron & Co.	......	......	......	......	20,678
Various	......	......	......	......	71,485
August 28. By the S. S. *Portfield*, from Pará.					
Various	......	......	......	......	1,372
September 9. By the S. S. *Siddons*, from Pará.					
G. Amsinck & Co., Inc.	......	......	......	......	2,156
Various	......	......	......	......	29,206
September 10. By the S. S. *Michael*, from Pará.					
Poel & Kelly	58,674	......	31,450	113,103	203,227
Meyer & Brown, Inc.	......	107,520	......	......	107,520
H. A. Astlett & Co.	......	......	16,500	......	16,500
J. H. Rossbach & Bros.	......	......	......	......	3,332
Paul Bertuch	......	......	......	88,184	88,184
September 11. By the S. S. *Lake Ellithorpe*, from Pará.					
Neuss, Hesslein & Co.	22,376	......	......	13,523	35,899
Wm. Schall & Co.	62,154	......	2,240	15,332	79,726
G. Amsinck & Co., Inc.	......	......	7,986	......	7,986
Various	......	......	......	......	19,822
September 11. By the S. S. *Lake Ellithorpe*, from Bolivia.					
Wm. Schall & Co.	62,285	......	2,249	15,363	79,897

PLANTATIONS

(*Figured* 180 *pounds to the bale or case*)

	Shipment from:	Shipped to:	Pounds	Totals
August 9. By the S. S. *Cross Keys*, at Seattle.				
Thos. A. Desmond & Co.	Singapore	Seattle	60,480	60,480
August 19. By the S. S. *Boveric*, at New York and Boston.				
Hood Rubber Co.	Colombo	Watertown	65,620	
L. Littlejohn & Co., Inc.	Colombo	New York	156,800	222,420
August 20. By the S. S. *Amazon*, at San Francisco.				
Firestone Tire & Rubber Co.	Singapore	Akron	112,680	112,680

	Shipment from:	Shipped to:	Pounds	Totals
August 21. By the S. S. *Sanuki Maru*, at New York and Boston.				
Baring Brothers	Colombo	New York	151,200	
Hood Rubber Co.......	Colombo	Watertown	9,360	
Meyer & Brown, Inc...	Colombo	New York	280,000	440,560
August 23. By the S. S. *City of Manila*, at New York and Boston.				
Hood Rubber Co.......	Colombo	Watertown	16,631	
L. Littlejohn & Co., Inc.	Colombo	New York	403,200	419,831
August 26. By the S. S *Caronia*, at New York.				
Various	Liverpool	New York	1,800	1,800
August 27. By the S. S. *Lyons Maru*, at New York.				
L. Littlejohn & Co., Inc.	Colombo	New York	147,180	147,180
August 28. By the S. S. *Romeo*, at New York and Boston.				
Hood Rubber Co.......	Colombo	Watertown	1,700	
Hadden & Co..........	Colombo	New York	22,320	
Frazar & Co..........	Colombo	New York	44,740	
Chas. T. Wilson Co., Inc.	Colombo	New York	32,400	
L. Littlejohn & Co., Inc.	Colombo	New York	180,800	
Various	Colombo	New York	536,900	818,860
August 28. By the S. S. *West Columb*, at New York.				
Aldens' Successors, Inc.	Singapore	New York	107,640	
Wm. Brandt & Sons....	Singapore	New York	75,780	
Goldman, Sachs & Co...	Singapore	New York	201,600	
Mitsubishi Goshi Kaisha.	Singapore	New York	55,980	
William H. Stiles & Co.	Singapore	New York	50,000	
L. Littlejohn & Co., Inc.	Singapore	New York	649,800	
Meyer & Brown, Inc..	Singapore	New York	302,400	
Various	Singapore	New York	990,160	
X. W. Obalski & Co., Inc.	Batavia	New York	26,100	
Chas. T. Wilson Co., Inc.	Batavia	New York	72,720	
The Fisk Rubber Co....	Batavia	Chicopee Falls	13,860	
Fred Stern & Co.......	Batavia	New York	167,040	
Winter, Ross & Co....	Batavia	New York	18,900	
Various	Batavia	New York	164,520	
Various	Soerabaya	New York	133,200	
L. Littlejohn & Co., Inc.	Colombo	New York	147,060	
Various	Colombo	New York	231,480	3,408,240
August 30. By the S. S. *Mandasan Maru*, at Seattle.				
Mitsui & Co., Ltd......	Kobe	Seattle	162,000	162,000
September 1. By the S. S. *Volumnia*, at New York.				
The Goodyear Tire & Rubber Co.	London	Akron	585,900	
T. D. Downing & Co..	London	New York	57,960	
Fisk Rubber Co........	London	Chicopee Falls	185,277	
Various	London	New York	168,673	997,810
September 1. By the S. S. *West Ira*, at San Francisco.				
Various	Kobe	San Francisco	90,000	90,000
September 2. By the S. S. *Arakan*, at San Francisco.				
Spreckels "Savage" Tire Corp.	Batavia	San Diego	43,920	43,920
September 2. By the S. S. *City of Colombo*, at New York.				
Hood Rubber Co.......	London	Watertown	56,540	
Hood Rubber Co.......	Singapore	Watertown	89,700	146,240
September 3. By the S. S. *Haleric*, at New York and Boston.				
Chas. T. Wilson Co., Inc.	Colombo	New York	3,780	
Hood Rubber Co.......	Colombo	Watertown	22,710	
Baring Brothers	Colombo	New York	340,200	
Poel & Kelly..........	Colombo	New York	200,160	
L. Littlejohn & Co., Inc.	Colombo	New York	22,400	
Meyer & Brown, Inc...	Colombo	New York	358,400	947,650
September 2. By the S. S. *Ryndam*, at New York.				
L. Littlejohn & Co., Inc.	Singapore	New York	11,274	11,274
September 3. By the S. S. *City of Newcastle*, at New York and Boston.				
Hood Rubber Co.......	Colombo	Watertown	9,720	
Chas. T. Wilson Co., Inc.	Colombo	New York	35,640	
General Rubber Co....	Colombo	New York	180	
Thornett & Fehr, Inc..	Colombo	New York	11,520	
L. Littlejohn & Co., Inc.	Colombo	New York	44,800	
Edward Maurer Co., Inc.	Colombo	New York	55,980	
E. S. Kub & Valk Co...	Colombo	New York	51,300	
Meyer & Brown, Inc...	Colombo	New York	35,840	
Various	Colombo	New York	110,500	355,480
September 8. By the S. S. *Madioen*, at New York.				
Aldens' Successors, Inc.	Soerabaya	New York	183,060	
L. Littlejohn & Co., Inc.	Java	New York	403,200	
The United Malaysian Rubber Co., Ltd.....	Borneo	New York	11,200	
Various	Belawan-Deli	New York	76,680	
Manhattan Rubber Mfg. Co.	Batavia	New York	27,000	
Robertson, Cole & Co..	Batavia	New York	35,280	
Various	Batavia	New York	402,300	1,138,720
September 8. By the S. S. *Bolton Castle*, at New York.				
Hood Rubber Co.......	Singapore	Watertown	56,100	56,100
September 8. By the S. S. *Telemachus*, at New York.				
Hood Rubber Co.......	London	Watertown	19,956	
Hood Rubber Co.......	Singapore	Watertown	112,000	
William H. Stiles & Co.	Singapore	New York	100,000	231,956
September 9. By the S. S. *Wheatland Montana*, at Seattle.				
Thos. A. Desmond & Co.	Singapore	Seattle	90,720	90,720
September 9. By the S. S. *Deucalion*, at New York.				
Hood Rubber Co.......	Singapore	Watertown	218,700	
New York Overseas Co.	Singapore	New York	55,800	
F. R. Henderson & Co..	Singapore	New York	253,980	
J. Aron & Co..........	Singapore	New York	32,400	
Thornett & Fehr, Inc..	Singapore	New York	22,320	
W. R. Grace & Co......	Singapore	New York	432,360	
Meyer & Brown, Inc...	Singapore	New York	291,200	
L. Littlejohn & Co., Inc.	Singapore	New York	448,000	
E. S. Kub and Valk Co.	Singapore	New York	233,740	
Van Miel-Nordheim Corp.	Singapore	New York	22,500	
A. C. Fox & Co........	Singapore	New York	10,080	
Mitsui & Co., Limited..	Singapore	New York	100,800	
Pell & Dumont, Inc....	Singapore	New York	30,240	
Eastern Rubber Co....	Singapore	New York	80,640	
Chas. T. Wilson Co., Inc.	Singapore	New York	167,400	
W. T. Sargent & Sons..	Singapore	New York	20,520	
Poel & Kelly..........	Singapore	New York	197,460	
Fred Stern & Co.......	Singapore	New York	24,300	
The Fisk Rubber Co...	Singapore	Chicopee Falls	201,032	
William H. Stiles & Co.	Singapore	New York	50,000	
Various	Singapore	New York	959,260	
F. R. Henderson & Co..	Port Dickson	New York	24,120	
Various	Port Dickson	New York	14,580	
Various	Pt. Sw't'nh'm	New York	60,840	
Poel & Kelly..........	Malacca	New York	11,700	
Various	Philippine Ils.	New York	10,980	
General Rubber Co....	Telok Naboeng	New York	1,108,260	
F. R. Henderson & Co..	Penang	New York	209,520	
W. R. Grace & Co......	Penang	New York	162,360	
The Goodyear Tire & Rubber Co..........	Penang	Akron	66,800	
The B. F. Goodrich Co.	Penang	Akron	153,000	
Edward Boustead & Co..	Penang	New York	27,000	
Joosten & Janssen, *as agents*	Penang	New York	82,600	
Various	Penang	New York	18,720	
Various	Teluk Anson	New York	25,020	
Poel & Kelly..........	Deli	New York	14,400	
Alden's Successors, Inc.	Deli	New York	37,080	
Irwin-Harrisons & Crosfield, Inc.	Deli	New York	268,380	
The Fisk Rubber Co....	Deli	Chicopee Falls	57,240	
W. R. Grace & Co......	Deli	New York	181,260	
East Asiatic Co., Inc....	Deli	New York	59,040	
Various	Deli	New York	75,780	6,521,412
September 10. By the S. S. *Tenyo Maru*, at San Francisco.				
Thos. A. Desmond & Co.	Hongkong	New York	10,080	10,080
September 10. By the S. S. *Ubbekarspel*, at New York.				
Joosten & Janssen, *as agents*	Rotterdam	New York	7,000	7,000
September 13. By the S. S. *John Roach*, at New York.				
Fred Stern & Co.......	Soerabaya	New York	18,180	
Kuharah Trading Co., Ltd.	Soerabaya	New York	38,880	
Various	Soerabaya	New York	122,760	
F. R. Henderson & Co..	Batavia	New York	79,920	
L. Littlejohn & Co., Inc.	Singapore	New York	336,000	
Goldman, Sachs & Co..	Batavia	New York	9,000	
Winter, Ross & Co....	Batavia	New York	55,980	
Fred Stern & Co....	Batavia	New York	11,520	
Poel & Kelly..........	Batavia	New York	30,240	
William H. Stiles & Co.	Singapore	New York	40,000	
Various	Batavia	New York	47,880	
H. A. Astlett & Co.....	Singapore	New York	56,000	
Meyer & Brown, Inc....	Singapore	New York	11,200	
Various	Singapore	New York	1,079,130	1,936,690
September 14. By the S. S. *Bessie Dollar*, at New York.				
Thornett & Fehr, Inc...	Singapore	New York	154,800	
Wm Brandt & Sons ...	Singapore	New York	123,840	
F. R. Henderson & Co..	Singapore	New York	195,300	
Edward Maurer Co., Inc.	Singapore	New York	29,880	
L. Littlejohn & Co., Inc.	Singapore	New York	179,200	
W. R. Grace & Co......	Singapore	New York	139,140	
William H. Stiles & Co.	Singapore	New York	10,000	
Winter, Ross & Co. ...	Singapore	New York	50,400	
Baird Rubber & Trading Co.	Singapore	New York	67,840	
Whittall & Co. of Ceylon.	Singapore	New York	27,200	
Various	Singapore	New York	412,500	1,390,100
September 14. By the S. S. *West Sequana*, at San Francisco				
Pioneer Rubber Co.....	Singapore	San Francisco	24,480	24,480
September 17. By the S. S. *Alaska Maru*, at New York.				
Hood Rubber Co.......	Singapore	Watertown	326,428	326,428
September 20. By the S. S. *Amazon Maru*, at New York.				
Firestone Tire & Rubber Co.	Belawan	Akron	118,980	
Various	Belawan	New York	137,340	
Hood Rubber Co.......	Singapore	Watertown	1,737,900	
Chas. T. Wilson Co., Inc.	Singapore	New York	181,440	
L. Littlejohn & Co., Inc.	Singapore	New York	89,800	
W. R. Grace & Co......	Singapore	New York	210,240	
Various	Singapore	New York	163,260	2,638,960

BALATA

	Shipment from:	Shipped to:	Pounds	Totals
August 27. By the S. S. *Hebe*, at New York.				
Wm. Schall & Co......	Dutch Guiana	New York	12,225	12,225
August 30. By the S. S. *Matura*, at New York.				
Thos. Scott & Co......	Trinidad	New York	600	600
September 1. By the S. S *Volumnia*, at New York.				
Earle Brothers.........	London	New York	22,500	22,500
September 4. By the S. S. *General G. W. Goethals*, at New York				
P. R. Rincones, Jr., Co.	Cristobal	New York	6,150	6,150
September 18. By the S. S. *Lake View*, at New York.				
Middleton & Co., Ltd...	Paramaribo	New York	3,307	3,307
September 21. By the S. S. *Grangepark*, at New York.				
Ultramares Corp.	Cristobal	New York	2,548	
J. S. Sembrada & Co...	Cristobal	New York	1,862	
American Trading Co..	Cristobal	New York	2,254	6,664

CENTRALS

	Shipment from:	Shipped to:	Pounds	Totals
August 22. By the S. S. *Essequibo*, at New York.				
Mecke & Co............	Valparaiso	New York	3,300	3,300
August 28. By the S. S. *Hebe*, at New York.				
Arkell & Douglas, Inc.	Paramaribo	New York	15,000	15,000
August 28. By the S. S. *Cristobal*, at New York.				
A. M. Capen's Sons, Inc.	Cristobal	New York	2,100	
Isaac Brandon & Bros..	Cristobal	New York	150	2,250

CENTRALS—Continued

	Shipment from:	Shipped to:	Pounds	Totals
AUGUST 30. By the S. S. *Maturo*, at New York.				
G. Amsinck & Co., Inc..	Trinidad	New York	36,750	
Southern Sales Corp...	Trinidad	New York	27,300	
South and Central America Com. Co....	Trinidad	New York	19,350	
Various	Trinidad	New York	48,300	131,700
SEPTEMBER 7. By the S. S. *Caldas*, at New York.				
R. Echavarria & Co....	Cartagena	New York	3,000	3,000
SEPTEMBER 8. By the S. S. *Allianca*, at New York.				
G. Amsinck & Co., Inc.	Cristobal	New York	1,050	1,050
SEPTEMBER 21. By the S. S. *Grangepark*, at New York.				
G. Amsinck & Co., Inc.	Cristobal	New York	2,550	
Chas. E. Griffin.........	Cristobal	New York	6,000	
H. S. Wolff & Co......	Cristobal	New York	1,650	
Various	Cristobal	New York	6,450	16,650

AFRICANS

SEPTEMBER 7. By the S. S. *Nieuw Amsterdam*, at New York.				
Poel & Kelly...........	Rotterdam	New York	690	690
SEPTEMBER 12. By the S. S. *Caronia*, at New York.				
Meyer & Brown, Inc...	Liverpool	New York	11,200	11,200
SEPTEMBER 13. By the S. S. *Kroonland*, at New York.				
Gillespie Bros. & Co....	Antwerp	New York	103,845	103,845
SEPTEMBER 18. By the S. S. *Burmese Prince*, at New York.				
Pitt & Scott...........	Havre	New York	150,120	150,120
SEPTEMBER 20. By the S. S. *Meissionier*, at New York.				
Meadows, Wye & Co....	Havre	New York	18,745	18,745
SEPTEMBER 20. By the S. S. *Clan Buchanan*, at New York.				
Various	Mombasa	New York	6,120	6,120

MANICOBAS

SEPTEMBER 13. By the S. S. *St. Michael*, at New York.				
J. H. Rossbach & Bros..	Pernambuco	New York	57,640	57,640

GUTTA PERCHA

SEPTEMBER 20. By the S. S. *Amazon Maru*, at New York.				
L. Littlejohn & Co., Inc.	Singapore	New York	12,000	12,000

GUTTAS

SEPTEMBER 8. By the S. S. *Madioen*, at New York.				
The United Malaysian Rubber Co., Ltd......	Borneo	New York	145,207	145,207

PONTIANAK

SEPTEMBER 8. By the S. S. *Madioen*, at New York.				
The United Malaysian Rubber Co., Ltd......	Borneo	New York	9,508	9,508
SEPTEMBER 9. By the S. S. *Deucalion*, at New York.				
Various	Singapore	New York	472,500	472,500
SEPTEMBER 13. By the S. S. *Amazon Maru*, at New York.				
Konig Bros. & Co......	Singapore	New York	32,700	
Shawmut Corp. of Boston	Singapore	New York	103,200	
Various	Singapore	New York	60,000	195,900

GUAYULE

AUGUST 27. By rail at Eagle Pass, Texas.				
Continental Rubber Co. of New York........	Mexico	Akron	70,000	70,000
SEPTEMBER 2. By rail at Eagle Pass, Texas.				
Continental Rubber Co. of New York........	Mexico	New York	55,000	
Continental Rubber Co. of New York........	Mexico	Akron / Atlanta	55,000	110,000

CUSTOM HOUSE STATISTICS

PORT OF NEW YORK

IMPORTS

	July 1919		July 1920	
UNMANUFACTURED—*free*:	Pounds	Value	Pounds	Value
Crude rubber:				
From France	......	......	197,165	$67,798
Netherlands	......	......	692,369	280,188
Portugal	......	......	509,146	169,974
Turkish Europe..	......	......	3,440	927
England	666,822	$305,218	3,369,347	1,471,548
Canada	45,246	19,456	......	......
Costa Rica......	1,512	809	3,280	878
Uruguay	......	......	24,116	5,300
Trinidad	2,757	914	......	......
Nicaragua	14,967	4,426	15,680	4,341
Panama	3,543	852	9,504	2,699
Salvador	5,332	2,500	3,335	911
Mexico	1,155	252	12,370	3,570
Bolivia	......	......	27,539	11,252
Brazil	2,055,583	579,257	3,529,968	920,488
Colombia	41,622	15,817	86,983	27,689
Ecuador	......	......	18,337	5,301
Peru	......	......	635,093	220,873
Venezuela	137,940	52,146	79,751	24,149
British India....	......	......	134,830	44,989
Straits Settlements	31,385,984	13,004,755	20,498,110	9,809,130
British E. Indies.	2,311,729	909,270	2,844,299	1,174,374
Dutch E. Indies..	7,854,478	3,251,302	9,834,653	4,474,469
China	......	......	37,660	21,176
Japan	......	......	33,600	13,555
Philippines	644,954	256,188	17,046	5,550
British S. Africa.	......	......	2,738	685
Egypt	......	......	17,940	6,997
Totals	45,173,624	$18,403,162	42,638,299	$18,768,761

	July 1919		July 1920	
UNMANUFACTURED—*free*:	Pounds	Value	Pounds	Value
Crude rubber:				
Jelutong (Pontianak):				
From Netherlands	......	......	414,400	$50,806
Japan	40,000	$4,000	......	......
Straits Settlements	2,729,213	365,839	875,773	154,748
Dutch E. Indies.	1,203,855	64,075	234,884	40,290
Totals	3,973,068	$433,914	1,525,057	$245,844
Gutta percha:				
From England	......	......	1,141	$351
Trinidad	......	......	200	42
Brazil	......	......	37,831	5,162
Straits Settlements	1,038,794	$168,547	555,363	146,108
Dutch E. Indies.	218,079	29,735	250,417	38,445
Philippines	7,491	1,750	......	......
Totals	1,264,364	$200,032	844,952	$190,108
Balata:				
From England	35,840	$35,250	......	......
Panama	17,412	5,823	4,782	$1,673
Brazil	......	......	1,513	885
Colombia	7,292	3,546	22,373	15,456
British Guiana...	7,466	6,271	......	......
Dutch Guiana...	......	......	7,055	5,245
Venezuela	37,422	35,214	......	......
Peru	......	......	7,570	2,331
Totals	105,432	$86,104	43,293	$25,590
Reclaimed and scrap rubber	535,180	$40,776	1,014,970	$103,663
Totals, unmanufactured	51,051,668	$19,163,988	46,066,571	$19,333,966
Manufactures of rubber and gutta percha	......	$39,575	......	$141,898
Chicle ....*dutiable*	511,576	302,255	748,815	535,289

EXPORTS OF DOMESTIC MERCHANDISE

	July 1919		July 1920	
MANUFACTURED:				
Automobile tires........	......	$1,377,128 (Automobile tires, Inner tubes, Solid tires)	......	$2,544,733
Inner tubes	......		......	228,208
Solid tires	......		......	160,698
All other tires..........	......	32,992	......	61,460
Belting	......	272,318 (Belting, Hose, Packing)	......	148,944
Hose	......		......	120,469
Packing	......		......	57,046
Rubber boots ......*pairs*	5,943	14,894	1,783	6,108
Rubber shoes.......*pairs*	83,390	66,577	338,457	364,158
Soles and heels.........	......	......	......	45,382
Druggists' sundries......	......	56,710	......	134,316
Other mfrs. of rubber...	......	247,806	......	320,321
Totals manufactured.	89,333	$2,068,425	340,240	$4,191,843
Insulated wire..........	......	$638,775	......	$430,514
Fountain pens....*number*	35,296	43,981	28,851	28,662
Suspenders and garters..	......	149,262	......	293,631
Chewing gum	......	80,800	......	97,696
UNMANUFACTURED—*free*:				
Reclaimed and scrap rubber	687,531	90,683	247,381	25,620

FOREIGN EXPORTS

	July 1919		July 1920	
Crude rubber	23,755	$9,003	35,700	$22,600
Balata	43,127	20,079	27,700	15,675
Jelutong (Pontianak)....	4,200	2,700	......	......
Guayule	......	......	1,666	1,083
Reclaimed and scrap rubber	......	......	1,875	169
Chicle	......	......	1,905	4,185
Rubber manufactures....	......	3,138	......	225

PORT OF NEW ORLEANS

IMPORTS

	July 1919		July 1920	
UNMANUFACTURED—*free*:				
Crude rubber:				
Nicaragua	2,602	$678	......	......
Guatemala	......	......	2,190	$414
Totals	2,602	$678	2,190	$414
Chicle	5,599	4,000	......	......
Rubber manufactures, *dutiable*	......	......	......	$562

EXPORTS

	July 1919		July 1920	
MANUFACTURED:				
Automobile tires	......	$6,801 (Automobile tires, Inner tubes, Solid tires)	......	$158,592
Inner tubes	......		......	71,001
Solid tires	......		......	9,857
All other tires..........	......	358	......	10,202
Belting	......	4,266 (Belting, Hose, Packing)	......	5,898
Hose	......		......	21,914
Packing	......		......	8,092
Rubber boots ......*pairs*	......	......	6	19
Rubber shoes ......*pairs*	3,553	3,593	35,291	42,573
Soles and heels.........	......	......	......	31,099
Druggists' sundries......	......	852	......	394
Other rubber manufactures	......	521	......	14,974
Totals	3,553	$16,391	35,297	$374,615
Insulated wire and cables	......	$1,753	......	$11,069
Fountain pens	......	......	......	117
Suspenders and garters..	......	1,047	......	8,790
Rubber scrap and reclaimed	183	110	......	......
Chewing gum	......	1,476	......	1,953

REEXPORTS

	July 1919		July 1920	
Crude rubber	1,900	$857	......	......

PORT OF BOSTON

IMPORTS

July	1919 Pounds	1919 Value	1920 Pounds	1920 Value
UNMANUFACTURED—*free:*				
Crude rubber:				
From England	11,194	$5,334	28,547	$9,577
Straits Settlements	404,389	138,564	......	......
British E. Indies	......	......	48,440	13,994
Totals	415,583	$143,898	76,987	$23,571
Rubber substitutes	......	......	......	$61
Rubber scrap and reclaimed	10,900	$645	......	......
Rubber manufactures, *dutiable*	......	4,425	......	2,970

EXPORTS

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
MANUFACTURED:				
Automobile tires	......		......	$64,946
Inner tubes	......	$247	......	12,402
Solid tires	......		......	355
Belting	......		......	3,501
Hose	......	1,466	......	12,756
Packing	......		......	668
Rubber boots ......*pairs*	4,625	11,595	3,508	11,622
Rubber shoes ......*pairs*	13,637	10,708	247,703	219,281
Soles and heels	......	......	......	13,111
Druggists' sundries	......	......	......	193
Other rubber manufactures	......	62,793	......	51,241
Totals	18,262	$86,809	251,211	$390,076
Insulated wire and cables	......	$1,484	......	$13,202
Fountain pens....*number*	......	......	15	26
Suspenders and garters	......	17,797	......	13,019
Rubber scrap	41,948	4,124	73,866	5,356

REEXPORTS

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
Balata	1,530	$520	......	......

PORT OF SEATTLE

IMPORTS

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
UNMANUFACTURED—*free:*				
Crude rubber:				
From Canada	15	$15	......	......
Straits Settlements	1,374,855	487,615	......	......
British E. Indies	11,200	4,215	......	......
Dutch E. Indies	579,537	250,171	......	......
Japan	56,180	14,081	222,400	$80,464
Totals	2,031,787	$756,097	222,400	$80,464
Jelutong (Pontianak)	23,114	$2,311	......	......
Rubber manufactures	......	6	......	$88

EXPORTS

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
MANUFACTURED:				
Casings	......	......	......	$11,630
Automobile tires	......		......	2,475
Inner tubes	......	$12,177	......	2,284
Solid tires	......		......	2,475
All other tires	......	753	......	7,161
Belting	......		......	9,718
Hose	......	14,712	......	2,969
Packing	......		......	366
Rubber boots ......*pairs*	6,113	20,826	......	724
Rubber shoes ......*pairs*	25,128	28,376	......	50
Druggists' sundries	......	998	......	309
Other rubber manufactures	......	4,805	......	4,200
Totals	31,241	$82,647	......	$44,361
Insuluated wire and cables	......	$3,153	......	$66
Fountain pens....*number*	94	114	361	269
Suspenders	......	4,393	......	1,122
Chewing gum	......	163	......	348
Rubber scrap and reclaimed	73,073	3,586	2,086	83

REEXPORTS

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
Crude rubber	581	$258	......	......

PORT OF SAN FRANCISCO

IMPORTS

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
UNMANUFACTURED—*free:*				
Crude rubber:				
From Straits Settlements	1,080,262	$386,536	938,825	$456,004
British Oceania	......	......	3,476	1,696
Dutch E. Indies	273,692	101,265	999,867	402,026
Totals	1,353,954	$487,801	1,942,168	$859,726
Jelutong (Pontianok)	4,763	$1,381	......	......
Chicle	29,168	36,168	......	......
Rubber manufactures	......	657	......	$84

EXPORTS

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
MANUFACTURED:				
Automobile tires	......		......	$760,276
Inner tubes	......	$54,399	......	53,958
Solid tires	......		......	30,763
All other tires	......	769	......	34,247
Belting	......		......	83,795
Hose	......	27,619	......	40,854
Packing	......		......	50,085
Rubber boots ......*pairs*	......	......	6,057	19,129
Rubber shoes ......*pairs*	360	263	16,471	21,208
Soles and heels	......	......	......	2,526
Druggists' sundries	......	781	......	4,149
Other rubber manufactures	......	11,395	......	53,142
Totals	360	$95,226	22,528	$1,154,132

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
Insulated wire and cables	......	$256	......	$2,277
Fountain pens ...*number*	1,587	1,590	......	......
Suspenders	......	......	......	......
Chewing gum	......	2,911	......	2,160
UNMANUFACTURED—*free:*				
Reclaimed and scrap rubber	20,000	$800	17,720	$710
REEXPORTS				
Rubber manufactures	......	......	......	$4

RUBBER STATISTICS FOR THE DOMINION OF CANADA

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

May	1919 Pounds	1919 Value	1920 Pounds	1920 Value
UNMANUFACTURED—*free*:				
Rubber, gutta percha, etc.:				
From United Kingdom	209,000	$101,623	647,441	$358,376
United States	321,887	139,719	584,654	248,669
Belgian Congo	....	....	33,400	17,434
Brazil	46,305	25,352	129,506	64,146
British East Indies:				
Ceylon	315,104	162,226	....	....
India	....	....	33,493	16,760
Straits Settlements	940,289	455,575	508,740	265,161
Other countries	....	....	66,336	32,878
Totals	1,832,585	$884,495	2,003,570	$1,003,424
Balata	....	....	51	$74
Rubber, recovered	179,771	$29,667	358,705	65,593
Rubber, powdered, and rubber or gutta percha scrap	93,671	4,596	313,936	22,524
Rubber substitutes	28,562	4,145	107,001	14,917
Totals, unmanufactured	2,134,589	$922,903	2,783,263	$1,106,532
PARTLY MANUFACTURED				
Hard rubber sheets and rods	110,138	$65,808	7,733	$5,127
Hard rubber tubes	....	2,212	....	4,365
Rubber thread, not covered	6,761	9,972	3,017	4,491
Totals, partly manufactured	116,899	$77,992	10,750	$13,983
MANUFACTURED—				
Belting	....	$10,517	....	$17,405
Hose	....	10,708	....	12,914
Packing	....	9,144	....	5,704
Boots and shoes	....	16,592	....	19,494
Clothing, including waterproofed	....	19,672	....	19,463
Gloves	....	994	....	1,237
Hot water bottles	....	1,941	....	2,913
Tires, solid	....	13,390	....	37,505
Tires, pneumatic	....	103,267	....	116,839
Tires, inner tubes	....	13,196	....	13,034
Other manufactures	....	183,669	....	288,999
Totals, manufactured	....	$383,090	....	$535,507
Totals, rubber imports	....	$1,383,985	....	$1,656,022
Insulated wire and cables:				
Wire and cables covered with cotton, linen, silk, rubber, etc.	....	$12,742	....	$21,824
Copper, wire and cables, covered as above	....	5,075	....	17,690
Chicle	149,869	98,724	34,088	17,536

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS

May	1919 Produce of Canada Value	1919 Reexports of Foreign Goods Value	1920 Produce of Canada Value	1920 Reexports of Foreign Goods Value
UNMANUFACTURED—				
Crude and waste rubber	$63,020	$400	$22,738	....
MANUFACTURED—				
Belting	....	....	$7,195	....
Hose	$5,811	....	9,377	....
Boots and shoes	31,460	....	66,455	$115
Clothing, including waterproofed	3,568	$204	4,282	509
Tires, pneumatic	407,084	1,000	587,475	7,064
Tires, other kinds	6,264	....	1,987	....
Other manufactures	23,370	7,680	30,802	348
Totals, manufactured	$477,557	$8,884	$707,573	$8,036
Total rubber exports	$540,577	$9,284	$730,311	$8,036
Insulated wire and cables:				
Copper wire and cable	$287,813	....	$17,922	....
Chicle	73,049	....	....	....

EXPORTS OF INDIA RUBBER MANUFACTURES AND INSULATED WIRE AND CABLE FROM THE UNITED STATES BY COUNTRIES, DURING THE MONTH OF JULY, 1920

EXPORTED TO	Belting	Hose	Packing	Boots		Shoes		Soles and Heels	Automobile Tires				Insulated Wire and Cables	Druggists' Rubber Sundries	All Other Manufactures of Rubber	Total
	Value	Value	Value	Pairs	Value	Pairs	Value	Value	Casings Value	Inner Tubes Value	Solid Tires Value	All Others Value	Value	Value	Value	Value
Europe:																
Austria									$404							$404
Azores and Madeira Islands								$90							$12	102
Belgium		$9	$1,032						85,841	$4,208			$986	$823	1,340	94,239
Czechoslovakia									154							154
Denmark			531			8,176	$7,552	2,191	19,416	1,543	$1,120		1,200	750	5,043	39,346
Finland	$335		1,343			33,954	38,598		18,997	622		$11,500		279	2,618	74,292
France	9,708	990	34			13,828	8,748		115,459	306			4,036	559	32,015	171,855
Germany		2,292							22,589	2,349					2,834	30,064
Gibraltar						192	183		127							310
Greece									6,369	512	1,300			2,531	482	11,194
Italy		5,079		253	$921	8,400	6,762	8,589	10,457	8,050		145	6,976	1,867	9,263	58,109
Netherlands	4,918	1,089				999	937	503	209,825	11,627		626	27,586	6,098	6,302	269,511
Norway	1,480	9,844	152			67,775	73,015	530	210,939	11,190	26,702	4,291	11,948	598	8,508	359,197
Poland and Danzig				30	104	112	148		14,345	6,200	300		14,430	125	813	36,465
Portugal		449							3,607	913			3,090	265	8	8,332
Russia in Europe				10	100	6,150	11,000		600	90				100		11,890
Spain								1,288	151,539	15,995	46,233	185	3,251	19,037	5,321	242,849
Sweden	8,418	5,818	26			28,757	28,328	680	305,520	38,546	11,602	12,058	12,170	39,712	4,657	467,535
Switzerland						1,836	2,100		7,655	1,823			3,521		4,350	19,449
Turkey in Europe						3,906	7,506									7,506
England	1,796	31,037	7,923	1,272	3,067	197,624	172,518	7,869	577,625	31,664	659	12,703	32,795	20,631	115,987	1,016,274
Scotland			1,600			9,978	7,762		13,884	342						23,588
Ireland									173	40						213
Yugoslavia, Albania, etc									3,866	605						4,471
Totals, Europe	$26,655	$56,607	$12,641	1,565	$4,192	381,687	$365,157	$21,740	$1,779,391	$136,625	$87,916	$41,508	$121,989	$93,375	$199,553	$2,947,349
North America:																
Bermuda		$450	$136			609	$822	$223	92						$89	$1,812
British Honduras		35	35			2,599	3,689		996	$88				$69	554	5,466
Canada	$31,073	10,024	10,410	2,819	$11,896	15,657	17,119	552	41,441	5,475	$19,690	$3,367	$23,329	30,862	266,786	472,024
Costa Rica	1,576	2,096				120	80	1,046	639	92			1,099	321	2,412	9,361
Guatemala		39	76			2,077	3,307	783	4,232	2,756	436		4,427	484	1,011	17,551
Honduras	300	361	644			1,374	1,865	321	1,537	327			1,520	105	1,168	8,648
Nicaragua	3,249	810	402	6	19	1,836	2,013	1,551	3,001	67	350		542	510	1,846	14,360
Panama	1,360	2,050	554			8,681	9,566	2,298	37,863	21,048	7,229	8,606	28,609	247	4,211	123,641
Salvador	1,607	238						1,167	4,756	643			971	278	310	9,970
Greenland															404	404
Mexico	34,141	55,699	29,546	10	49	41,802	47,618	7,966	98,730	16,419	6,884	2,189	46,816	6,708	48,985	401,750
Miquelon, Langley, etc															150	150
Newfoundland and Labrador	3,501	1,773		5,744	21,213	528	616	606	2,533	245	67	216	1,926	389	1,140	34,225
Barbados						96	226	59	2,540	252		15	83		423	3,598
Jamaica		105				1,263	2,272	453	40,053	2,519		204	1,583	69	794	48,052
Trinidad and Tobago	281	452	115			3,091	3,029	1,150	26,704	3,279	7,000		112	269	5	42,396
Other British West Indies	73					1,490	2,150	15	1,163	137		12	20	18	318	3,906
Cuba	6,821	19,821	19,971			47,590	47,167	28,772	150,753	52,670	13,842	931	25,729	8,256	23,591	398,324
Virgin Islands of U. S.						567	777		254	120			56	120	44	1,371
Dutch West Indies		5	28			2,950	4,074	54	80	140		30		139	270	4,820
French West Indies	1,266	21							290		235		22		21	1,855
Haiti		54	100			202	210	217	7,293	1,503			909	133	354	10,773
Dominican Republic	71	312	92			1,318	2,399	709	4,462	3,535	741	1,084	893	472	2,353	17,123
Totals, North America	$85,319	$94,845	$62,109	8,579	$33,177	133,850	$148,999	$47,942	$429,412	$111,315	$56,474	$16,654	$138,646	$49,449	$357,239	$1,631,580
Oceania:																
Australia	$2,825	$10,727	$7,522	36	$297	5,221	$3,419		$264,504	$20,296	$407	$11,030	$4,276	$1,471	$17,694	$344,468
New Zealand	12,021	5,689	6,278	6,821	23,222	264	485	$552	367,172	22,921	20,139	24,787	953	1,076	17,930	503,225
Other British Oceania		895				490	632		1,170	100			80		29	2,906
French Oceania		33	13	4	16	2,986	4,395		1,525	193	197	229		54	143	6,798
Other Oceania						260	300		475			303			25	1,103
Philippine Islands	26,735	15,686	16,051	154	683	48,181	58,044	3,637	315,966	23,994	18,860	9,348	85,574	3,158	32,642	610,378
Totals, Oceania	$41,581	$33,030	$29,864	7,015	$24,218	57,402	$67,275	$4,189	$950,812	$67,504	$39,603	$45,697	$90,883	$5,759	$68,463	$1,468,878
South America:																
Argentina	$36,329	$16,650	$7,385	144	$725	23,236	$26,697	$2,148	$144,634	$18,431	$6,165	$8,052	$35,895	$5,286	$18,243	$326,640
Bolivia	600	723	55						1,150				405	400	365	3,698
Brazil	7,064	7,184	1,586	1	6	13,292	12,822	28,567	266,776	67,189	6,264	10,328	36,392	6,390	14,581	465,149
Chile	7,550	15,444	103			3,820	3,154	117	53,152	14,230	2,595	450	2,292	3,919	6,067	109,073
Colombia	5,351	487	26	12	40	924	1,069	1,807	10,997	2,080	132	580	4,466	1,796	6,604	35,435
Ecuador		1,572	75			1,140	1,179		455					185	458	3,924
British Guiana						3,936	5,322		3,267	145		418	63		702	9,917
Dutch Guiana									60	26						86
French Guiana															225	225
Peru	2,902	1,629	1,766			172	184		18,635	3,551	3,000		7,439	4,334	2,793	46,233
Uruguay	4,771	439	100			13,661	12,394	2,790	81,657	7,510	350	53	3,607	3,255	5,039	121,965
Venezuela	1,139	665	1,569					806	21,601	5,252	89	3,758	656	5,859	4,636	46,030
Totals, South America	$65,706	$44,793	$12,665	157	$771	60,181	$62,821	$36,235	$602,384	$118,414	$18,595	$23,639	$91,215	$31,424	$59,713	$1,168,375

Exported to—	Belting Value	Hose Value	Packing Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Soles and Heels Value	Automobile Tires: Casings Value	Automobile Tires: Inner Tubes Value	Automobile Tires: Solid Tires Value	Automobile Tires: All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
Asia:																
China	$6,254	$4,840	$4,727	......	......	1,056	$1,190	$94	$63,385	$1,988	$909	......	$76,124	$2,001	$12,038	$173,550
Chosen	......	......	99	......	......	21	32	......	3,824	530	......	......	......	44	......	4,529
British India	13,518	2,002	578	1	$7	3,404	5,913	350	123,350	9,881	12,733	$7,000	368	2,850	6,579	185,129
Straits Settlements	......	312	......	......	......	2,849	2,874	......	110,700	4,988	8,170	......	......	263	6,412	133,719
Other British East Indies	......	......	......	......	......	362	401	......	1,066	156	......	......	......	21	1,729	3,373
Dutch East Indies	2,454	582	46	......	......	......	......	17	41,124	4,725	36,216	7,500	32,179	1,818	2,497	129,152
Hongkong	......	411	821	......	......	1,594	1,470	......	174	19	2,387	......	1,937	138	2,240	9,597
Japan	53,122	9,964	15,430	960	2,128	19,031	17,678	......	57,011	3,961	400	7,161	3,777	495	26,243	197,370
Persia	......	......	......	......	......	......	......	......	......	......	......	......	......	75	......	75
Russia in Asia	......	......	......	12	99	......	......	......	......	......	......	......	......	......	......	99
Siam	......	......	......	......	......	......	......	......	1,420	200	600	......	69	102	......	2,391
Turkey in Asia	......	......	......	......	......	360	453	......	1,270	390	1,242	......	......	......	2,743	6,098
Totals, Asia	$75,348	$18,111	$21,701	973	$2,234	28,677	$30,011	$461	$403,324	$26,838	$62,651	$21,661	$114,454	$7,807	$60,481	$845,082
Africa:																
Belgian Congo	......	......	......	......	......	2	2	......	$56	$10	......	......	......	......	......	$68
British West Africa	......	......	......	......	......	19	19	......	31,903	3,477	$300	......	......	......	$7	35,706
British South Africa	$8,488	$1,025	$1,985	......	......	5,768	6,059	$2,768	45,440	9,047	206	$1,955	$1,604	$1,107	9,347	89,031
British East Africa	......	......	......	......	......	168	175	......	9,229	......	......	......	......	......	602	10,006
Canary Islands	......	......	......	......	......	......	......	......	2,500	......	......	......	......	......	30	2,530
French Africa	5,491	......	......	......	......	......	......	36	1,909	33	......	46	......	......	......	7,515
Kamerun, etc.	......	......	......	......	......	......	......	......	1,137	150	......	......	......	......	......	1,287
Morocco	......	......	......	......	......	......	......	......	2,500	......	......	......	......	......	......	2,500
Portuguese Africa	......	91	......	......	......	......	......	......	......	......	......	......	......	......	......	91
Egypt	......	......	......	......	......	......	......	......	9,126	......	......	......	......	......	52	9,178
Totals, Africa	$13,979	$1,116	$1,985	......	......	5,957	$6,255	$2,804	$103,800	$12,717	$506	$2,001	$1,604	$1,107	$10,038	$157,912
Totals	$308,588	$248,502	$140,965	18,289	$64,592	667,754	$680,518	$113,371	$4,269,123	$473,413	$265,745	$151,160	$558,791	$188,921	$755,487	$8,219,176

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORY OF THE UNITED STATES

	Belting, Hose and Packing, Value	Boots and Shoes Pairs	Boots and Shoes Value	Tires: Automobile Value	Tires: All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
Hawaii	$14,640	......	......	$137,031	$2,565	......	......	$14,733	$168,969
Porto Rico	9,447	......	......	230,738	24,187	......	......	55,583	319,955
Totals	$24,087	......	......	$367,769	$26,752	......	......	$70,316	$488,924

(Compiled by the Bureau of Foreign Commerce, Department of Commerce, Washington, D. C.)

UNITED KINGDOM RUBBER STATISTICS

IMPORTS

	July 1919 Pounds	July 1919 Value	July 1920 Pounds	July 1920 Value
Unmanufactured—				
Crude rubber:				
From—				
Straits Settlements	3,864,900	£375,381	6,931,800	£703,209
Federated Malay States	4,660,100	434,701	5,755,900	575,896
British India	161,800	15,550	638,100	65,460
Ceylon and dependencies	1,749,900	167,026	3,561,900	360,262
Other Dutch possessions in Indian seas	952,900	91,203	427,000	42,340
Dutch East Indies (except other Dutch possessions in Indian seas)	2,003,900	201,287	885,800	88,134
Other countries in the East Indies and Pacific not elsewhere specified	175,500	16,528	324,200	32,739
Brazil	291,900	36,336	2,395,100	227,159
Peru	137,300	14,800	6,600	576
South and Central America (except Brazil and Peru)	137,600	13,595	105,200	9,976
West Africa:				
French West Africa	....	....	800	63
Gold Coast	32,600	3,048	42,500	4,336
Other parts of West Africa	31,800	2,582	28,100	1,464
East Africa (including Madagascar)	65,300	6,312	142,800	10,237
Other countries	226,200	21,668	204,600	21,775
Totals	14,491,700	£1,400,017	21,450,400	£2,143,626
Waste and reclaimed rubber	611,200	16,480	710,400	12,069
Totals, unmanufactured	15,102,900	£1,416,498	22,160,800	£2,155,695
Gutta percha and balata	233,900	34,692	860,900	139,604
Rubber substitutes	....	....	158,100	7,407
Manufactured				
Boots and shoes..*dozen pairs*	9,412	£17,221	25,574	£68,381
Waterproof clothing	....	650	....	512
Tires and tubes	....	132,622	....	578,397
Other rubber manufactures	....	42,447	....	48,153
Insulated wire	....	558	....	300

EXPORTS

	July 1919 Pounds	July 1919 Value	July 1920 Pounds	July 1920 Value
Unmanufactured—				
Waste and reclaimed rubber	1,192,400	£31,650	1,464,500	£41,076
*Rubber substitutes	....	....	242,800	11,556
Totals	1,192,400	£31,650	1,707,300	£52,632
Manufactured—				
Boots and shoes..*dozen pairs*	6,565	£14,021	37,375	£71,824
Waterproof clothing	....	117,824	....	307,090
Insulated wire	....	88,452	....	176,586
Submarine cables	....	107,265	....	44,039
Tires and tubes	....	314,358	....	763,504
Other rubber manufactures	....	214,955	....	465,741
Totals	....	£856,875	....	£1,828,784

EXPORTS—COLONIAL AND FOREIGN

	July 1919 Pounds	July 1919 Value	July 1920 Pounds	July 1920 Value
Unmanufactured—				
Crude rubber:				
To Russia	22,400	£3,500	....	....
Sweden, Norway and Denmark	571,300	71,017	220,900	£22,846
Germany	108,500	10,064	771,000	64,427
Belgium	772,600	61,244	378,800	48,952
France	763,700	71,576	2,680,100	266,207
Spain	45,100	5,000	53,600	5,728
Italy	408,200	35,412	402,000	42,262
Austria-Hungary	....	....	88,300	8,665
Other European countries	485,800	46,369	45,000	4,607
United States	1,046,200	78,449	2,454,900	276,884
Canada	528,100	49,308	219,700	20,587
Other countries	117,900	14,323	416,400	49,167
Totals, rubber	4,869,800	£446,262	7,730,700	£810,332
Waste and reclaimed rubber	....	....	1,900	£109
Gutta percha and balata	190,600	£24,868	174,700	19,671
*Rubber substitutes	....	....	2,400	101
Manufactured—				
Boots and shoes...*dozen pairs*	15	£168	486	£6,599
Waterproofed clothing	....	81	....	9
Tires and tubes	....	9,264	....	107,464
Insulated wire	....	....	....	42
Other manufactures	....	4,766	....	2,810
Totals, manufactured	....	£14,279	....	£116,924

*Included in "Other Articles," Class III, T., prior to 1920.

THE MARKET FOR COTTON AND OTHER FABRICS

NEW YORK

With minor fluctuations, American cotton steadily declined last month, due to the general lack of demand and uncertain crop conditions. From 30.75 cents, the price quoted on August 31, middling uplands spot cotton fell to 25.50 cents on September 30, in a weak market.

At this writing, a fine prospect for cotton is clouded and made uncertain, both in Texas and Oklahoma, by too much precipitation

and consequent damage by boll weevil. This same condition prevails all across the southern portion of the cotton belt to the Atlantic ocean. The amount of the final cotton yield depends much upon the weather in the next three weeks. Only out in Arizona and California is there no question of a yield considerably larger than last year. Incidentally, New Mexico is getting into cotton raising by irrigation. Yet when all the sum of possible disaster by too much rain and by early frost has been summed up there seems the strong likelihood of a crop which will be equal to all our needs with a liberal amount left for export.

During the last week of September all the long staple cotton markets appeared to be weak and price declines were recorded in the entire list.

Arizona Cotton. The new crop has not yet appeared in sufficient volume to indicate the actual market. Average extra was said to be around 65 to 70 cents. The only cotton ginned so far is that from volunteer plants and is, therefore, somewhat shorter than the regular cotton.

Egyptian Cotton has declined steadily since mid-summer and now good grade uppers can be bought for 45 cents. Sakel is offered at 75 cents for forward shipment. Crop prospects in Egypt continue favorable, although the outlook is not quite so bright as throughout the season and early receipts are not showing up well as regards staple. Fear is also being expressed by both American and English spinners that the mixing of seed is causing the growths to deteriorate. Representations are being made to the proper authorities to seriously take up the matter of seed distribution and place it under the control of responsible parties.

Sea Islands appear to be firmly held, as $1 is still being asked for average extra choice. The present crop will, without doubt, be less than 5,000 bales all told. Reports from Savannah indicate that the boll weevil has not wrought such havoc this year as last, and that the few farmers who had the courage to plant Sea Islands seem to have carried their crops through the worst attacks. There is, therefore, talk of considerably increasing the acreage next season.

Ducks, Drills and Osnaburgs. Other than a small demand for hose and belting duck from mechanical goods manufacturers, this market is practically dead as far as the rubber trade is concerned. Prices have materially declined since last month and the quotations here given are all nominal.

Raincoat Fabrics. The gray goods market has apparently reached the low level and buyers are once more showing interest in the new fabrics. The actual demand, however, is far from normal. The only fabric that is being sold in volume is 64 by 60 olive drab sheeting, commonly known as bombazine.

Tire Fabrics. This market is for all practical purposes unquotable and not represented by the sales of small distressed lots that do not indicate actual value based on today's cotton cost.

The fabric mills are curtailing and shutting down, resulting in disorganization that will require several months for a return to efficient production when the normal demand for tire fabrics is resumed. This will probably not materialize until January 1, or early Spring, due to the heavy stocks being carried by tire manufacturers.

NEW YORK QUOTATIONS

September 27, 1920

Prices subject to change without notice

ASBESTOS CLOTH:				
Brake lining, 2½ lbs. sq. yd., brass or copper insertion	*lb.*	*$1.00	@	1.10
2¼ lbs. sq. yd., brass or copper insertion	*lb.*	*1.10	@	1.15
BURLAPS:				
32—7-ounce	*100 yards*	7.25	@	
32—8-ounce			@	
40—7½-ounce		8.25	@	
40—8-ounce		8.50	@	
40—10-ounce		10.50	@	
40—10½-ounce		11.00	@	
45—7½-ounce		10.00	@	
45—8-ounce		10.25	@	
48—10-ounce		15.00	@	
DRILLS:				
38-inch 2.00-yard	*yard*	.40	@	
40-inch 2.47-yard		.35	@	
52-inch 1.90-yard		.44¾	@	
52-inch 1.95-yard		.43¾	@	
60-inch 1.52-yard		.56	@	
DUCK:				
CARRIAGE CLOTH:				
38-inch 2.00 yard enameling duck	*yard*	.42½	@	
48-inch 1.74-yard		.48⅞	@	
72-inch 16.66-ounce		.99	@	
72-inch 17.21-ounce		1.03	@	
MECHANICAL:				
Hose	*pound*	.70	@	
Belting		.68	@	
HOLLANDS, 40-INCH:				
Acme	*yard*		@	
Endurance			@	
Penn			@	
OSNABURGS:				
40-inch 2.35-yard	*yard*		@	
40-inch 2.48-yard			@	
37½-inch 2.42-yard			@	
RAINCOAT FABRICS:				
COTTON:				
Bombazine 64 x 60	*yard*	.20	@	
60 x 48		.18	@	
Cashmeres, cotton and wool, 36-inch, tan		.95	@	
Twills 64 x 72		*.46	@	
64 x 102		*.48	@	
Twill, mercerized, 36-inch, blue and black		.42½	@	
tan and olive		.40	@	
Tweed		*.80	@	1.40
printed		*.27½	@	
Plaids 60 x 48		.19	@	
56 x 44		.18	@	
Repp		*.40	@	.45
Prints 60 x 48		.20	@	
64 x 60		.22	@	
IMPORTED WOOLEN FABRICS SPECIALLY PREPARED FOR RUBBERIZING—PLAIN AND FANCIES:				
63-inch, 3¼ to 7½ ounces	*yard*	.90	@	2.25
36-inch, 2¾ to 5 ounces		.70	@	1.84
IMPORTED PLAID LINING (UNION AND COTTON):				
63-inch, 2 to 4 ounces	*yard*	.78	@	1.64
36-inch, 2 to 4 ounces		.49	@	.94
DOMESTIC WORSTED FABRICS:				
36-inch, 4½ to 8 ounces	*yard*	.70	@	1.54
DOMESTIC WOVEN AND PLAID LININGS (COTTON):				
36-inch, 3¾ to 5 ounces		.22	@	.28

UNITED STATES CRUDE RUBBER IMPORTS FOR 1920 (BY MONTHS)

1920	Plantations	Parás	Africans	Centrals	Guayule	Manicoba and Matto Grosso	Balata	Miscellaneous Gum	Waste	Totals 1920	Totals 1919
January ......tons	17,799	2,620	821	111	....	....	....	....	....	21,351	7,235
February	29,681	2,456	558	265	34	....	....	....	....	32,994	17,456
March	28,533	2,463	514	23	114	3	113	983	1,252	33,998	28,223
April	21,036	1,893	628	29	79	10	22	812	448	24,957	28,146
May	24,443	2,025	662	95	113	....	45	1,059	224	28,666	16,348
June	12,911	1,352	427	27	164	....	7	552	164	15,604	16,319
July	14,695	1,115	34	40	....	....	8	1,283	312	17,487	17,965
August	12,730	590	13	75	156	....	67	1,135	300	15,066	11,067
Totals, 8 months, 1920	161,828	14,514	3,657	665	660	13	262	5,824	2,700	190,123	......
Totals, 8 months, 1919	121,710	16,637	1,724	1,085	1,442	161	....	....	....	....	142,759

(Compiled by The Rubber Association of America, Inc.)

SHEETINGS, 40-INCH:

48 x 48, 2.35-yard	yard	.24½@
48 x 48, 2.50-yard		.23 @
48 x 48, 2.85-yard		.19 @
64 x 68, 3.15-yard		.26 @
56 x 60, 3.60-yard		.19 @
48 x 44, 3.75-yard		.17¾@
SILKS:		
Canton, 38-inch	yard	.50 @
Schappe, 36-inch		.70 @
STOCKINETTES:		
SINGLE THREAD:		
3½ Peeler, carded	pound	@
4½ Peeler, carded		@
6½ Peeler, combed		@
DOUBLE THREAD:		
Zero Peeler, carded	pound	@
3½ Peeler, carded		@
6½ Peeler, combed		@
TIRE FABRICS:		
BUILDING:		
17¼-ounce Sakellarides, combed	pound	*2.35 @
17¼-ounce Egyptian, combed		*2.15 @
17¼-ounce Egyptian, carded		*2.05 @
17¼-ounce Peelers, combed		*2.25 @
17¼-ounce Peelers, carded		*1.47 @
CORD:		
15-ounce Egyptian	pound	*2.40 @
BICYCLE:		
8-ounce American	pound	*1.50 @
10-ounce American		*1.48 @
CHAFER:		
9¼-ounces Sea Island	pound	@
9¼-ounce Egyptian, carded		*2.29 @
9¼-ounce Peeler, carded		*1.71 @

*Nominal.

EGYPTIAN COTTON EXPORTS

The exports of cotton for the periods September 1, 1918, to June 28, 1919, and September 1, 1919, to June 26, 1920, as shown in the monthly agricultural statistics (June 30, 1920), published by the Statistical Department of the Ministry of Finance of Egypt, are as follows:

Destination	Sept. 1, 1918, to June 28, 1919		Sept. 1, 1919, to June 26, 1920	
	Bales*	Cantars†	Bales*	Cantars†
America	54,248	395,894	272,850	2,038,783
Austria	......	......	1,426	10,318
Belgium	......	......	2,368	17,329
France	44,964	331,222	49,970	384,437
Germany	......	......	6,235	45,293
Greece	2,550	18,332	551	3,580
Italy	24,121	176,466	37,669	281,256
Japan	10,909	78,647	16,368	121,453
Netherlands	......	......	2,209	15,771
Portugal	250	1,786	800	5,512
Rumania	......	......	55	405
Spain	7,456	54,907	9,593	71,500
Switzerland	19,761	146,542	11,739	88,161
Turkey	......	......	185	769
United Kingdom	300,577	2,209,004	401,387	3,029,344
Other countries	......	......	417	3,085
Total	464,836	3,412,800	813,822	6,116,996

* 1 bale of steam-pressed cotton weighs approximately 7.75 cantars; and 1 bale of cotton pressed hydraulically, 8.50 cantars.
† The cantar is equivalent to 99.0493 pounds avoirdupois.
(Compiled in the Near East Division, Bureau of Foreign and Domestic Commerce.)

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS

NEW YORK

The demand of the rubber trade for such items as zinc oxide, lithopone and carbon black has been much less than usual during the past month, owing to the general curtailment in the manufacture of automobile tires, in the making of which these items are largely used. As they are also important ingredients in the manufacture of paint, prices are well maintained by the steady demand from that industry.

Aniline. Trade demand has been only moderate in volume and spot stock prices have ranged from 27½ to 30 cents per pound.

Barytes. The scarcity of crude barytes will continue to hamper the production of refined product for months to come until increased supplies and enlarged facilties can be developed.

Blanc Fixe. This important product from barytes is in much demand and its supply is only limited by the resources of crude available.

Benzol. The demand continues in excess of the supply. Spot stocks of the pure grade are steady at 35 cents per pound.

Blacks. While blacks are in good demand by the paint trade, there is a marked falling off in the rubber trade requirements which will not again reach normal proportions until automobile tire manufacturers are able to resume capacity production. The present output is averaging approximately one-third of manufacturing capacity only.

China Clay. Receipts from abroad are liberal but as they have been bought to arrive they do not particularly affect the market, which holds steady in demand.

Carbon Bisulphide. The demand holds steady at slight advance in price.

Carbon Tetrachloride. In sympathy with carbon bisulphide, from which it is manufactured, carbon tetrachloride holds steady in price and demand.

Dry Colors. Market conditions register little change and none in anticipation.

Litharge. This material is in steady demand and follows the same market influences as all other lead products. Production is not far in excess of demand.

Lithopone. The supply falls considerably short of the demand due to the shortage of crude barytes necessary in its manufacture. Some of the makers of lithopone have advanced prices for the last quarter of 1920 one-half cent per pound during September. To meet the demands of the paint trade a new grade of lithopone known as albalith has been placed on the market. This material has special light resistant properties.

Sublimed Lead. Continues in good demand, much the same as litharge, with which it compares as a standard rubber trade pigment.

Sulphur. The market holds very steady in demand and price.

Solvent Naphtha. Supplies are scarce and firm in price with demand steady for all grades.

Whiting. Improved supplies of chalk have helped the whiting trade and relieved the situation for rubber manufacturers who prefer the native chalk whiting to the manufactured substitutes.

Zinc Oxide. The effect of the reduction of tire production has been noted in the demand for zinc oxide although it has not embarrassed the production of this material, for which there is a good demand from the paint industry, which holds the price steady.

NEW YORK QUOTATIONS

September 27, 1920

Prices subject to change without notice

ACCELERATORS, ORGANIC

Accelerene (New York)	lb.	$4.75 @	
Accelemal	lb.	.60 @	.65
Aldehyde ammonia crystals	lb.	*2.70 @	3.25
Aniline oil	lb.	.28½ @	
Excellerex	lb.	.65 @	.75
Hexamethylene tetramine (powdered)	lb.	2.25 @	2.50
N. C. C.	lb.	.50 @	
No. 999	lb.	.21 @	
Paraphenylenediamine	lb.	2.60 @	2.70
Thiocarbanilide	lb.	.57 @	.70
Velosan	lb.	3.70 @	
Vul-Ko-Cene	lb.	.35 @	
Virol	lb.	.80 @	

ACCELERATORS, INORGANIC

Lead, dry red (bbls.)	lb.	.12¼ @	
sublimed blue (bbls.)	lb.	.10 @	.10¼
sublimed white (bbls.)	lb.	.10 @	
white, basic carbonate (bbls.)	lb.	.10½ @	
Lime, flour	lb.	.01¾ @	.03
Litharge, domestic	lb.	.11¾ @	*.15
imported	lb.	@	
sublimed	lb.	.12 @	
Magnesium, carbonate, light	lb.	11½ @	.12½
calcined extra light	lb.	.60 @	.65
calcined light	lb.	.30 @	
calcined medium light	lb.	.25 @	
calcined heavy	lb.	.07½ @	.08
calcined commercial (magnesite)	lb.	.04 @	
oxide, extra light	lb.	.55 @	.70
light technical	lb.	.35 @	
light, imported	lb.	.55 @	
imported	lb.	.55 @	

ACIDS

Acetic, 28 per cent (bbls.)	cwt.	3.75 @	4.50
glacial, 99 per cent (carboys)	cwt.	15.95 @	16.70
Cresylic (97% straw color) (bbl.)	gal.	1.30 @	
(95% dark) (bbl.)	gal.	1.10 @	1.20
Muriatic, 20 degrees	cwt.	2.25 @	2.50
Nitric, 36 degrees	cwt.	6.25 @	6.50
Sulphuric, 66 degrees	ton	20.00 @	

ALKALIES

Caustic soda, 76 per cent (bbls.)	lb.	.04½ @	.07½
Soda ash (bbls.)	lb.	.05 @	

COLORS

Black:

Bone, powdered	lb.	.06 @	.07½
granulated	lb.	.11 @	.15
Carbon black (sacks, factory)	lb.	.15 @	.25
pressed	lb.	.20 @	.26
Drop	lb.	.08½ @	.20
Ivory black	lb.	.18 @	.30
Lampblack	lb.	.18 @	.45
Oil soluble aniline	lb.	1.00 @	
Rubber black	lb.	.08½ @	

Blue:

Cobalt	lb.	.25 @	.35
Prussian	lb.	.75 @	1.00
Ultramarine	lb.	.18 @	.40
Rubber makers' blue	lb.	3.50 @	

Brown:

Iron oxide	lb.	.04¼ @	.06¾
Sienna, Italian, raw and burnt	lb.	.06½ @	.15
Umber, Turkey, raw and burnt	lb.	.05½ @	.09
Vandyke	lb.	.08 @	.10
Maroon oxide	lb.	.14 @	.15

Green:

Chrome, light	lb.	.42 @	.70
medium	lb.	.42 @	.70
dark	lb.	.50 @	.70
commercial	lb.	.07 @	.15
tile	lb.	.08 @	.20
Oxide I. R.	lb.	.85 @	1.05
Oxide of chromium (casks)	lb.	1.25 @	
Rubber makers' green	lb.	3.50 @	

Red:

Antimony, crimson, sulphuret of (casks)	lb.	$0.45 @	
crimson, "Mephisto" (casks)	lb.	.60 @	
crimson, "R. M. P."	lb.	.65 @	
Antimony, golden sulphuret of (casks)	lb.	.20 @	.22
golden sulphuret (States)	lb.	.35 @	.40
golden, "Mephisto" (casks)	lb.	.33 @	
golden, "R. M. P."	lb.	.33 @	
red sulphuret (States)	lb.	.25 @	.30
vermilion sulphuret	lb.	.55 @	
Arsenic, red sulphide	lb.	.17½ @	
Indian	lb.	.14 @	.15
Para toner	lb.	2.25 @	
Red excelsior	lb.	.19 @	.22
Toluidine toner	lb.	4.25 @	
Iron oxide, reduced grades	lb.	.08 @	.12
pure bright	lb.	.12 @	.18
Maroon oxide	lb.	.14 @	.15
Spanish neutral	lb.	.05¾ @	
Venetian	lb.	.03 @	.07
Oil soluble aniline, red	lb.	1.75 @	2.00
orange	lb.	1.65 @	
Oximony	lb.	.18 @	
Vermilion, American	lb.	.25 @	.30
permanent	lb.	.37 @	
English quicksilver	lb.	1.70 @	1.75
Rubber makers' red	lb.	3.50 @	
purple	lb.	3.50 @	

White:

Albalith	lb.	.07¾ @	.08¼
Aluminum bronze, extra brilliant	lb.	.65 @	
extra fine	lb.	.75 @	
Lithopone, domestic	lb.	07¾ @	.09½
Ponolith (carloads, factory)	lb.	@	
Rubber-makers' white	lb.	@	
Zinc oxide, American (factory):		C. L.	L. C. L.
Special	lb.	.10½ @	.11
XX red	lb.	.10½ @	.11
French process (factory):			
White seal	lb.	.13½ @	17
Green seal	lb.	.12¼ @	.12¾
Red seal	lb.	.11¼ @	.13½
Azo factory:			
ZZZ (lead free)	lb.	@	
ZZ (under 5% leaded)	lb.	@	
Z (8-10% leaded)	lb.	@	

Yellow:

Cadmium, sulphide, yellow, light, orange	lb.	2.10 @	
red	lb.	2.10 @	
Chrome, light and medium	lb.	.35 @	.38
Ochre, domestic	lb.	.02½ @	.05½
imported	lb.	.04¾ @	.08
Oil, soluble aniline	lb.	1.75 @	
Rubber makers' yellow	lb.	2.50 @	3.50
Zinc chromate	lb.	.50 @	.55

COMPOUNDING INGREDIENTS

Aluminum flake (carload)	ton	33.00 @	
silicate	ton	30.00 @	40.00
Ammonium carbonate (powdered)	lb.	.17¾ @	
Asbestine (carloads)	ton	30.00 @	40.00
Barium, carbonate, precipitated	ton	100.00 @	120.00
sulphide, precipitated	lb.	.05 @	
dust	ton	120.00 @	
Barytes, pure white (f. o. b. works)	ton	28.00 @	
off color	ton	20.00 @	
uniform floated	ton	28.00 @	
Basofor	lb.	.06½ @	
Blanc fixe (dry, bbls.)	lb.	.06 @	06¼
Bone ash	lb.	12 @	
Carrara filler	lb.	.02 @	
Chalk, precipitated, extra light	lb.	.05 @	.05½
heavy	lb.	.04 @	.04½
China clay, Dixie	ton	22.00 @	
Blue Ridge	ton	22.00 @	
domestic	ton	10.00 @	20.00
imported	ton	19.00 @	25.00
Cotton linters, clean mill run, f. o. b. factory	lb.	.03½ @	
Fossil flour (powdered)	ton	60.00 @	
(bolted)	ton	65.00 @	
Diatomite	lb.	.03 @	.04
Glue, high grade	lb.	.35 @	.45
medium	lb.	.30 @	.35
low grade	lb.	.20 @	.25
Graphite, flake (400-pound bbl.)	lb.	10 @	.25
amorphous	lb.	.04 @	.08
Ground glass FF. (bbls.)	lb.	.03 @	
Infusorial earth (powdered)	ton	60.00 @	
(bolted)	ton	65.00 @	
Liquid rubber	lb.	18 @	
Mica, powdered	lb.	.15 @	
Pumice stone, powdered (bbl.)	lb.	.05 @	10
Rotten stone, powdered	lb.	.02½ @	.04½
Rubber paste	lb.	.19 @	.22
Silica, gold bond	ton	40.00 @	
silver bond	ton	28.00 @	
Soapstone, powdered gray (carload)	ton	12.00 @	
Starch, powdered corn	cwt.	4.73 @	
Talc, powdered soapstone	ton	20.00 @	25.00
Terra blanche	ton	22.00 @	32.00
Tripoli earth, air-floated, cream or rose (factory)	ton	50.00 @	
white (factory)	ton	52.50 @	
Tyre-lith	ton	120.00 @	130.00
Whiting, Alba (carloads)	cwt.	.80 @	.90
Columbia	cwt.	.95 @	
commercial	cwt.	1.50 @	
Danish	ton	24.00 @	
English cliffstone	cwt.	2.00 @	
gilders	cwt.	1.60 @	
Paris, white, American	cwt.	1.75 @	
Quaker	ton	16.00 @	
Super	ton	30.00 @	32.50

Wood pulp, imported	lb.	$0.03¾ @	
XXX	ton	65.00 @	
X	ton	60.00 @	
Wood flour, American	ton	*50.00 @	

MINERAL RUBBER

Elateron (c. l. factory)	ton	60.00 @	
(l. c. l. factory)	ton	63.00 @	
Gilsonite	ton	75.00 @	
Genasco (c. l. factory)	ton	69.00 @	
(l. c. l. factory)	ton	71.00 @	
Hard hydrocarbon	ton	42.00 @	
Soft hydrocarbon	ton	40.00 @	
K-X	ton	@	
K. M. R	ton	@	
M. R. X	ton	@	
Pioneer (c. l. factory)	ton	60.00 @	
(l. c. l. factory)	ton	65.00 @	
Raven M. R	ton	60.00 @	65.00
Refined Elaterite	ton	@	
Richmond	ton	@	
No. 64	ton	@	
318/320 M. P. hydrocarbon (c. l. factory)	ton	50.00 @	
(l. c. l. factory)	ton	53.00 @	70.00
300/310 M. P. hydrocarbon (c. l. factory)	ton	47.50 @	
(l. c. l. factory)	ton	50.00 @	
Robertson, M. R. pulverized (c. l. factory)	ton	95.00 @	
M. R. pulverized (l. c. l. factory)	ton	97.50 @	
M. R. (c. l. factory)	ton	72.50 @	
M. R. (l. c. l. factory)	ton	75.00 @	
Ruhrax (factory)	ton	50.00 @	
Synpro, granulated	ton	97.50 @	
Walpole rubber flux (factory)	lb.	.05 @	

OILS

Avoilas compound	lb.	.17 @	.19
Castor, No. 1, U. S. P	lb.	.18 @	
No. 3. U. S. P	lb.	.17 @	
Corn	lb.	.16 @	
Corn, refined Argo	cwt.	17.25 @	
Cotton	lb.	.15 @	
Glycerine (98 per cent)	lb.	.28 @	.29
Linseed, raw (carloads)	gal.	1.20 @	
Linseed compound	gal.	@	
Palmoline	lb.	.15 @	.17
Palm niger	lb.	.11½ @	
Palm "Lagos"	lb.	.14 @	
Palm special	lb.	.17 @	
Peanut	lb.	.18 @	
Petrolatum	lb.	.10 @	.12
Petrolatum, sticky	lb.	.12 @	.14
Petroleum grease	lb.	.07½ @	.09
Pine, steam distilled	gal.	1.85 @	2.00
Rapeseed, refined	lb.	.20 @	
blown	lb.	.20 @	
Rosin	gal.	.70 @	.95
Synpro	gal.	.70 @	1.00
Soya bean	lb.	.14 @	
Tar	gal.	.36 @	.42

RESINS AND PITCHES

Balsam, fir	gal.	2.00 @	
Cantella gum	lb.	.50 @	
Cumar resin, hard	lb.	.16 @	
soft	lb.	.13 @	
Tar, retort	bbl.	15.00 @	15.50
kiln	bbl.	14.50 @	15.00
Pitch, Burgundy	lb.	.08½ @	
coal tar	lb.	.02 @	
pine tar	lb.	.04 @	
ponto	lb.	.14 @	
Rosin, K	bbl.	13.75 @	
strained	bbl.	@	
Shellac, fine orange	lb.	1.30 @	1.50

SOLVENTS

Acetone (98.99 per cent drums)	lb.	.25 @	
methyl (drums)	gal.	1.50 @	
Benzol (water white, 90%)	gal.	.33 @	.38½
Beta-naphthol	lb.	.80 @	
Carbon bisulphide (drums)	lb.	.07½ @	.08¼
tetrachloride (drums)	lb.	.13 @	.15
Naphtha, motor gasoline (steel bbls.)	gal.	.31 @	
73 @ 76 degrees (steel bbls.)	gal.	.41 @	
70@ 72 (steel bbls.)	gal.	.39 @	
68 @ 70 degrees (steel bbls.)	gal.	.38 @	
V. M. & P. (steel bbls.)	gal.	.30 @	
Toluol, pure	gal.	.35 @	.40½
Turpentine, spirits	gal.	1.46 @	
wood	gal.	1.40 @	1.43
Osmaco reducer	gal.	.65 @	
Xylol, pure	gal.	.45 @	.50½
commercial	gal.	.30 @	.35½

SUBSTITUTES

Black	lb.	.10 @	.20
White	lb.	.11 @	.23
Brown	lb.	.15 @	.21
Brown factice	lb.	.10 @	.21
White factice	lb.	.11 @	.24
Paragol, soft and medium (carloads)	cwt.	18.81 @	
hard	cwt.	18.31 @	

VULCANIZING INGREDIENTS

Lead, black hyposulphite (Black Hypo)	lb.	.32 @	.39
Orange mineral, domestic	lb.	.15¼ @	
Sulphur chloride (jugs)	lb.	.20 @	
(drums)	lb.	.08 @	
Sulphur, flour, Brooklyn brand (carloads)	cwt.	3.40 @	
Bergenport, soft (c. l. factory)	cwt.	3.85 @	
Bergenport, soft (l. c. l. factory)	cwt.	4.15 @	
superfine (carloads, factory)	cwt.	2.00 @	2.62

(See also Colors—Antimony.)

WAXES

Wax, beeswax, white	lb.	$0.67 @	
ceresin, white	lb.	.16 @	
carnauba	lb.	.35 @	
ozokerite, black	lb.	.65 @	
green	lb.	.65 @	
Montan	lb.	.20 @	
paraffine, refined 118/120 m. p. (cases)	lb.	@	
123/125 m. p. (cases)	lb.	@	
128/130 m. p. (cases)	lb.	@	
Sweet wax	lb.	.15 @	

THE MARKET FOR RUBBER SCRAP

NEW YORK

The prevailing inactivity noted in the reclaimed rubber market has brought the rubber scrap business well nigh to a full stop. Reclaimers are well stocked with the various grades of scrap and, according to the present outlook, will not be in the market in force for months to come, owing to the general demand of their customers for deferred shipment of goods on order. Such interest as exists is confined to the better grades of scrap, such as boots and shoes, inner tubes and tires.

QUOTATIONS FOR CARLOAD LOTS DELIVERED

Prices subject to change without notice

September 27, 1920

BOOTS AND SHOES:

Arctic tops	lb.	*$0.075 @	
Boots and shoes	lb.	*.06½ @	.06¾
Trimmed arctics	lb.	*.05¼ @	.05¾
Untrimmed arctics	lb.	*.04¼ @	.04¾

HARD RUBBER:

Battery jars, black compound	lb.	*.01 @	.01¼
No. 1, bright fracture	lb.	*.23 @	.24

INNER TUBES:

No. 1	lb.	*.14½ @	.15
Compounded	lb.	*.08½ @	.09
Red	lb.	*.07 @	.07½

MECHANICALS:

Black scrap, mixed, No. 1	lb.	*.03½ @	.04
No. 2	lb.	*.02½ @	.02¾
Car springs	lb.	*.03½ @	.04
Heels	lb.	*.03 @	.03½
Horse-shoe pads	lb.	*.03 @	.03½
Hose, air brake	lb.	*.03½ @	.03¾
fire, cotton lined	lb.	*.01½ @	.01¾
garden	lb.	*.01½ @	.01¾
Insulated wire stripping, free from fiber	lb.	*.03½ @	.04
Matting	lb.	*.01¼ @	.01½
Red packing	lb.	*.05½ @	.06
Red scrap, No. 1	lb.	*.09 @	.10
No. 2	lb.	*.06¾ @	.07¼
White scrap No. 2	lb.	*.08 @	.09
No. 1	lb.	*.10 @	.11

TIRES:

PNEUMATIC—			
Auto peelings	lb.	*.03¾ @	.04¼
Bicycle	lb.	*.02¼ @	.02¾
Standard white auto	lb.	*.03¾ @	.04¼
Mixed auto	lb.	*.02½ @	.03
Stripped, unguaranteed	lb.	*.01¾ @	.02¼
White, G. & G., M. & W., and U. S	lb.	*.04¼ @	.04¾
SOLID—			
Carriage	lb.	*.04 @	.04¼
Irony	lb.	*.01 @	
Truck	lb.	*.03½ @	.03¾

*Nominal.

NOTES ON ACCELERATORS

In the article under the above caption by Dr. Henry P. Stevens, published in The India Rubber World, August 1, 1920, pages 719-720, the tabulation of figures quoted, although given by Seidl, were not from his own results, but based on experimental results of Gottlob. On this point the article should have referred to the figures as "Some figures of Gottlob recently quoted by Seidl" in order to be strictly in keeping with the facts.

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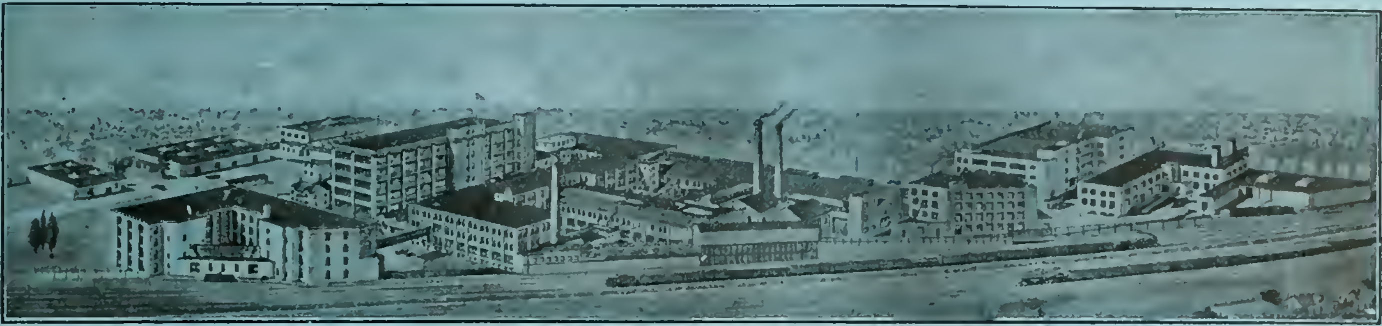
HIGH GRADE RUBBER GOODS

(MADE IN CANADA)



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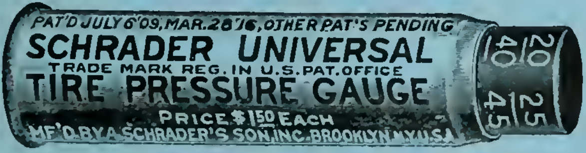

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Edited by HENRY C. PEARSON

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THE NEXT RUBBER EXHIBITION

AMERICANS who enjoyed and were benefited by the Third International Rubber Exhibition in New York in 1912, and the fourth in London in 1914, will be interested to learn that plans are well under way for the fifth exhibition to be held in London in June, 1921. Many governments, important industrial associations, and leading rubber growers and manufacturers of rubber goods and machinery have already assured their hearty cooperation in making the affair surpass in magnitude and excel in helpfulness all the exhibitions held since their inception in 1908. Experience has shown that not only are such displays of high educational concern to the general public, but that they are of positive value to the entire rubber trade. The International Conference, which is held in connection with these exhibitions, is always a feature of outstanding interest. The essays submitted by the foremost specialists in the rubber world cover a wide range of subjects of vital import to the trade, and the practical discussions by men who through their genius and industry have achieved real success are stimulating to an exceptional degree. It may seem early, but it is none too soon for the leaders in the rubber trade in this country to prepare for ample and creditable representation at the big exhibition.

OVER EIGHTY MILLION TIRES

J. C. FREDERICK in the *Review of Reviews* forecasts the automobile business in a most interesting fashion. Indeed those tire men who fear immediate "saturation" may well read and take hope. Here are some of the figures. Present census of automobiles and trucks in the United States, 7,750,000. Saturation point based on Iowa per capita figures, 40,800,000 or on one-fourth of that, 10,200,000 plus 7,750,000, which equals 17,950,000. This expressed in tire terms is 71,800,000 tires and tubes. Europe's need Mr. Frederick puts at 31,300,000 cars. He points out also that the American car is popular and that the supply does not equal the demand. Say Europe can use 10,000,000 tires on the above basis it would look as if some time within the next few years 81,800,000 new tires will be built in American factories, and then there are the replacements. Not really a bad outlook.

BRITISH EXPORT EFFICIENCY

WHILE Americans have long realized the truth of the saying that British business men are the world's greatest overseas traders, and have appreciated the fact that the limited capacity of the home market for absorbing manufactured products has been a powerful factor in impelling British business men to strive unceasingly to expand the volume of their foreign trade, but comparatively few in this country have had much knowledge of the ingenious methods employed by the British to gain their commanding position in the mercantile world. Nor is it surprising that Americans have known so little of the magnitude and the intricate ramifications of the machinery devised by the British, with and without government aid, for enlarging the scope of overseas trade.

Americans, for instance, have no counterpart for the British Trade Corporation, scarcely three years old, with a fifth of its £10,000,000 capital paid up, and which has already helped large and small British manufacturers to sell many million pounds' worth of goods overseas. Nor have American manufacturers an organization which functions like the Federation of British Industries, a trade organization of 20,000 producing firms, all British. It is organized by trades and districts, is governed by a grand council of 211 members, conducts expositions at home and in foreign countries, compiles an export register, and, apart from the British Government, maintains trade commissions in numerous foreign and colonial markets.

Great Britain learned many valuable lessons from aggressive, commercial Germany; and so, too, America, which is steadily approaching the saturation point in its

own great home market, and which must plan for a larger share of overseas commerce, may well study closely the intensive methods and far-reaching experiences of the big European nations in developing their foreign commerce.

A TROPICAL COLLEGE FOR TRINIDAD

Word comes that the long continued efforts of Sir Francis Watts have been successful in securing an Agricultural College for the West Indies. The location will be the tropical island of Trinidad which is ideal as to climate and soil and its contiguity to Central and South America and the United States.

The experiment station at Port of Spain, Trinidad, has done much already in rubber, cotton, and the like, and the college will begin with a wealth of material right at its doors. A university so close to our borders, with a faculty made up of the best talent from the vast possessions of Great Britain is now to attract scholars from our universities who more and more are turning to tropical work.

LIGHTER CARS AND SMALL TIRES

It may be hard to convince Mr. Average Car-Owner that gasoline consumption is really exceeding production, and that the report is not a cunning canard put out by the great oil companies as a pretext for raising prices; but it is a fact, nevertheless, and the most unbiased authorities say that there is no reason to believe that gasoline will ever be cheap again or that the output will ever keep pace with the demand.

Limiting the number of cars or rationing gasoline might be suggested as alternatives; but, inasmuch as neither course would be popular, and as no satisfactory substitute for "gas" is being marketed, the rational remedy for such a situation would seem to be the manufacture of motor vehicles which will not require nearly as much fuel as those now in vogue. In other words, cars must be made lighter; and, while having engines of ample power, the excess now provided and so often misused must be greatly lessened if not eliminated.

Thus the heavy passenger car will gradually disappear, and a small, light motor vehicle appear. There are signs that in the near future such a car will be put on the market for as low a price as $250 and will use scarcely half the "gas" now ordinarily consumed, and the cost of which must rise in direct ratio to its increasing scarcity.

Already the Germans, forced to deal with a serious "gas" shortage, are turning out a small, light, cheap car said to be quite efficient. Other European countries, also confronted with a scarcity of petrol, are planning to do away with cumbersome cars that are veritable locomotives consuming an inordinate amount of valuable fuel.

In this country a famous electrical wizard announces the invention of a remarkably light, power-economizing motor car, and soon to be marketed. Evidently necessity, "invention's mother," is preparing us for a radical change in automobile construction and incidentally for a great output of light, low-priced, economical cars—perhaps for the millions, all of which must stimulate to a greater degree than ever the manufacture of rubber tires, the *sine qua non* of the modern automobile.

NOT HEVEA ONLY

With the very commendable preparation that is going forward for study of and experiment upon *Hevea* trees no one can quarrel. It is not only wise, but necessary. Nevertheless, would it not be the part of wisdom to bring both the *Castilloa* and the *Manihot* up to a greater productiveness also? In many instances individual trees have shown a surprising product. Furthermore, who knows that wound response cannot be brought about in these trees? If so, with their abundant flow of latex they might in time rival the *Hevea.* Then, too, there is the immunity to disease that *Castilloa* particularly enjoys. The *Hevea* has proved such a wonder that the others are for the time being about forgotten, which is a pity.

FACTORY ORGANS

The House Organ, so-called, is quite likely to be shaped for the selling force, the dealer and sometimes the ultimate consumer. The Factory Organ, however, is the newspaper of the mill and, in its present development, is proving a power for good that it is hard to overestimate. It gives just the needed opportunity for the wise executive to talk to his employes in terms they understand and in a way that makes a permanent impression. The publication is the forum of the factory. It chronicles the minor happenings, the pleasant personalities, corrects errors in thought and gives merit, even minor merit, a chance for appreciation.

As a means of Americanization, of welfare work, or assistance to all of the right thinking, it is priceless. More power to it.

Confirmation having been made of the report of a $300,000,000 merger of the General Chemical, Solvay Process, Semet-Solvay, Barrett, and the National Aniline and Chemical companies into what will be the largest concern in the world manufacturing and distributing chemical products, the rubber industry, one of the greatest users of chemicals, is pardonably curious to know how its interests will be affected by such a gigantic consolidation. Assurance is given that the new corporation does not intend to increase its profits by raising prices, but rather by effecting numerous economies, by lessening waste and "lost motion," by more efficient production, and by wisely coordinating the forces of the hundred and one establishments that will pass under single control.

India Rubber in the Oil Industry

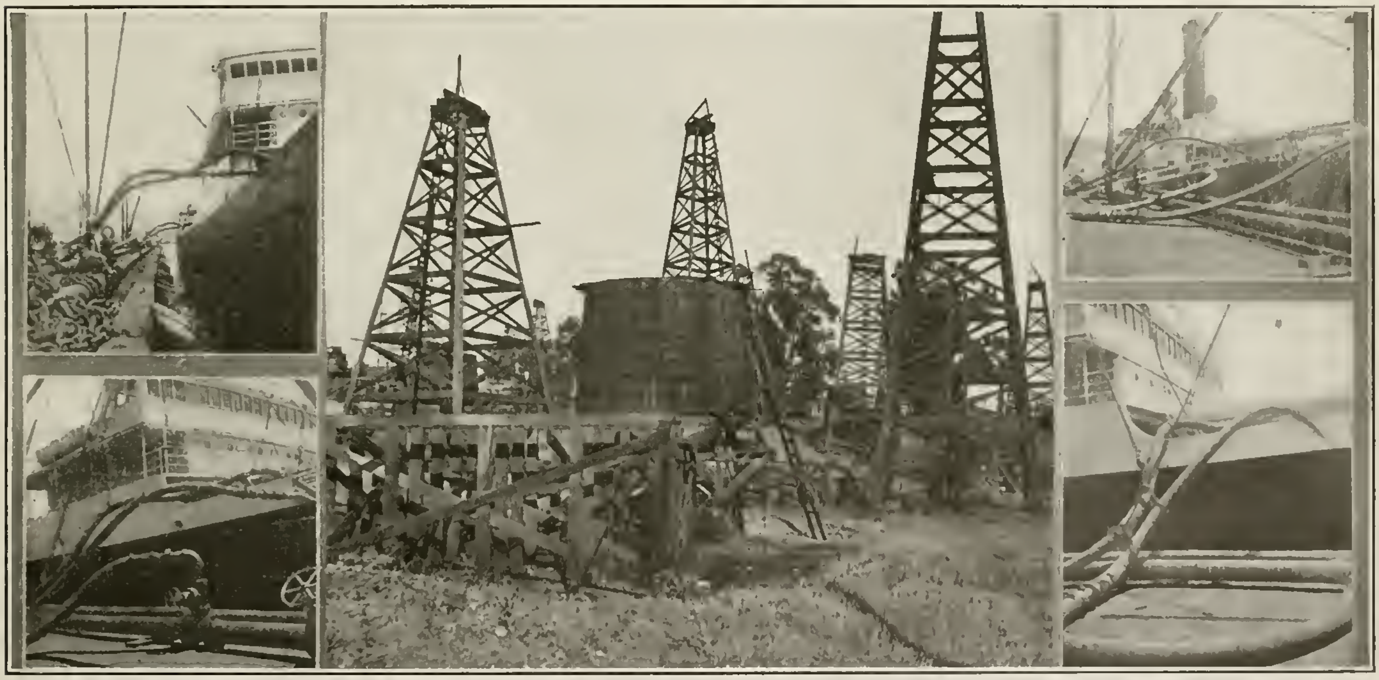
Rubber figures as a considerable item, as it plays an indispensable part in the colossal petroleum industry of the United States, in which, according to the Geological Survey, over 16,000 companies and individuals operating wells are expected to produce in 1920 some 400,000,000 barrels of crude oil worth about $1,260,000,000. Estimates of the actual capital involved in the production, refining and distribution of petroleum, while varying greatly, give an approximate total of over two billion dollars for the entire country.

Of this enormous total about one-third is accredited to the Southwest, where the recent development of petroleum fields has amazed the nation by its magnitude and rapid extension. From Texas to the Pacific Slope in a hundred territories thousands of wells are daily yielding hundreds of thousands of barrels of oil, and a multitude of prospectors are continually opening up new areas and drilling for new supplies of a commodity for which there is an ever-increasing demand.

California, of whose oil industry more complete statistics are available than of some of the other southwestern states, produces fully one-fifth of the world's total supply of petroleum. On July 1, 1920, there were nearly 800 concerns in the state operating 9,311 wells and drilling 454 more, 261 having been started in the first six months of 1920, as compared with 182 in the same period of 1919. The state's total crude oil production for 1919 was 101,221,000 barrels, according to reports kept by the Standard Oil Co., and according to the state's own reports for 1919, three hundred twenty oil companies had $139,321,872 in cash and $222,244,897 in properties.

In Texas it is estimated that over 300 companies are producing oil, many of them in great quantities, and about 600 more are drilling. In New Mexico, it is said, that 70 oil companies are operating, 28 in Arizona, 26 in Utah, and 30 in Nevada. Attracted by the steadily-enhancing value of the crude product, many more concerns with ample capital are planning to go actively into the big "oil game," and consequently augment the demands being made upon manufacturers of various rubber essentials for the oil fields. The general complaint among oil well drillers is that operations are greatly retarded by slow deliveries of machinery. Little fault, however, seems to be found with the execution of orders for rubber goods, the sales of which in the Southwest oil industry total several hundred thousand dollars annually.

While most of the rubber used in drilling, pumping, conveying, etc., in the oil industry in this section is provided by Eastern and Mid-Western factories, a fairly large proportion of such goods is being furnished by makers of rubber specialties on the Pacific Coast.



Rubber Goods Are Indispensable to the Oil Industry in Drilling, Pumping and Conveying Crude Oil, Also in the Final Distribution of the Refined Products

DRILLING OUTFITS

It may not be amiss here to touch briefly upon that most essention operation in an oil field—drilling, and the apparatus with which it is carried on. While old-time oil men insist that for drilling there is nothing to rival the familiar standard, immovable derrick, up-to-date prospectors rather favor compact portable drilling rigs, which are not only easily moved about and quickly erected, but with which, it is claimed, wells can also be drilled in a much shorter time than with the standard rig. Very deep drilling may be done with the former, but the latter has proved its value for shallower wells, and has been efficient even at depths of 2,500 feet or more. A fine type of drilling outfit is the combination derrick, about 80 feet high, so arranged that it can be used for both cable and rotary drilling. In cable drilling the tools, which fairly chisel a hole through the solid earth, are alternately lifted within the derrick and then dropped through an ever-lengthening casing of iron pipe; while in rotary drilling the boring is done by a low-set machine, the essential feature being a revolving horizontal steel table, in the center of which is fastened the drilling bit and through the center of which can also be slipped the sections of pipe casing. The table is geared to a bevel pinion on a shaft driven by a motor or gas engine.

When oil is struck a long piston rod replaces the drilling "string" in the center of the derrick, the pumping jack is set over

the well, and the picturesque walking beam begins its task, one which every oil man always hopes will be a never-ending series of "ups and downs."

BELTING

When the stage is all set for an "oil drama," rubber is ushered in in an important rôle in the very first act; that is, the operation of "spudding in" or drilling a well. It is needed primarily for belting. The big oil companies of the Southwest have tried all kinds of belts for driving drills at high speed 24 hours a day in the fields, both by the rotary chiselling or "percussion" process, in which a 625-pound bit is lifted and dropped into the hole; and the boring method, in which a 100-pound bit with a serrated tip is revolved at the bottom of an 8 or 10-inch iron pipe to which additions are being constantly made; but the one belt that the workers find stands the hardest kind of abuse and gives the greatest efficiency is that made of rubber.

Rubber belting is preferred in the oil fields because it is tougher, more flexible, more cohesive and has greater tensile strength than leather; it hugs the pulleys closely, making anti-slip "dope" unnecessary; there is no stretch to it, hence no time lost in take-ups; it is uniform in its construction, joints being eliminated when measurements are sent to the factories for endless belts; there is no limit to the width, thickness, quality, or design in which it can be made up; it is water-proof and can be made practically impervious to oils, acids, gases and steam; and it can withstand the roughest service in sandy sections and extreme variations in temperature. A fact of no little interest, too, is that rubber belting costs less than leather.

A familiar type of rubber belt used on oil well drills is 12 to 14 inches wide and made of 6-ply canvas duck with a good quality of friction. For a few special cases 8-ply belts are made to order. All such belts, drillers say, withstand the heavy, uneven jerks caused by the weight of the tools and the spring of the cable much better than leather. When a well has been set up and a gasoline or electric-driven pump has been installed, the transmission belt that is preferred to connect motor and pump is a 4 or 5-ply heavy duck well frictioned with rubber and generally a foot wide. The durability of such belts often amazes the users, many giving five and six years of service despite oil, grit, slush and rough usage. It might be added that such belts are generally of the type having the plies stitched and the surface rubber-covered to make it moisture-proof.

OIL HOSE

Another article of even greater utility in the oil industry is hose; and many are the varieties used to meet exacting conditions. It is first employed in the primary or drilling operation, especially where the rotary method is used, and with it water is constantly pumped down the slender hollow shaft to cool the drill and to keep it from getting clogged with sand and pulverized rock, as well as to flush out the bore-hole. The type of hose used ranges from 2 to 2½ inches internal diameter, is made with a thick, tough inner wall, and generally has from five to eight plies, except at the ends of the 30 to 50-foot length, where it is reinforced with one or two additional plies of fabric to withstand coupling strain. All such hose has a protective armor, being closely wrapped with either round or half-round wire, commonly No. 6 gage, for rough handling. Some types for pressures of 250 pounds or more have flat wire wound through the cores to safeguard the hose further from grit abrasion and to prevent bends from straining it too much. For compressed air needs, many use plain wrapped duck or braided hose, 5 to 9-ply, with the core made of an oil-resisting rubber; but the demand is increasing for hose with wire armor, which gives added strength and longer life for rough work.

For conducting oil from tanks to barrels the hose most used has four or five plies of frictioned duck with the center lined with an oil-resisting rubber compound, and with a closely-set spiral flat wire extending through the core not only to protect the compound from possible corrosion but also to prevent the hose from kinking or collapsing through the high vacuum so often occurring in hose used for this purpose. For general oil conveying a hose is used that has four or five plies with a specially-made canvas lining to protect the rubber, and also a round or flat wire helix in the core to check sharp bending.

To draw oil from shore tanks to steamships or tankers, or to reverse the process, a suction and discharge hose of exceptional strength and caliber is employed. It has to be made to withstand the utmost extremes in weather, the harshest handling, continual contact with rapidly-growing masses of oil, and usually high pressure. Spun metal hose has been tried, but, while such hose may give fair service in selected cases, the big oil companies much prefer to put their trust in rubber. As they say, all transfers of oil cannot be made with ships moored to docks; often the big hose has to be stretched a long distance from the shore, and sometimes it has to be fastened to a string of floats in rough water when a ship cannot be brought near a wharf or where wharves are lacking. They must have a hose that will not break if it bends. If in using a spun metal hose in such cases the hose were to snap in two, as is always possible, such an accident would mean perhaps serious loss and delay to shippers and customers.

One type of suction and discharge hose which is considerably used on the Pacific Coast ranges in internal diameter from six to eight inches and often lasts a year with steady use. It has a heavy, oil-resisting cover, under which are four plies of 32-ounce duck frictioned fabric. Under the latter is a braided steel cable wound spirally, then four plies more of fabric, next a heavy rubber lining, then two layers of canvas frictioned on the reverse side, and finally a heavy galvanized iron flat wire helix for the core and so pressed into the canvas as to give quite a smooth bore throughout. Surprise is sometimes expressed that external wire winding is seldom used on such hose. The reason given is that it is not safe, as friction of the metal covering with stones or on concrete docks might cause a spark that would mean a disastrous fire. A few concerns, however, have in use a type of hose which has all the features of that just described (except the cable) and with a flat wire or rope wound around the outside but protected with a specially-treated canvas covering.

For oil discharge only, a 4 or 5-ply hose with a compact, smooth-bore rubber lining is ordinarily used. A more durable type is made of four plies of fabric, a heavy tubing compound, four plies more of fabric, and a heavy rubber lining. Some buyers require manufacturers to conform to the United States War Department specifications or to those of the Southern Pacific Railway, while many of the large oil companies buy only according to their own specifications.

GASOLINE HOSE

Some complaint has been made that gasoline sellers often use old or inferior hose in filling automobile tanks, with the result that particles of partly-dissolved or disintegrated rubber are drawn into the needle valves of carburetors, interfering with engine operation, and sometimes causing motor car owners much vexation and expense. Investigation, however, has revealed but little basis for such complaint. In a few cases at out-of-the-way stations some dealers may have used old garden hose temporarily in filling tanks, and some dissolved rubber from worn lining or joints may have given a few motorists annoyance, but the amount of such trouble has really been negligible. An increasing number of gasoline sellers use a hose nozzle having a 60 to 80 wire mesh strainer to catch lint, dirt, etc., that may be in gasoline. Experienced "gas" sellers say that if the nozzles are fastened in the hose to prevent the fluid from reaching the fabric, there will be rarely any disintegration trouble. As an improvement, some stress the need of couplings that when inserted in hose

will not perceptibly lessen the caliber or impede the flow of gasoline as do many now in use. Something in spun metal is suggested as the desideratum.

Most "gas" stations have very good rubber equipment, the operators having found that the best is the cheapest in the long run; and the big oil companies on the Pacific Coast, which operate long chains of stations, have standardized with a gasoline hose having a strong duck lining that quite effectively keeps the gasoline from acting on the rubber. Within such ¾ or 8-inch canvas core is a helical flat wire further to safeguard the rubber, and surrounding the rubber are four plies of fabric, and finally a heavy spiral of flat wire to keep the hose from bending sharply and to add to its wearing quality. This type of hose is exceptionally durable. The stations are also supplied with 5 to 7-ply air hose, a strong tubing with a rubber covering, and with the further protection of a spiral flat, round, or half-round wire.

FIRE HOSE

For emergency fire needs the oil companies equip their stations with a folding, unlined, linen duck hose that is easily packed away; but in their oil fields and at their refineries they always keep on hand a great amount of very flexible, double cotton-jacketed hose of from 2 to 2½ inches in diameter to meet an ever-present danger of conflagration. Some concerns, however, use in their fields, instead of cotton-jacketed hose, a good grade of rubber-covered rubber-lined fire hose made in four plies, with a fifth ply at each coupling.

PUMP VALVES, SLEEVES, AND PACKING

In the slush pumps of the oil fields rubber gets its severest test; and it is here that it is used quite exclusively for ready-made or wrapped-on sleeves for plungers. As these pumps must be used for cleaning out bore-holes after the sand in them has been flushed out with water, and must also do the hardest kind of service night and day in sucking up into the sump cisterns heavy oil often much mixed with grit, the rubber sleeves, varying in diameter from five to six inches and in thickness from ½ to ¾ of an inch, have to be made of specially compounded stock. Not only does the rubber sleeve aid in producing the requisite pumping vacuum, but to a considerable degree it also prevents the scoring of the pump cylinder by allowing the sand to work above the piston, which could scarcely happen if the plunger were wholly of steel, as plungers are at the refineries, where only strained oil is handled.

Sometimes in the pumping of crude oil the sleeves are changed as often as twice a day, while in other cases they may last a month or two if but little abrasive substance is drawn up from the well. Hence the life of the rubber sleeve varies with the character of the oil field and the earth strata through which the well has been driven. One make of sleeve for light service is of very pliable stock, and, when worn on one side, may be twisted inside out and used on the reverse side, thus giving double service and effecting a saving. Instead of sleeves many workers still use sheet packing, which, if of good quality and snugly fitted, gives very good service. Many use such packing only when short of sleeves.

Many are the varieties of rubber valves used for oil pumps, each manufacturer endeavoring best to adapt goods to the special needs of customers. The softer compounds are used where the pressures are below 80 pounds, while the tough, high density valves are utilized where the pressures range up to 200 pounds and the temperature reaches up to 212 degrees F.

Rubber packings for oil machinery range from the thin 2 and 3-ply stock to be cut by hand as needed to the special packing made to order and having a dozen or more layers of specially frictioned fabric cut transversely to the weave or on the bias, the advantages claimed for the diagonal cutting being that it wears longer, the fabric exposed thus is more compressible, and that it aids much in lubricating. A spiral packing much used for rods running in oil is made of tightly-woven asbestos with a rubber core.

A considerable amount of pipe rings, gaskets, casing cups, hose washers, split stuffing-box rings, swab rubbers, and oil-well packers are also consumed in the oil industry, being supplied in a practically endless variety of sizes, forms, and qualities. A great deal of trouble used to be occasioned on natural gas lines, especially those near the oil fields, by gasoline condensate collecting at the rubber joints in the iron pipe lines, and which neither the gas well pressure nor the pumping suction could wholly remove. The result was the steady deterioration of the rubber couplings and clamp rings, with much expense for renewals and loss in time and in gas delivery while repairs were being made. This difficulty has been quite overcome with couplings and clamp rings made of a special "gas" resisting compound, which, it is said, will remain unaffected by the condensate for five years or more.

One article which is manufactured in large quantities is brake-shoes that are used on heavy oil drilling machinery. These are made of a particularly tough rubber compound, in which are inlaid several layers of woven brass wire and thick asbestos fabric. It is claimed these are practically indestructible.

Nor does the foregoing enumeration of rubber needs in the oil fields take into account many other articles that are quite indispensable in the handling of oil from the time when the heavy, black fluid is drawn from the depths of the earth to the time when, highly-refined, it is finally delivered to the consumers. Such miscellaneous articles may include tires used on fleets of trucks, and the rubber boots and shoes, gloves and helmet hats worn by small armies of men working in rain and sunshine in fields fairly flooded with oil.

INTERNATIONAL CHAMBER OF COMMERCE ORGANIZED

The recent organization of the International Chamber of Commerce at Paris is the fulfilment of plans launched at the international trade conference at Atlantic City, New Jersey, a year ago, and further elaborated at the conference at Paris, France, in June. It is a voluntary body thoroughly representative of many nations ready to discuss and adjust such important questions as finance, raw material, production, shipping, unfair competition and numerous other phases of international trade.

Like the Chamber of Commerce of the United States, the constitution of the international body provides for submitting international trade questions of general and immediate interest to the membership for a vote. The referenda will be taken in the associate countries and the result published by the International Chamber.

There are two classes of membership, organization and associate. The annual dues of each class are fixed at three hundred francs, except that in the case of organizations this fee is used as a basis, and is a minimum charge for organizations entitled to only one delegate. Organization members will comprise national and local commercial, financial and industrial organizations representative of the interests they embrace. Associate members will consist of individuals, firms and corporations.

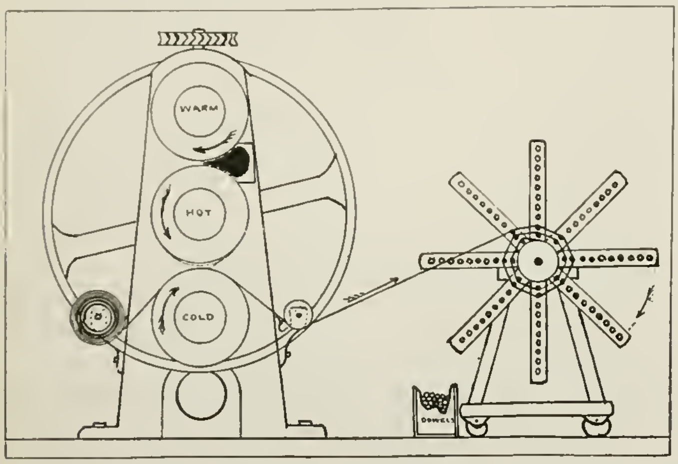
A board of three directors and three alternates is selected by each of the countries represented. The American directors are John H. Fahey, formerly president of the Chamber of Commerce of the United States, of Boston; Willis H. Booth, of New York, and Edward A. Filene, of Boston. The alternates are: Harry A. Wheeler, formerly president of the Chamber of Commerce of the United States, of Chicago; William Butterworth, of Moline, Illinois, and Owen D. Young, of New York.

Temporary headquarters for the new organization have been established at 33 rue Jean-Goujon, Paris, France. The permanent headquarters, which will be determined by the Board of Directors, will probably be located at the seat of the League of Nations.

The Manufacture of Rubber Plasters

A Little Known Industry

It will doubtless surprise many to know that certain very important sections of the rubber industry have never been affected by the discovery of vulcanization. That Goodyear, Hancock, Parks or Peachey and their discoveries interest them not at all. They do not know sulphur, sulphuret, sulphur chloride, accelerators, vulcanizers, steam presses nor dry heaters. Nevertheless, their rubber goods are found in the open market the world over, indeed are accepted as necessities everywhere.



Calendering and Reeling Porous Plaster Stock

The lines referred to are pharmaceutical preparations known as adhesive plasters. The plaster business operates fully equipped factories, employs standard washers, mixers, calenders and spreaders like any other rubber mill. There the likeness ends and special machines, adapted only for plaster work, are used.

As in all lines of rubber work, the manufacture of plasters entails individual problems. Although thousands of tons of rubber have been employed, only the sweet smelling or non-odorous types are usable. Hence Pará wild or plantation is the favorite. In preparing the plaster compound, not only must it be non-odorous, but a peculiar degree of adhesiveness is demanded. It must be sticky with the characteristic of remaining so and never drying out. Furthermore, the compound must contain drugs and medicaments in great variety and in definitely ascertained proportions.

MELTED RUBBER

So far nothing is more permanently adhesive than melted rubber. It is therefore not strange that in early plaster preparations it was used and most successfully. So sticky is it that cloth covered with thin films, although exposed to the sun for months, does not dry out at all.

The "lead plaster," in which melted rubber is used, occupies an important place in the pharmacopœia of the leading nations In the process of compounding it the rubber is dissolved in a fixed solvent, such as petrolatum, and then mixed with lead acetate (prepared as lead oleate) and spread upon fabric. The ingredients are used in the following proportions:

Rubber	2 volumes
Petrolatum	2 volumes
Lead oleate	96 volumes

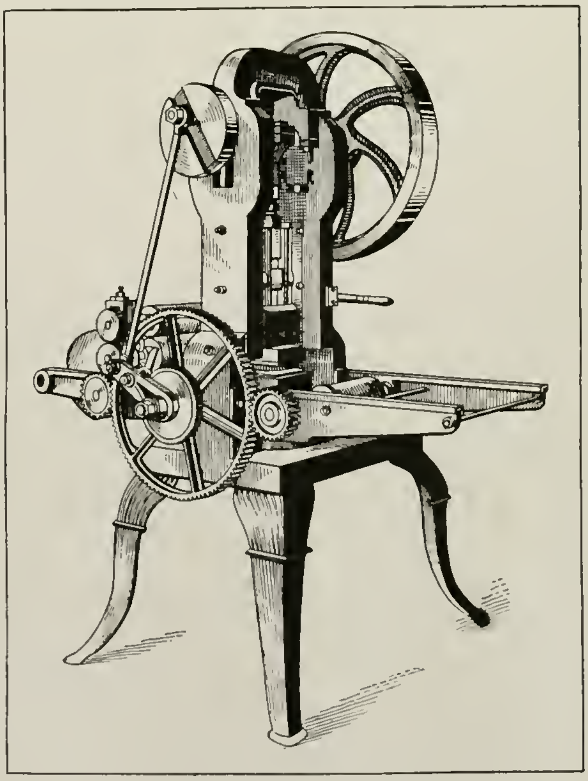
The rubber is first melted at a temperature of 302 degrees F., then the petrolatum is added and the same temperature maintained until the ingredients form a plastic mass. The lead oleate is next added and the heat kept up until the mass is quite fluid. The heat is then withdrawn and the mass stirred while cooling until it becomes firm.

The lead oleate is prepared by taking 10 volumes of granular dried soap, dissolving it in 35 volumes of hot distilled water and straining the solution. To it is then added six volumes of lead acetate dissolved in 25 parts of hot distilled water and afterward filtered. The solution is stirred thoroughly until a precipitate (lead oleate) has been formed. The water is drawn off and the lead oleate precipitate washed well with hot water and thoroughly kneaded on a warm tile to free it from water. The mass is then rolled flat, wrapped in waxed paper and kept in sealed vessels until used in combination with the rubber-petrolatum vehicle.

The melted rubber plaster was never manufactured to any extent in the United States. It had, however, quite a vogue in Europe. In manufacturing it, the only rubber machinery used was a washer and dryer, a kettle for melting the rubber, mixing slabs, for the other ingredients, and a spreader for applying the coating. The perforating, cutting, backing and packing was all done by hand.

PLASTER MILL EQUIPMENT

In the United States, however, where mustard, belladonna, capsicum, menthol, and various other plasters are popular, fully equipped rubber mills exist, having regulation washers, dry rooms, compounding rooms, mixers, calenders and spreaders. Nor do they melt the rubber. Instead, they so compound it that it remains adhesive for years.



Automatic Perforator for Porous Plasters

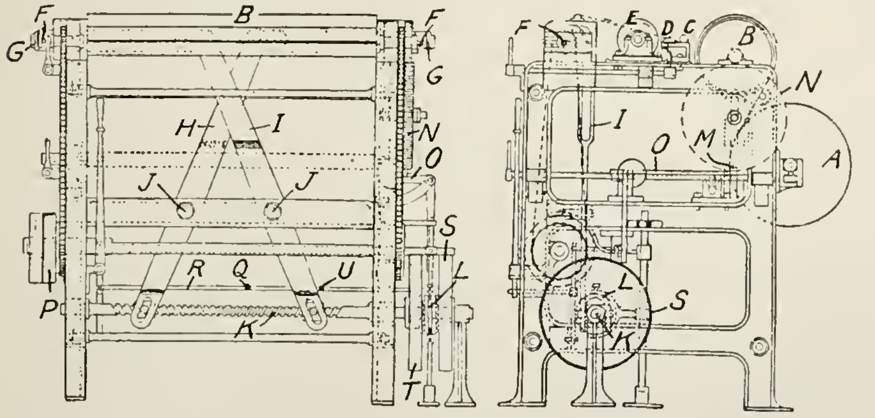
What is known as French plaster, consists simply of Pará rubber and essence of petroleum, with no medicament. This same compound serves as a base for mustard plasters, the mus-

tard flour being dusted upon the surface of the plaster after it leaves the calender or spreader.

For medicated plasters, various drugs, resins and waxes are employed. Thus, one formula for menthol plaster employs rubber, gum olibanum, orris root, menthol, Burgundy pitch, resin, and beeswax. An English formula calls only for rubber, Burgundy pitch, and gum olibanum. Another recipe specifies Pará rubber, Pontianak, birdlime (gluten), belladonna and paraffine oil.

POROUS PLASTERS

The preliminary operation in making plasters is preparing the gums, resins, and waxes. These ingredients are melted by a steam bath and strained for the purpose of removing all dirt and foreign matter. These are then mixed in a kettle with the medicinal agents required and then incorporated with the sheet rubber on ordinary mixing mills. Each batch is made proportionately for 100-gross lots of the regular size porous plasters. The rubber compound is next calendered upon a sheet of fine cambric. This has been previously dried and as it is free from size, the pressure of the rolls sets it firmly into the meshes of the cloth. As the sheet of coated fabric issues from the calender, the coated side is passed under an idler roller onto an octagonal



Blair's Surgical Bandage Machine

handling reel, as it is necessary to keep the adhesive surface free from contacts. Separate individual maple dowels are used in winding upon the reel. The sheet is left upon the reel until the surface is thoroughly cool. When cool, it is run through a strip cutter and cut into strips usually five inches wide, each strip being wound on a separate spool. The spools, holding 100 yards, are passed next to the perforating machines. These machines are specially built and are considered trade secrets. The ordinary plaster is 5 by 7½ inches, and in this area are some 240 one-eighth-inch perforations. The perforating machine cuts this number at once, and not only that, but puts on the light double strips of face cloth, folding their centers, cuts the plaster to size, and passes it along for finishing.

One machine handles about 50 plasters a minute, and in spite of the fact that the product is sticky beyond description, it runs smoothly and steadily day in and day out. Finishing consists in lightly pasting a square of backing cloth upon the reverse side of the plaster, and packing two dozen in a box for market.

NON-POROUS PLASTERS

It should not be forgotten that non-porous plasters also find a ready market. There is for example the tiny "plasteret," 1 inch by 2 inches for size and sold by the dozen. This is used for burns, scratches, bruises and as a ready means of repair, taking the place of gutta percha tissue.

The giant of all plasters, however, is the kidney plaster, more than a foot long, six inches wide and curved to fit over the kidneys. In these the rubber compound is spread upon soft moleskin, died out to shape, backed with a rectangle of cloth, when they are ready for market. The compound consists chiefly of rubber, capsicum and belladonna.

SURGEON'S ADHESIVE PLASTER

Perhaps the neatest, if not the most valuable of all, is the surgeon's adhesive plaster. The base is rubber—and good quality rubber. The only adulterant, or rather medicament, is zinc oxide. With the addition of a non-drying oil, this is the whole compound. This tape comes upon the market wound on spools of various sizes so that almost any length or width can be found in the ordinary drug store. In manufacturing, the coated cloth is wound from the calender upon mandrels and cut into short rolls on an automatic lathe. These rolls are then fed into a machine similar to a grommet setter, which forms a metal spool through and around the roll. It is then put in a tiny carton and is ready for market.

BANDAGE CUTTING AND WINDING MACHINE

In this connection a detailed description of Blair's machine for cutting and winding surgical bandages in any width is interesting. The sheet of rubber, wound on a roll *A*, passes over the measuring roller *B*, under a bar *C* and over the bar *D* which removes, the wrinkles, and keeps it taut edgewise. It is then passed over a series of rotary cutters *E*, and the separate strips are wound on a pair of spindles *F* and over a loose wire laid alongside the spindles. These spindles are placed end to end and are drawn apart or separated by the sliding pieces *G*, which are moved by levers *H* and *I* pivoted at *J*. The lower ends of these levers are attached to the right and left-handed screw *K*, which is operated by the main belt drive through the jaw-clutch *L*.

In operating the machine, the spindles *F* wind up the cut bandages, until a notch *M* in the wheel *N* comes against the end of the rod *O*, causing the driving belt to be shifted to the loose pulley *P*. This engages the clutch *L*, causing the screw *K* to revolve and the levers *H* and *I* to separate the spindles *F*. The rolls of bandage then drop off and remain hanging on the wire. The lever *I* comes against the stop *Q* on the bar *R*, throwing the clutch *L* out of gear with the wheel *S* and engaging it with a wheel *T* which revolves the screw *K* in the opposite direction, bringing together the spindles *F*. Another stop *U* on the bar *R* causes the clutch *L* to be moved midway between and out of gear with the wheels *S* and *T*. The finished bandages are cut off, another loose wire is laid against the free hanging ends of the cloth, which are placed on the spindles, and the machine is again set in motion.

CORN PLASTERS

In speaking of adhesive plasters it would not do to ignore those that bring comfort to the pedal extremities. They are of ancient origin and have attracted the inventive genius of such notables as Sir Humphry Davy and Sir Astley Cooper. To be sure, their formulas, salt of sorrel and potash or yellow wax and verdigris, are no longer used, but they paved the way for the present sanitary effective rubber corn plaster.

The compounds used vary but little. A well known one follows:

	Per Cent
Extract of cannabis indica	10
Resin compound	70
Salicylic acid	20

The last named is the non-drying rubber base, practically the same that is used in porous plasters. The compounding is done as in other plaster work and so is the calendering and general

handling. The rubber compound is spread upon a sheet of thick, soft felt. The simpler forms, cut in a die press, are backed with protective cloth and are ready for market. They are in two shapes, round for corns and oval for bunions. A more modern type has as an addition a strip of fabric, coated on one side with rubber compound and placed over the toe in the felt plaster, where it, together with the backing cloth, protects the dab of paste that softens the corn, the rubber-coated circular felt pad acting simply as a guard. In the manufacture of this type an automatic machine cuts the strips, puts the dabs of paste in the right place, sticks the felt pad just where it belongs, and finishes by adding the strip of backing cloth.

MOVING PICTURES OF BUSINESS RECORDS

What we call the moving picture is not, properly speaking, a moving picture at all. It is merely a sreies of pictures each of which is seen at such a short interval after the preceding one that the image of one does not fade from the vision before the next picture appears. It is this rapid succession that gives the appearance of continuity and motion. The same pictures when not seen in rapid succession do not give as vivid and clear an impression.

In much the same manner, data from business records, arranged in columns or tables and explained by text, does not give the clear impression that it would if reduced to picture form. If all the data can be connected in such a way as to give the appearance of continuity, showing the relation of one item to another, then practically the same result has been secured in regard to business records that the motion picture secures in regard to pictures.

Various methods are now in use for reducing business records to picture form. Some are simple and some complicated. Some serve their purpose admirably and some are deceptive. The best of them blend the different data together in much the same manner as the moving picture. They show exactly what is going on, and whether the business is going ahead or behind. A study of the pictured record shows what to do to increase profits. There are many features of the business that show up which would be overlooked without these records.

These records serve their purpose in much the same manner that a motion picture of a growing plant shows plant growth. If one watches a flower grow, there are sure to be many details of that growth which he either does not notice or fails to remember. However, suppose that at proper intervals a picture of that plant is taken, the exposures extending over a period of many weeks. When they have been completed and the picture projected upon a screen, every detail of growth is seen. It is the continuity that gives the motion picture its great value. It is the continuity of properly made graphic charts, curves, maps, etc., that gives them their value.

Photographic moving pictures have served science and business in many ways. For example, pictures are taken showing the action of automobile and truck tires under various conditions of load and road conditions. These are taken at as rapid a rate as possible. They are then projected at a very much slower rate and every detail of the motion and the action of the tires at once becomes clear and vivid.

Again, photographic records may be made of the motion of machines, workmen, factory operations, anything that it is desired to study. These can then be studied in far greater detail than would be the case if attention was confined to the machines, workmen or factory operations. The motion picture gives a record that is superior, so far as research is concerned, to the actual thing or person studied.

Curves, charts, etc., serve exactly the same purpose in the study of business records that the moving picture serves in studying all types and kinds of motion. These give a continuous record of the growth of days, weeks, months or years in such form that trends, effects, causes, everything that affects the business may be studied with detailed accuracy. Information is gained that could not possibly be gained in any other way. No one could possibly study the same data in printed or written form and be able to see as clearly the cause and effect, the trend and the probable future results.

The electric lighting business, which has grown from nothing to a very large and a very important industry during the last forty years, is an example of what picture records can accomplish. In this business question of rates was an exceedingly important one. Unless the current could be sold at a sufficiently low price it would not be possible to sell it. Cost of production, market possibilities, and all other features bearing upon the proposition were reduced to picture records. These were studied. New rates were established. Their effects were studied by means of new picture records. Those companies which made the greatest use of picture records have invariably been the ones which have enjoyed the greatest degree of prosperity.

Moving pictures of business records, that is, charts, curves, maps, and the like, that show a continuity similar to that of the photographic motion picture serve the business man as nothing else can. They give accurate related data. Data that is unrelated does not always convey the correct impression. For example, a table showing the cost of living and how it has increased during the past few years may be decidedly misleading Make a curve showing the change in the cost of living during the past half century and on the same sheet draw another curve showing average earnings of any particular class of people and the result is accurate related data that tells the truth. It is a moving picture that shows all the details in a manner that they could not be shown by tables and descriptions, any more than could the growth of a plant be pictured by tables and descriptions as accurately as it could be by the motion picture.

There is no other way in which the relation of cause to effect can be shown with equal clearness. Make a graphic representation of the effect and also one of the causes and the relation becomes transparently clear. As an example, make a picture of commodity prices over any given period. Suppose it is made from the period just preceding the Civil War up to the present time. Also on the same sheet make a graphic representation of the number of men killed in war, and the value of property destroyed, the percentage of population in arms and the like. The result is a perfectly clear representation of the relation of war to the variation in the cost of commodities. Such a moving picture will show what to expect during the coming years, as it reveals the relation between cause and effect and the basic cause of the present general price changes.

Graphic records save an immense amount of time and make it possible to secure data at a glance which would otherwise require wading through a great mass of statistics. They save time in exactly the same way that moving pictures save time in studying the growth of plant life. All this time saved is available for planning bigger and better things in the future. It does not have to be devoted to learning what has actually happened in the past or what is happening at the present time. A single glance gives most of this information. A few minutes of study gives more information than hours of concentration could possibly give without these picture records, these graphic charts, curves, maps, etc., that give true motion picture continuity to business records.

The Svenska Galoschforsaljnings Aktiebolaget, Stockholm, Sweden, wholesale dealer in rubber shoes, has increased its capital to 180,000 kroner.

The Development of Pneumatic Truck Tires and Tire Equipment

Why Use Pneumatic Tires for Motor Trucks?[1]

By W. E. Shively[2]

Every development in the transportation industry has been toward a faster, more reliable or cheaper method of transporting men and materials. No one will deny that the motor truck is a very significant development in the transportation system of the world. This was conclusively proved in the world war. Most of us are of the opinion that the motor truck is destined to become the most important factor of our transportation system, judging by the events of the past two years. The development of the motor truck has been limited by the solid tire.

At first, solid tires were used on all but light delivery trucks. On every other type of highway motor vehicle, the limitations of the solid tires were soon discovered and the solid tire was replaced by the pneumatic tire. But the tire manufacturers had not kept pace with the development of the motor truck, inasmuch as they had not perfected a large enough pneumatic tire. Tire engineers, however, were among the first to recognize the shortcomings, and proceeded to develop a large single pneumatic tire for motor-truck use.

Discussion of the relative merits of pneumatic and solid tires must of necessity reduce itself to a comparison of the elasticity of compressed air with that of rubber. We think of rubber as a very elastic substance, but it cannot be compared to compressed air in this respect. The reasons that motor trucks can be operated with any degree of success on solid tires are that they are operated at relatively low speeds and are built so heavy that they will endure the shocks and vibration to which they are subjected.

Two fundamental advantages result from the use of pneumatic tires on trucks, increased cushioning and increased traction. Increased cushioning is the most important factor, because it has a greater effect on the performance of the truck. The cushioning ability of a pneumatic tire is four times that of a solid tire of the same carrying capacity. As a result of this six distinct advantages are gained from the use of pneumatic truck tires: (1) faster transportation, (2) economy of operation, (3) less depreciation of fragile load, (4) easier riding, (5) less depreciation of roads, (6) lighter weight trucks.

TRANSPORTATION AND OPERATION ECONOMIES

Faster transportation or quicker deliveries result from the increased cushioning of pneumatic truck tires because it is possible to obtain greater maximum and minimum speeds. Manufacturers of solid-tired trucks remove their guarantee if a speed of 11 or 12 m.p.h. is exceeded, while pneumatic-tired trucks are being operated at 20 to 35 m.p.h.

Table I shows the increased mileage obtained with pneumatic tires by four truck operators.

TABLE I

Details	Operators[3]			
	A	B	C	D
Truck capacity ....tons	2	3½	2	2
Period, months	6	1	5	4
Mileage on pneumatic tires..................	6,414	1,995	5,510	7.014
Mileage on solid tires....................	4,476	675	2,223	4,677
Miles per gallon of gasoline on pneumatic tires	5.77	5.75	7.21	7.70
Miles per gallon of gasoline on solid tires.....	3.98	4.77	5.43	7.10
Miles per gallon of oil on pneumatic tires....	104.00	32.00	55.00	152.00
Miles per gallon of oil on solid tires........	59.00	30.70	54.00	78.00
Cost per mile on pneumatic tires,.........cents	45.00	31.30	21.50	27.70
Cost per mile on solid tires............cents	56.30	55.00	24.00	31.00

[3] With a 2-ton truck for a 9-month period, a fifth operator obtained 9.1 miles per gallon of gasoline on pneumatic, and 6.1 miles per gallon on solid tires.

The economy of operating trucks on pneumatic tires has been shown by the experience of many users. There is a considerable saving in gasoline, oil and upkeep. The saving in gasoline in the case of five truck operators is shown in Table I; also the saving in oil consumption, probably due to the decreased vibration in all of the moving parts of the truck.

The upkeep or repair cost of a truck operated on pneumatic is much less than when operated on solid tires. It can be attributed to the decreased amount of vibration and the absence of severe shocks and jolts. The estimated saving is from 25 to 50 per cent. Regarding depreciation charges, as a result of experience, Goodyear solid-tired trucks are depreciated on the basis of 60,000 miles of service, while the pneumatic-tired trucks are depreciated on a basis of 80,000 miles. In my opinion the 80,000 miles is too low, because there have been Goodyear trucks on pneumatic tires which at the end of 250,000 miles were still in good running condition. I believe that in the near future trucks will be depreciated on the basis of 100,000 miles.

DEPRECIATION OF LOADS AND ROADS

This is now considered by many to be one of the most important advantages. In hauling fragile materials such as bottled goods and eggs, there is very little, if any, breakage. Then there is the easier riding made possible by the use of pneumatic tires. In the case of delivery trucks, the elimination of the vibration makes it possible for the truck driver and his helper to ride almost continually without fatigue. This is of vital importance where it is necessary to drive for hours at a time. Easy riding is absolutely essential in passenger buses, from the standpoint of both comfort and speed.

Increased traction is made possible by the greater width of the pneumatic tires, their non-skid treads and their greater flexibility, which allow the surface of the tire to conform more nearly to the unevenness of the road, thereby getting a better grip. As a result of this increased traction, we obtain reliability and safety. By reliability is meant that it is possible for the truck to operate successfully over almost any kind or condition of road, and during all seasons of the year. By safety is meant that, because of the increased traction of the tires, the truck will hold the road better and the brakes will be more effective. This point has been thoroughly proved by the experience of many users of pneumatic truck tires. In traveling over the mountains along the Lincoln highway during the winter, this increased traction has saved both drivers and trucks from serious accidents on numerous occasions.

COST OF PNEUMATIC TIRE EQUIPMENT

While it is true that the initial cost of truck pneumatic-tire equipment is greater than that of solid-tire equipment, it has been proved by experience that this difference is more than offset by the greater earning power and the lower costs of operation. It has usually been found that in from four to six months the increased cost of the pneumatic-tire equipment is completely wiped out. When specially designed pneumatic-tire trucks make their appearance, this increased cost of pneumatic-tire equipment will be offset.

As to possible loss due to injury or abuse of the tires, it has been found that this is not a serious objection. There are many instances where pneumatic truck tires have run from 12,000 to

[1] Abstracted from Cleveland-Detroit Sections paper, The Journal of the Society of Automotive Engineers, October, 1920.

[2] Development engineer. The Goodyear Tire & Rubber Co., Akron, Ohio.

20,000 miles on the original air. Repair molds and retreading equipment are now in use in many parts of the country, and are being placed in other localities as rapidly as possible; so, it will be no more difficult to have a pneumatic truck tire repaired than any other part of the truck.

PRACTICABILITY OF PNEUMATIC TIRES

The practicability of pneumatic truck tires has been questioned probably more than anything else. The first thing to be discussed under this subject is that of delays due to changing tires. In the case of detachable rims, where it is necessary to remove the tire from the rim, replace it and then inflate it, it does not require more than 30 minutes to perform the entire operation. In the case of a demountable rim, a change can easily be made in 15 minutes. The average truck driver is not required to make a tire change more than once in three months.

Most garages and service stations carry sufficient air pressure to inflate tires up to the 42 by 9-inch size, and many can take care of the larger sizes. By the time the largest tires are in general use, there will be sufficient air pressure to keep the tires properly inflated. Trucks equipped with detachable rims, or operating in long-distance or inter-city service, are usually equipped with small air compressors. These trucks experience no difficulty in securing sufficient pressure. One objection, which is not mentioned so much now as when pneumatic truck tires first made their appearance, is the danger of the high inflation pressures. Pneumatic truck tires are made to withstand three to four times the pressure carried in them, so that this objection must be passed to the rims. These are made to withstand many times the pressure carried in the tires. If the rims are properly assembled, there is small chance of accident.

Regarding the rise in pressure caused by the heating up of the tire, we have operated these large tires under the most severe conditions possible and in no case have we found an increase in pressure of more than 35 pounds per square inch. If the tires are made to withstand three to four times the pressure at which they are operated, it is hardly possible that this additional 35-pound pressure will cause them to blow out.

The large outside diameters of the tires are often objected to because they affect the truck ability and because they raise the center of gravity of the truck. In changing over a solid-tired truck to pneumatic tires, there is the possibility of reducing the ability of the truck. Our experience has shown that unless the truck is operated over a very hilly route, its ability has not been noticeably affected. Looking into the future, this question of truck ability and gear ratios will be taken care of by changes in design; so, the question of change-overs is only temporary. Raising the center of gravity of the truck is not as serious as it might seem.

Data on Pneumatic Tires and Rims Used on Trucks[1]

By Burgess Darrow[2]

The object of this paper is to familiarize truck engineers, and others interested in truck design, with facts and opinions which will assist in providing correct pneumatic tire and rim equipment for trucks. The sizes which have been worked out during the past six years, and which are now standard, are as given in Table I.

Table I. Sizes of Pneumatic Tires

Rim Sizes, In.	Normal Tire, In.[3]	Oversize Tire, In.[4]	Extreme Maximum Allowable Load per Tire (Cord), Lb.	Inflation Pressure, Lb. Per Sq. In.
34x5	34x5	36x6	1,700	80
36x6	36x6	38x7	2,200	90
38x7	38x7	40x8	3,000	100
40x8	40x8	42x9	4,000	110
40x8	42x9	....	5,000	120
44x10	44x10	....	6,000	130
48x12[5]	48x12	....	8,500	140

[3] Original equipment on new trucks.
[4] Not for original equipment; only for consumer's convenience.
[5] Not yet standard with S. A. E. practice.

Table I also gives the rim sizes, normal tire sizes and the tires which can be fitted as oversize. It shows that there is no oversize possibility when 9, 10 and 12-inch sizes go out on new trucks, because the oversizing plan falls down above the 9-inch size, on account of the size and stiffness we are forced to build into the beads as designed at present.

LOADS AND INFLATIONS

To the best of our knowledge tires give best average satisfaction in the way of plenty of cushioning and not too much flexing. Flexing breaks down a tire, when run under conditions which produce a deflection in the tire of from 12 to 15 per cent of the section diameter, or the height above the rim. The deflection can be controlled by regulating the load or the pressure, or both. Table I also gives the standard maximum loads and the inflation pressures. These inflation pressures are practical to maintain, the tires are built accordingly and we get satisfactory, practical results in first cost and mileage delivered if they are used.

In reference to underinflation and overload, both evils result in an excessive deflection of the tire. This means that an excessive shearing action is put on the rubber between the plies of the tire, and also on the cushion built into the tire between the tread and the plies, which in turn results in a separation of the parts and starts the tire on the road to failure.

Table II. Weights of Tire Equipment

Tire Size Inches Front	Tire Size Inches Rear	Weight, Pounds	Remarks
6	6	72	Weights of tires alone, without wheels or rims, but including tubes and flap.
7	7	87	
8	8	119	
9	9	174	
10	10	246	
12	12	398	

TUBES, FLAPS AND VALVES

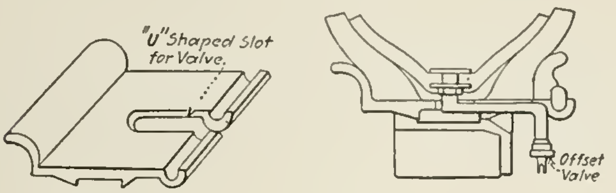
Tubes for pneumatic truck tires must be designed and compounded to retain as much of their original strength and shape as possible, after being subjected in service to more or less heat and to continued flexing. The tube has been one of the most difficult problems in connection with large tires, but has been solved partly in a mechanical way by building the tubes thick, shaped like the tire, and so they are stretched very little in the tire. The tube problem has been solved to a still greater extent by rubber compounding. Tubes are on a par with the casings in development and render satisfactory service even in the largest sizes.

Flaps assume considerable importance in tires inflated to the pressures we recommend for truck tires. It is important that the flap should fit well, so there will be no adjustment of the flap when the tire is inflated, causing a localized stretch in the tube at the edge of the flap.

The valve question had to be approached first from the standpoint of holding air at pressures from 90 to 140 pounds per square inch and, second, from the standpoint of ease of tire change. The valve insides on all 6-inch and larger tubes is of

[1] Abstracted from Cleveland-Detroit Sections paper, The Journal of the Society of Automotive Engineers, October, 1920.
[2] Development department, The Goodyear Tire & Rubber Co., Akron, Ohio.

a heavy-duty type, different from the ordinary valve insides in construction, but the two are interchangeable in any valve stem. On the 10 and 12-inch sizes, which inflate to 130 and 140 pounds



The Journal of the S. A. E.

Fig. 1. Slotted Rim Offset Valve

per square inch respectively, even the heavy-duty type is unsatisfactory when used alone; so, a combination is used in the form of a heavy-duty valve insides and a needle-valve operated by a hand screw.

As to the relation of the valve to easy tire changing, it is customary in applying the small-size tires to insert the valve in the hole in the rim and tip the tire on the rim. This necessitates considerable clearance in diameter of the tire beads over the rim rim and then fish the valve through the valve hole. To avoid this difficulty some steel wheels are made with a U-shaped slot from the edge to the center of the rim, which permits the tire to go on the rim with no difficulty at the valve. (See Fig. 1.) We believe an offset valve with two right-angle bends in it, will eventually be used. The offset valve requires only a depression in the rim from the edge to the center, and not a slot. The wheel is stronger than if slotted, and besides making application just as easy, the valve comes out at the edge of the rim and is more accessible to inflate.

DUAL PNEUMATIC TIRES

The arrangement of tires on the trucks presents three possibilities; the ordinary truck with giant tires on four wheels, dual pneumatics on the rear, and trucks with six or more wheels. We look unfavorably only on the dual pneumatics, that is, two tires on the same wheel. Dual tires do not share the load equally because the inflation is seldom kept alike in both tires. Because of crowned roads, and more particularly rough roads, one tire takes more than its share of the load temporarily and this will injure the tire. An exaggeration of this condition is when one tire goes flat and the other takes all the load without

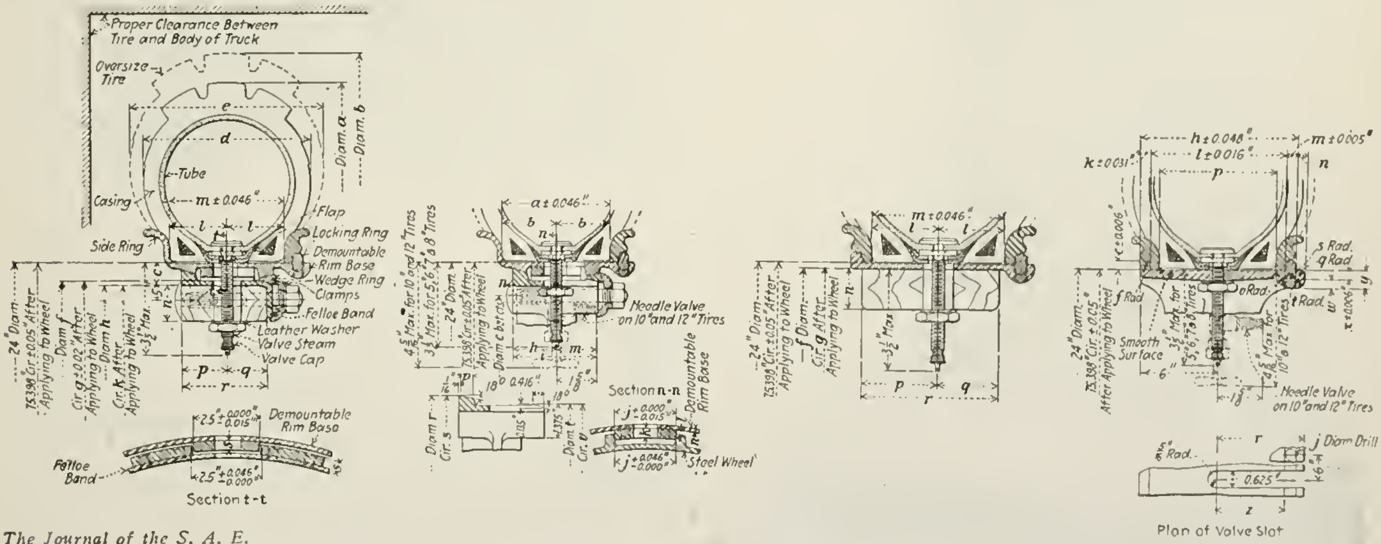


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Fig. 2. Examples of the Application of Pneumatic Tires to Motor Trucks

From Left to Right Are Shown a Demountable Rim, a Demountable Rim and a Steel Wheel, a Detachable Rim on a Wood Wheel and the Pneumatic Tire Applied to a Cast Steel Wheel

and, in 7-inch sizes and above, such design is impractical because the rims are wide and would necessitate too much clearance in bead diameter.

It is therefore necessary if a straight valve and the usual valve hole is used, to push the valve up into the tire, fit the tire on the the knowledge of the driver. The tire which still holds air is so badly overloaded that it is sure to be injured, if not ruined. Changing an inside tire, in the case of dual tires, necessitates removing both. Dual tires are too easily abused and prove more expensive than either of the other possibilities.

What Motor Trucks Need to Supplement Pneumatic-Tire Equipment[1]

By E. W. Templin[2]

The introduction of the pneumatic tire for motor trucks would have a material bearing upon the design of the truck itself, to get the most good from the use of such a tire.

Table I. Road Speeds

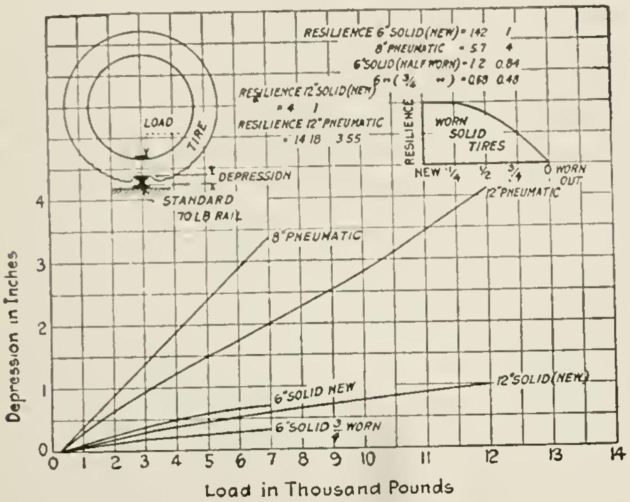
Present Solid Tire Gear Ratios	Average Governed Speed, m. p. h.	Capacity, Tons	Pneumatic Tire Speed m. p. h.
7 to 8................	17	1 to 1½	30
9 to 10................	15	2 to 2½	30
11 to 12................	13	3½	25
12 to 13................	10 to 12	5	25
14 to 16................	9	7	20

Tire Size, In.	Rear Wheel r. p. m.	Drive r. p. m.	Pneumatic-Tire Rear-Axle Gear Reductions
36 to 38	280.0 to 265.4	1,450	5.18 to 4.47
40 to 42	252.1 to 240.1	1,325	5.26 to 5.52
38 to 44	221.1 to 191.0	1,200	5.43 to 6.28
40 to 48	210.1 to 175.0	1,200	5.72 to 6.86
42 to 44	160.1 to 152.8	1,200	7.50 to 7.85

The main factors bearing upon the problem of truck design for pneumatic tires are as follows: (1) speed, including road and

[1] Abstracted from Cleveland-Detroit Sections paper, The Journal of the Society of Automotive Engineers, October, 1920.
[2] Motor-truck engineer, The Goodyear Tire & Rubber Co., Akron, Ohio.

engine speeds, rear-axle gear reduction and air brakes; (2) traction, including engine torque and transmission gear reductions; (3) shock effects, including stresses introduced and the necessary factor of safety of sprung and unsprung parts; (4) emergency equipment, including tire pumps and spare tires.



The Journal of the S. A. E.

Fig. 1. For a Given Load the Pneumatic Tire Deflects Four Times as Much as a Solid Tire

Table I shows road speeds that we consider satisfactory, together with the usual rear-tire specifications for various sizes of trucks. The engine speeds are figured on the basis of 1,200 feet per minute piston speed, which can be considered a good average. Higher speeds set up considerable vibration and add discomfort to driving.

SHOCK EFFECT

Fixing of allowable stress requires an investigation of the cushioning effect of pneumatic as compared with solid tires.

Fig. 1 shows the rate of deflection of pneumatic tires and

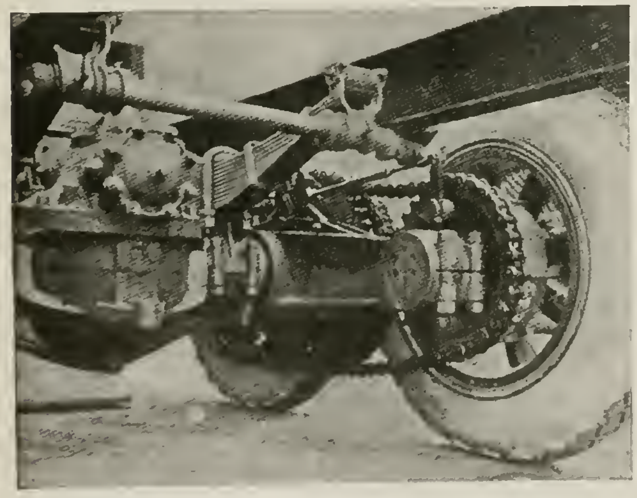


Fig. 2. First Application of Four Small Tires to Rear Wheels

corresponding solid tires, together with a curve showing how the solid tire depreciates in resilience with age and wear. It will be seen here that for a given load the pneumatic tire deflects four times as much as a solid tire.

COST

I believe it is possible to build a 5-ton motor-truck chassis equipped with pneumatic tires for only $200 to $300 more than a corresponding solid-tire truck, and that the net weight reduction may be easily 1,000 pounds without resorting to aluminum where it is not yet considered commercially practical.

SIX-WHEEL TRUCK

On account of the large size and weight of the 48 by 12-inch pneumatic tire, we were brought to consider the application of four smaller tires to the rear of the truck, instead of two of the excessively large ones. Our first attempt at an arrangement for applying four small tires to the rear without using dual tires, which is considered out of the question, is shown in Fig. 2. It

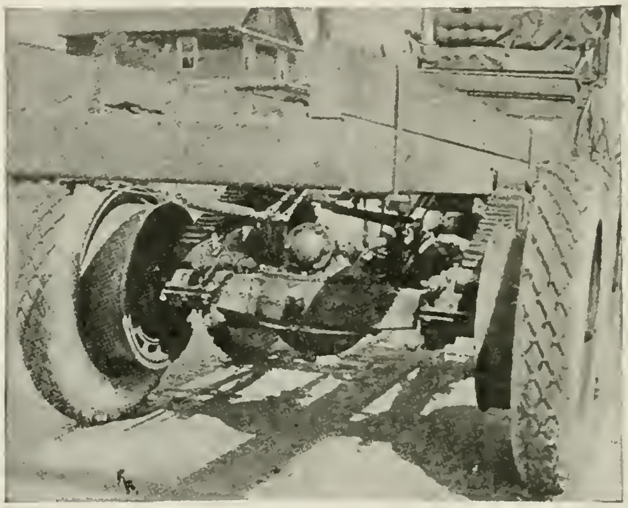


Fig. 3. Further Developments of the Tandem Axle Construction

consisted of a more-or-less standard rear axle with a walking beam adapted to each end and the wheel mounted upon trunnions from this walking beam, the springs being mounted upon the axle and attached to the frame on the inside. Chain drive was made use of in this case, which is about the only feasible drive with this arrangement. This construction ran successfully for about 10,000 miles before serious failure occurred. We were, however, inconvenienced with the chains jumping off and were not able to get a brake mechanism that would work. The main point against this design was its enormous weight; however, it served to show us that satisfactory tire mileage could be secured from such an arrangement and that there was a good possibility of adapting four small tires to the rear wheels. To further develop this point, we built up the tandem axle construction as

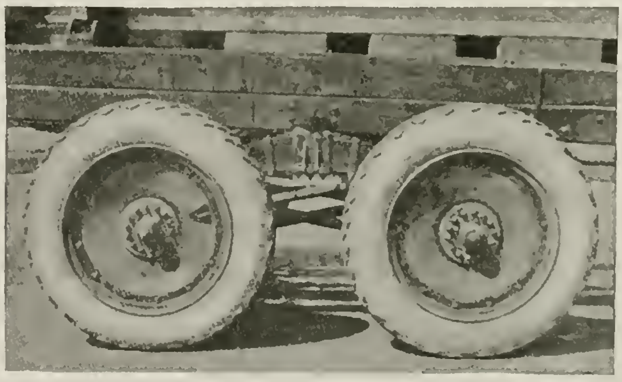


Fig. 4. Another View of the Tandem Axle Construction

shown in Figs. 3 and 4. This construction appears to have good possibilities and has at present operated some 3,300 miles, 1,000 to 1,200 miles over rough and uneven country roads, so rough in fact that it was difficult to keep the front springs tight. Fig. 5

indicates another very feasible design to adapt the tandem axles.

Some of the advantages of the six-wheel truck over the regular type of the same capacity, on 48 by 12-inch pneumatic tires and on the regular equipment of solid tires, are that compared with the pneumatic-tired four-wheel truck the saving by using four smaller tires is sufficient to purchase three or four complete spares, or approximately $500 per truck. Regarding ease of handling, each 40 by 8-inch tire weights only 119 pounds, whereas each 48 by 12-inch tire weighs 398 pounds. Carrying a spare tire

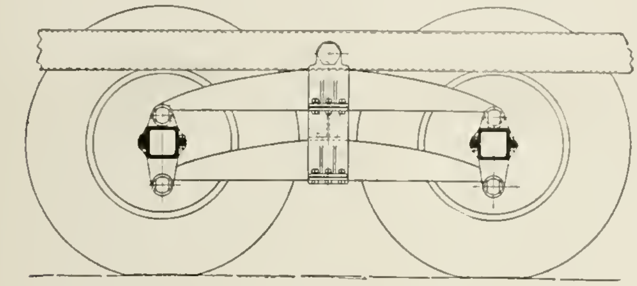


Fig. 5. A Feasible Design for Tandem Axles

in each case, the reduction in axle cost, the use of two rear axles in tandem results in the advantage that small axles are normally in large production, with consequent lower costs, whereas large sizes are made only in small quantities, with extremely high costs. The actual saving amounts to about $120 per truck. As regards weight saving, four 8-inch wheels with brake drums, etc., weigh 77 pounds more than the same equipment for a 12-inch tire. The total saving in weight is 814 pounds.

Considering traction qualities, the area of contact of four 8-inch pneumatic tires upon the road is about 27 per cent greater than that of two 12-inch pneumatics. This additional surface, keeping the tires from sinking in soft places, gives better traction when most needed and, in ordinary service, the additional area gives them a better chance to take hold. As compared to solid tires in winter service, off of paved roads, the four pneumatic tires have all of the advantage.

The four-wheel combination has about the same advantageous effects over single-axle construction that the pneumatic would have over solid tires, in regard to economy. With the four-wheel combination, when passing over an obstruction in the road, the chassis is raised only one-half the distance it would be raised in the regular type of construction. This reduces the acceleration of bodies upon the chassis to one-fourth that with ordinary construction. Thus, by reducing shocks and vibration, the number and cost of repairs, due to crystallization, fatigue of metal and the like, are reduced by a large percentage. The tandem construction makes for such exceptional riding qualities that a glass, filled to within an inch of the top with water and attached to the rear of the six-wheel truck, lost none of the water even when running over a decidedly rough road.

The most destructive factors of the operation of vehicles upon pavements are the wheel load and the wheel thrust. By referring to Fig. 6 one can see that a heavy wheel load causes the road to fail by breaking through the pavement. If, as is the case with the tandem construction, the wheel loads are cut in two, the chances are that the wheels will seldom find spots in the pavement weak enough to break through under this reduced load, even if a 5 to 7-ton load be carried on the truck.

The twin-axle combination has a decided advantage over both regular pneumatic-tired and solid-tired types in that four brakes of 21-inch diameter are used in place of two brakes of 21-inch diameter. The six-wheel truck has a greater operating radius.

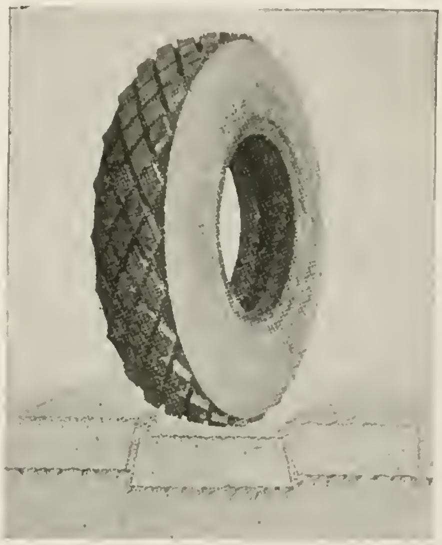


Fig. 6. A Heavy Wheel Load Breaks Throuch the Pavement

Pneumatic tires permit of an increase of average speed to double that of solid tires, and the combination of four small tires on the tandem rear-drive wheels will permit of increased minimum speeds on bad roads.

Pneumatic-Tire and Motor-Truck Development Experiences[1]

By M. D. Scott[2]

Table I gives a summary of the truck development obtained over a period of two and one-half years. Picture a truck weighing 15,800 pounds and carrying a pay load of 3,850 pounds, as against a truck weighing 8,000 pounds and carrying a pay load of 7,000 pounds. This has all been brought about through the use of pneumatic tires, thereby being able to carry a much heavier load on a much lighter truck and, as pointed out before, on a smaller sized tire, automatically increasing the earning power of the truck.

Table I. Summary of Pneumatic-Tire Accomplishment[3]

Body and Chassis Weight, lb.	Pay Load, lb.	Increased Pay Load; Decreased Ton-Mile Cost, Per Cent
15,800	3,850	(Basis, 100 per cent)
12,700	4,800	24.7
11,900	5,800	50.6
10,500	6,800	76.6
8,000	7,000	81.8

Period, 2½ years

But the end is not in sight. We have succeeded only in proving that commercial trucks are uniformly built unnecessarily heavy for use with pneumatic tires and that, when pneumatic tires are used, weight can be materially reduced and the pay-load capacity increased. We have also shown that the lessening of the weight in turn allows the use of a smaller and less expensive tire for the increased pay load. We prove that more can be carried on a light truck when it is hauled on air, and that pneumatic tires permit a light truck to haul a larger load. This all helps to sustain our contention that pneumatic-tired trucks will use less gas, have smaller repair bills and generally give better satisfaction.

The following tabulation shows the performance of a fleet of pneumatic-tired trucks covering a period of six months:

[1] Abstracted from Detroit-Cleveland Sections paper, The Journal of the Society of Automotive Engineers, October, 1920.

[2] The Goodyear Tire & Rubber Co., Akron, Ohio.

TABLE II. WINGFOOT HIGHWAY EXPRESS

Year 1919	Trucks Actively Operated	Fleet Mileage	Total Ton-Mileage	Through Loading Capacity Per Cent	Operating Cost	Overhead Cost Cleveland Terminal	Total Operating Cost	Cost Per Mile	Cost Per Ton-Mile	Pay Loads Hauled, lb.	Revenue	Profit	Truck Efficiency Miles per Gal., Gasoline	Truck Efficiency Miles per Gal., Oil
April	6	12,066	32,483	78	$5,089.03	$654.28	$5,743.31	$0.42170	$0.15670	1,450,704	$6,522.32	$779.01	...	...
May	8	14,904	37,868	78	5,905.22	689.10	6,594.32	0.39620	0.15590	1,864,235	7,962.70	1,368.38	...	...
June	9	12,984	32,242	80	5,529.95	601.40	6,131.35	0.42590	0.17150	1,674,669	7,099.30	967.95	...	...
July	8	12,613	33,365	85	5,259.04	676.53	5,935.57	0.41690	0.15760	1,733,570	7,620.46	1,684.89	...	...
August	8	13,660	36,140	81	5,545.71	629.84	6,175.55	0.40600	0.15345	1,684,181	7,331.67	1,156.12	...	...
September....	7	15,479	40,185	78	5,201.38	601.16	5,802.54	0.33603	0.12940	2,083,383	9,371.69	3,569.15	...	...
Totals	..	81,706	212,283	..	$32,530.33	$3,852.31	$36,382.64	......	......	10,490,742	$45,908.14[4]	$9,525.50	...	...
Average ...	7.7	13,617	35,381	80	$5,421.72	$642.05	$6,063.77	$0.40045	$0.15409	1,748,457	$7,651.35	$1,587.58	5.93	143.3

[4] Gross earnings, 51.9 per cent on the investment, 26.2 per cent on the operating cost.

Operating costs and efficiency of solid and pneumatic tire equipment are compared in the following tabulation:

TABLE III. SOLID VERSUS PNEUMATIC TIRE EQUIPMENT

Details	Pneumatic Truck Tires A-30	Solid Truck Tires A-33
Type, tons	3½	3½
Total travel, miles	7,054	6,548
Number of round trips	89	83
Average mileage per trip	79.3	78.5
Hauling, ton-miles	19,188	17,632
Loading capacity throughout, per cent	77.7	76.9
Costs		
Gasoline	$268.99	$293.43
Oil	15.66	40.76
Drivers	357.20	357.20
Administration	81.66	81.66
Depreciation	252.53	439.37
Maintenance, material	63.48	171.53
Maintenance, labor	49.38	93.13
Consumer's tire cost	830.96	394.19
Miscellaneous	7.50	17.00
Interest	64.94	59.56
Insurance	7.30	7.30
Rent	25.00	25.00
Total operating cost	$2,024.60	$1,980.13
Efficiency[5]		
Cost per mile	$0.2868	$0.3024
Cost per ton-mile	0.1055	0.1123
Gasoline, miles per gallon	5.9	5.1
Oil, miles per gallon	332.0	140.7
Time per round trip, hours	4.3	5.6
Truck speed, m. p. h.	18.6	14.3
Time saved, hours	115.7	......
Driver's earnings—		
Straight time 57.8 hours, at $0.60	$34.68	......
Overtime 57.8 hours, at $0.90	$52.02	......
Saving on ton-mile cost	$130.48	......
Net saving effected	$217.18	......
Net gain by cost reduction, per cent	10.7	......

[5] Credit not allowed pneumatic-tired equipment for additional available hours over solid tires; increased satisfaction and better personnel of drivers, with less labor turn over, value to production in effecting quicker deliveries, additional safety and fewer claims for breakage in pay loads.

POINTS FROM THE DISCUSSION OF PNEUMATIC VS. SOLID TRUCK TIRES

J. E. SCHIPPER:—On the large-size tires there is considerable more of a flat tread than on the smaller sizes; that is, the sidewall seems to be built up. Would that work out to advantage in the smaller-size tires, and has it any effect on the gas consumption on rutty roads?

CHAIRMAN HALE:—There is a flat tread and steep sidewall on the 44 by 10 and 48 by 12-inch tires. In 1917 it was decided that we should make a 44 by 10-inch pneumatic truck tire with sufficient carrying capacity to support a 3-ton truck. The greatest difficulty encountered was to prevent separation between the tread and the carcass. The first tires were made with round treads, which caused the tires to flex considerably before the necessary contact area could be obtained. This flexing, combined with a component of the vertical load on the tire, resulted in a tremendous shearing action between the tread and carcass, which in time caused the tread to separate from the carcass or tire body. The logical thing was to make the tread flat, to give the necessary contact area without so much flexing and to widen it out, which would decrease the unit stress on the union between the tread and carcass of the tire. We did that and the results have been very satisfactory.

There seems to have been an understanding among tire designers that it is not good practice to have much of a shoulder at the edge of the tread of passenger-car tires. However, we have proved that a flat tread of the proper proportions has several distinct advantages and results in much longer tire life. As to the relative economy in gasoline consumption of the two types of tire on rutty roads, there would be a slight advantage in favor of the round tread; but when good roads are taken into consideration the advantage would be in favor of the flat tread.

Have any tests been made to determine what the trucks geared to run 30 m.p.h. with a large engine will do in city travel? Is this truck limited to one particular use?

Gasoline and oil consumption comparisons hardly seem fair. The pneumatic records have been made on trucks with tires which have been developed for this purpose. The commercial solid tire has been made to sell. The efficiency varies tremendously. That may possibly be due to variations in tire manufacture. The tires used on electric trucks have to be made of an entirely different compound. So far as we have been able to determine, the highly efficient solid tire does not give any reduced mileage. Under equal conditions it gives better mileage. There is also a possibility for the development of the solid tire. We have run a few S.K.[6] tires and have had remarkable results. That tire has great possibilities for city work.

In connection with pneumatic tires, the demand comes from people who want to put these tires out in the country where there are no good roads. They buy them because they cannot get there with the solid tires. But they soon find that operating trucks under those conditions is hard on the truck tires, engine and every other part of the chassis and body. That immediately brings about a demand for a good road, with a foundation and with good surface. With the ultimate road of that type, what sort of tire will be used? The trend toward the pneumatic tire may change in time because of the changed condition of the road surface. The locomotive with its steel track and steel wheels gets satisfactory running under most conditions. It will be a long time before we have the type of road which the railroad now has, but the smooth hard road appears to be the ultimate road. If that is the case, would not the solid tire serve well?

MR. SCOTT:—Regarding the 30-m.p.h. truck designed for pneumatic tires, its efficiency and the speed at which it must run in city streets, this is a question of the efficiency of the large engine in comparison with the small. Practically all of our experimental work has been over long runs. By using a 5-ton truck engine to draw a 3-ton load we found that this engine was more economical than that of the 3½-ton truck. This is because of the ease with which the large engine does the work. Over the mountains the smaller engine was working at a maximum. A very close check on that showed a 0.7-mile difference in gasoline consumption of the larger engine over the smaller.

City work is dependent upon the stops to be made. Many trucks stop often; with these we can get about two miles per gallon of gasoline. With that same truck outside of the city, we can get six miles per gallon. An average on all the buses shows about five miles per gallon of gasoline with a 2-ton chassis. But that is not low mileage, because of the unusual number of starts and stops.

[6] Goodyear cushion tire.

Chairman Hale:—The efficiency of solid tires as far as absorbency is concerned depends entirely upon the formula used in compounding the rubber. It is possible to have a wide range in the efficiency of the rubber stock. There seems to be a very positive indication of a very satisfactory saving of gasoline in the use of the pneumatic as compared with solid tires.

Mr. Foljambe:—In regard to the tendency toward or away from pneumatic tires when we get good roads, it seems that the tendency toward pneumatic tires will be increased under those conditions. With good roads, speeding is the next thing desired. Even on good roads the desired speed cannot be attained with a solid tire. There never will be a time when all roads will be improved. Even with a highly-improved highway system the truck must occasionally leave the hard surface, which again requires some kind of tire other than a solid one.

Chairman Hale:—The speed at which the pneumatic-tired trucks shall be operated must be controlled entirely by the safety at which they can be operated. We have found that 25 to 30 m.p.h. is satisfactory; it is very similar to passenger-car speed.

There has been considerable talk to the effect that the pneumatic-tire equipment for trucks would completely supersede solid-tire equipment, with the claim that the pneumatic tire rides so much easier that the truck chassis will stand up better than it would in the case of the solid tires. No doubt this is true in the country when driving at high speeds, but it has been my experience that heavy trucks in crowded city traffic on short hauls last practically indefinitely when run on solid tires, because the nature of the service and the traffic conditions prevent the truck from running fast enough to develop any serious vibration. I feel that there will always be a large field for solid tires for heavy trucks in city work.

H. B. Knap:—On trucks in general it appears that solid tires will be used in cities for short-haul hard-road low-speed work. Pneumatic tires will be used for high-speed long-haul conditions and for soft-road rough-country conditions. In other words, the added expense per mile of the pneumatic tire must be offset chiefly by making more trips per year, either by virtue of higher permissible speeds or by being able to negotiate soft roads and ground where solid-tire equipment cannot operate.

Mr. Darrow:—The question of solid and pneumatic tires can be argued only on two counts. The first is reliability. We can expect 7,000 miles and over from pneumatic tires. During the life of each tire we can expect to remove it once from necessity, and perhaps other times for treatment. With average mileage and care we must remove one tire per month.

The second point is cost. The first-class improved highway of concrete, with a deep foundation, costs $40,000 per mile. Mr. Seiberling mentioned that there are 200,000 miles of more-or-less improved highways in the United States. This runs up to $8,000,000,000. If we ever get highways of that character, the element of depreciation on roads must be included in the cost of pneumatic tires.

In regard to unit load, there is a limit to the weight that can be carried on solid tires per inch of tire width. As a matter of fact, this is not the right way to measure it; it should be pounds per square inch of contact area. With pneumatic tires, the load per each square inch of contact area is equal to the inflation pressure. As to the cushioning, a solid tire deflects about 1/8-inch. A pneumatic tire deflects 3/4-inch or more. We have only one-quarter the impact with one-half the load, per square inch. Those things have a bearing on the maintenance of the foundation of the road. The road is the expensive part. We must keep in mind that solid tires will injure the foundation of the road and that the investment involved in keeping the roads in repair is tremendous.

To sum up and connect three things together, in a pneumatic-tired truck we have a saving in the truck itself, an increased efficiency and a large saving in roads. Taking into consideration only the initial tire cost and mileage delivered, we cannot show that pneumatic tires are more economical but, considering these other things, there is no question that pneumatic tires excel solid ones.

Joseph Schaeffer:—Considering the future prospects of large-size pneumatic tires, it appears that the weight will prove the main limiting factor. A driver and his helper can handle a tire with rim below 200 pounds, so that the 40 by 8-inch tire would still be practical, while the 48 by 12-inch tire, weighing with rim about 500 pounds, can hardly be handled by one or two men without involving undue effort. In exceptional cases the very large sizes may be justified and establish a field of usefulness, but for general adoption they appear to be too heavy and too expensive

THE NEW YORK ELECTRICAL SHOW

The annual New York Electrical Show was held October 6-16, inclusive, at Grand Central Palace. The displays made by an unusually large list of exhibitors were of much popular interest since many of them featured household electric appliances of every sort, in which rubber in some form is used. No housekeeper, it would seem, can afford to do without some of the labor-saving electrical machines, such as those for washing, ironing, cooking, and cleaning. A few only of the typical exhibits need be referred to here.

The Habirshaw Electric Cable Co., Inc., exhibited detailed plans showing how a home should be wired and where outlets should be placed. The exhibit also included samples of all the types of wires, cables and cords essential for the full utilization of the many domestic appliances which relieve household work of drudgery.

Western Electric Co. showed a complete assortment of electrical appliances for the home. Five essential machines of more than ordinary importance were shown, namely, the clothes washer, vacuum sweeper, dish washer, portable sewing machine, and ironer.

The Westinghouse Electric & Manufacturing Co. A general display of electric household heating devices for laundry, kitchen and nursery was augmented by an exhibit of a number of motor-driven appliances using small Westinghouse motors. This includes machines for washing, ironing, vacuum cleaning and dish washing. In another section the same company showed a complete motion picture equipment using a Westinghouse motor-generator set to transform from alternating to direct current, a studio light-control outfit for motion picture work and an outfit for charging vehicle batteries.

The Elasticap Co. demonstrated the value and convenience of Elasticaps, molded rubber caps, for the positive insulation of end splices of electric wires. They do away with the usual and often unreliable rubber tape method, meet all requirements of the fire underwriters, and are approved by the Underwriters' Laboratories, Inc. The Elasticap was illustrated and described in The India Rubber World, March 1, 1920, page 366.

The General Electric Co. in its main exhibit showed in actual operation many of the latest devices and apparatus for the utilization of the heat of electric energy. Of special interest were the following: electric arc welding equipment, automatically making perfect welds without attendance; electric furnace, heat-treating steel parts and tempering in an electrically heated oil oven for japanning and baking foundry cores; besides various other industrial heat applications, electric vehicle charging, and better lighting equipment of industrial establishments emphasized by an exhibit of four miniature models of machine shops. The results of research work in the insulating material field made an unusual display.

Safety and Sanitation for Rubber Mills and Calenders[1]

By C. B. Mitchella[2]

Safety and sanitation for rubber mills and calenders covers so many opportunities that if discussed fully it would fill a large volume. Many schemes have been tried with varying success for accomplishing the same purpose, and it is the intention that this paper shall present only the most important precautions and the most successful installations.

EDUCATION OF OPERATOR

Although the education of the operator is the most important of all precautions in preventing injuries on mills and calenders, this part of the subject will not be presented in detail; instead, the discussion will be confined to mechanical safeguards. However, a few pointed suggestions, or rules, to develop mental alertness of the operators are submitted as follows:

GENERAL RULES

1. Follow instructions of your foreman and your inspectors only.
2. Wear no clothing which can be caught in the machines, such as long sleeves, loose neckties, aprons or unbuttoned jackets.
3. Keep your eye on the job all the time, and give your work your entire attention.
4. Keep your hands off moving rolls.
5. Never force the rubber into the bite of the rolls with your hands.
6. Never oil, clean or repair your machine while it is in motion.
7. When cutting stock off roll, always cut below the center.
8. If you feel ill, or in such condition as to interfere with your work, report at once to your foreman.
9. Stop machine at once in case of emergency. Do not wait for instructions.

RULES FOR MILLS

1. Never allow your hand to go past the top of the roll, and never reach over one roll to work on the other.
2. Watch your hands when the rubber folds over. Don't let them get caught in the folds. Be careful in doubling the ends of batches when "batching out."
3. Never cross arms when cutting or rolling stock from the mill. Learn to cut and roll with both hands. When cutting from left to right, cut with right hand and roll with left. When cutting from right to left, cut with left hand and roll with right.
4. Never take anything out of the rolls while the mill is in motion. Stop the machinery.
5. Never stand on the mill pan, compound boxes, platforms or makeshifts.
6. Never work with one hand under the rolls while the other is above them.
7. Take care not to catch your fingers between the guide and roll.
8. The back roll of the mill runs faster than the front. Be careful.

RULES FOR CALENDERS

1. Never pick stock out of the bite of the rolls.
2. In starting end of liner in building up plies, keep your hands at least six inches from the rolls.
3. Never start calender unless properly signaled.

SAFETY IN OPERATION OF MILLS

SAFEGUARDS ON MILL PARTS

A safety throw-out to stop the mill in case of accident consists of a horizontal throw-out bar heavy enough to resist the struggling of an injured operator, placed over each mill roll. These bars should be located six feet above the floor upon which the operator stands, and in plan be located 18 to 21 inches to the front and rear of the bite of the rolls. Fig. 1 illustrates this double type of throw-out. The cross bars are made of one-inch steel rods rigidly attached to the double levers.

There are three predominating methods of cutting off the power from the mills: (1) magnetic clutch brake mounted on motor shaft: (2) mechanical clutch on either the drive gear of the mill, or on the motor shaft; (3) dynamic braking of the motor. From the experience the writer has had on all the above types, recommendation is made to use either the magnetic clutch brake, or the dynamic brake, preferably the former, and the discussion is confined to those types of apparatus. If the magnetic clutch brake is used, it is best to place over one housing of each mill an electric cut-out switch. Many installations of mill lines have been made with only one switch for the whole line, the switch being operated by a cable running from one end of the line to the other, or operated by an equivalent rod. This method is not perfectly reliable because of the lost motion due to the variable tension in the cable, or the torsional deflection and binding of the rod, any of which will slow down responsiveness of the switch. In order that the cut-out switch may be opened with the least travel of the safety throw-out bar, the switch spindle should be geared up to the throw-out lever shaft in a ratio of about five to one. Consequently, it is not necessary to move the safety bar a distance of more than three and one-half inches either up or down. The travel of the safety bar and lever is limited by an adjustable stop, which prevents damage to the electric switch by being thrown too far, and which makes the safety bar more rigid to resist the struggling of an injured operator. It should not require more than a five-pound force on the safety bar to throw the switch.

The electric switch should be entirely enclosed so that dirt cannot gather on contacts. The wiring from the mill switches should be carried in conduits down the housing, and through the mill pits to the panel board and magnetic clutch as shown in Fig. 2. The brake on the magnetic clutch should be operated by a counterweight and be capable of bringing the mills to a complete stop in no greater time than one second. While the mills are running, this counterweight is held inoperative by a solenoid electrified by a circuit which connects the mill safety switches and the clutch. This circuit is fed through circuit breakers which are held closed by a solenoid operated latch. After the clutch circuit is broken these circuit breakers cannot be closed except by the operator's going to the panel board and resetting by hand. Therefore the clutch cannot be engaged if the operator should first close the safety switch. It is probably useless to describe the well-known construction of the magnetic clutch, but it may be mentioned briefly that this clutch is of the disk type, the two disks being drawn together by electromagnets.

Dynamic braking is accomplished by cutting off the current which feeds the motor and at the same time placing a low resistance short circuit across the brushes of the motor armature. The motor then acts as a generator requiring considerable driving power. Obviously this power comes from the rotating parts of the mills, decreasing their momentum. As the speed decreases, the power generated by the motor decreases and brings the motor and mills to a smooth yet rapid stop.

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[1]Paper read before the Rubber Division of the National Safety Council at Milwaukee, Wisconsin, September 30, 1920.
[2]Engineering Department, The B. F. Goodrich Co., Akron, Ohio.

There are numerous types of mechanical clutches which have been applied to mill drives, most of them without brake. Among these, the spiral coil clutch and a disk clutch operated by compressed air are used probably more than other types. No doubt a mechanical clutch can be designed for quickly cutting off the power, but a great many of these clutches now in use do not release readily. In no event should a mechanical clutch be installed without a powerful brake in connection therewith.

The foregoing methods have been applied principally to groups of mills driven by one motor, but the method is equally applicable to an individual mill with its motor drive. An individual clutch for each mill on a line of mills is not so advisable as one clutch controlling a number of mills, because the greater the number of mills, the greater is the resistance and the quicker is the stop.

It is possible that the best throw-out mechanism that might be devised may not operate when most needed, and therefore it is very necessary that daily inspection and tests be made to determine the condition of these safety devices, and a record kept of the surface travel of the rolls. No day should begin without this test, and no mill should be operated until its safety throw-out is in perfect operating condition. Frequent tests with the mills loaded should be made to ascertain the surface travel of the rolls.

The location of the mill pan has much to do with the safety of the operator, particularly as to the distance which the operator may be increased to as much as 4 feet 6 inches without making it difficult to feed stock into the mill.

The speed of the mill rolls should not exceed twenty-five revolutions per minute. Higher speeds cause difficulty and danger in cutting and rolling of stock.

The roll-adjusting screw which projects through the front of the housing should have threads of large lead, so that the mill rolls may be separated in the shortest possible time, thereby releasing an operator caught between the rolls before he can be burned seriously. With threads of large lead, the adjusting screw will tend to back off, because of vibration, but this can be overcome by placing a quick operating clamp back of the head of the screw.

Between the roll-adjusting screw and front-roll bearing is usually placed a safety breaking cup. This cup often breaks into many small pieces which frequently strike the operator. A band or screen ought to be placed around the cup to confine these pieces.

Gears ought to be guarded most thoroughly if it is probable that a workman may be compelled to be adjacent to them. It is advisable in any case to enclose the outside perimeter or face of gears with a sheet steel band to prevent oil or grease from depositing on the floor of the pit. For most thorough guarding, a solid enclosure of steel plate should be provided over faces of gears and down the sides beyond the depth of the teeth, and the point of contact between gears covered completely. Projecting

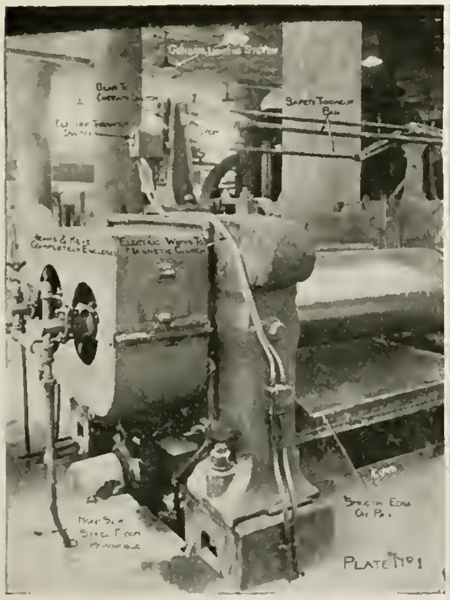

Fig. 1. Double Throwout Type of Safety Stop Device for Mills

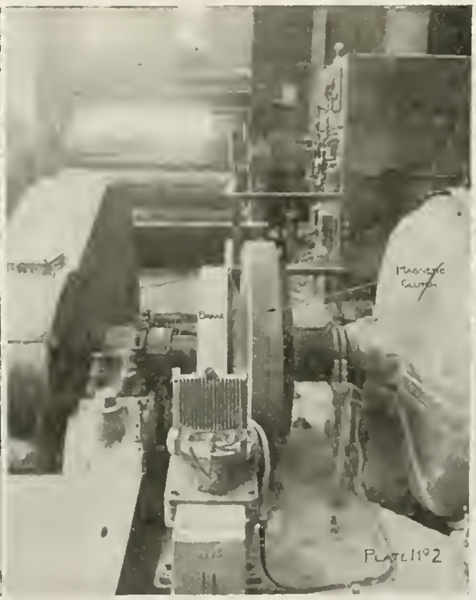

Fig. 2. Electrical Wiring From Mill Switches Should be Carried in Conduits

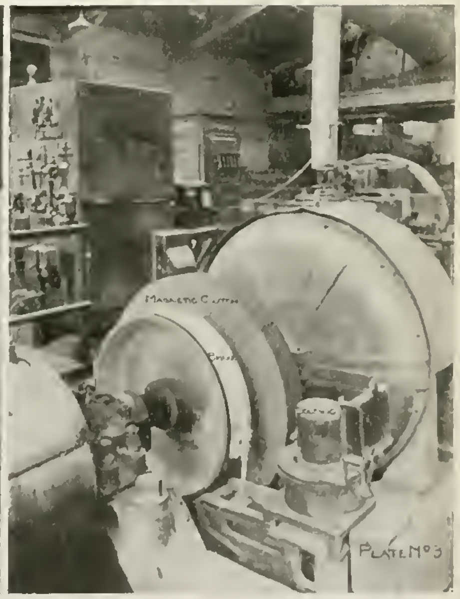

Fig. 3. The Brake on the Magnetic Clutch Should be Operated by a Counterweight

is kept from the face of the rolls. One of the principal precautions for safety in mill operations is to prevent the operator from placing his hands beyond the top of the nearest roll. It has been found excellent practice to have the least distance from the bite of the rolls to the edge of the pan 3 feet 8 inches on 84-inch mills, and 3 feet 1 inch on 60-inch mills. If, for any reason, it is not practical to locate the edge of the pan so far from the rolls, then a bar or pipe guard should be placed at the equivalent location. The front and rear edges of the pan should be smooth, preferably turned down or beaded, to prevent injury to the workmen's legs.

The height of the top of the mill rolls above the floor upon which the operator stands should not be less than 4 feet 2 inches. A height less than this gives the operator too great an opportunity to place his hands too far into the mill. This height keys, and other projecting revolving parts, as well as spokes, ought to be covered with removable wire mesh, which will not prevent visual inspection of the gear parts. Proper door openings must be provided in various parts of the guards, to facilitate inspection of the gears, and the guard designed so that it may be quickly removed when necessary to repair the mill. Guards should be attached neatly and rigidly to a machine to prevent rattling or sagging, or being knocked out of shape, for otherwise the guard may suddenly be removed by a self-appointed specialist, because of its being an aggravation and eyesore.

If there is no passageway between the ends of mills set in a group, then there is no necessity to guard the gears so thoroughly. Instead, a pipe railing, at least 3 feet 6 inches high may be placed between the mills and be fastened to the mill housings. Pipe railing, with gate, should be set around motor

panel boards and other electrical equipment, and these railings wrapped with friction tape, particularly where workmen operate the electric switch and may be in contact with railing. Pipe railings around pits, such as for motor drives, are often covered with steel plate from floor to top of railing so that materials may be stored adjacently without falling into the pit.

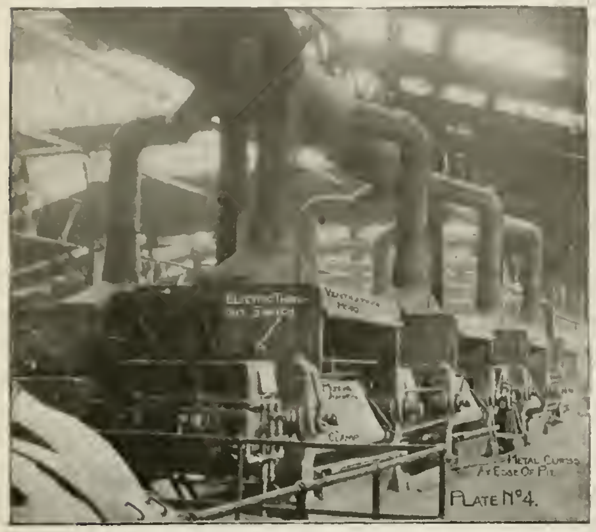

Fig. 4. Each Mill is Provided with a Sheet Iron Hood

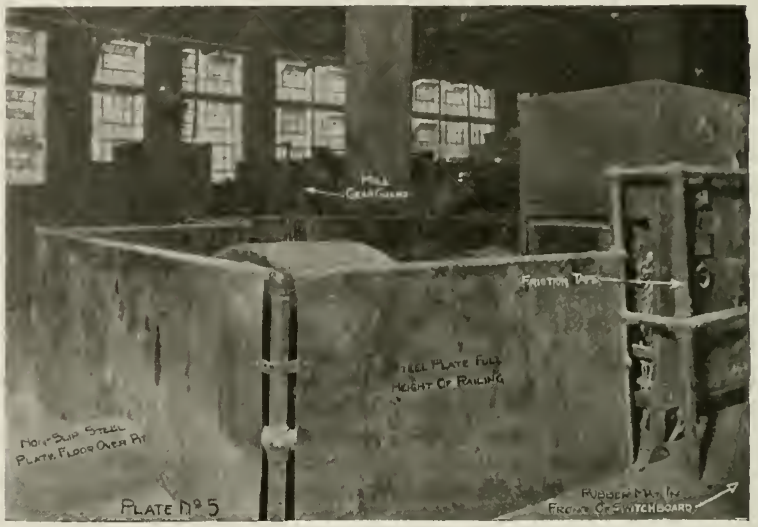

Fig. 5. Mill Pits and Switchboards Should be Safeguarded

A mixing apron is desirable for continuously feeding rubber and pigments into the rolls. This apron reduces the number of manual operations which would otherwise be necessary to feed the mill entirely by hand, and therefore it proportionately reduces the possibilities of injury to the operator. The apron should not be closer than five inches above the mill pan.

MISCELLANEOUS SAFEGUARDS AROUND MILLS

Many injuries have resulted by workmen falling on slippery mill room floors, and various floor coverings such as rubber mats and non-slip metal have been provided for the operator to stand upon. These are not entirely satisfactory except that light weight non-slip metal can be used to good advantage for cross overs between mills to cover the pit and line shaft, and where it is necessary to remove floor for repairs to equipment. A non-slip cement floor can be made perfectly satisfactory and maintain a perfectly smooth surface. Several prominent firms have laid such floors for years by constructing the original floor finish with a carborundum treatment as follows:

Proceed as in a neat cement floor finish to the point where the area has first been wood floated to a level surface and finished smooth with steel floats, then sprinkle the finished area with a dry mixture composed of one part of 12-30 carborundum grit and two parts of Portland cement. Wood float to a smooth surfact and finish with steel float. Sprinkle the area a second time, wood float to a smooth surface and again finish with a steel float. In the two sprinklings use one and one-third pounds of carborundum grit to each square yard of surface. Cover and keep wet seven days, or longer, the same as for neat cement finish.

The above method will make a floor surface which is considerably harder than the ordinary cement finish. This method can also be used in combination with the metallic floor hardeners.

Several accidents have been attributed to improper lighting of mill rooms. Momentary blindness of workman caused by excessive glare of lamps may be the cause of a workman making a wrong movement. A poor lighting system will produce fatigue due to continuous eye strain. A general lighting system of uniformly spaced units distributing light equally over the whole mill room, with an intensity of 5 foot-candles, as shown in Fig. 1, will make the mill room a safe and cheerful place to work. An inexpensive lighting unit may be used, the reflector being of metal, dome type, porcelain enameled. This reflector used with a bowl enameled type C lamp of high wattage, will produce a diffused, high intensity, non-glaring illumination. However, where ventilating hoods are placed above the mills it will be necessary to install a local lamp under the hood in such a location that it will be up and out of the normal vision. This lamp should be covered with a heavy cage to protect it from breakage. The intensity of light on the mill rolls should be the same as provided in the general lighting system. This is important, for if the light on mill rolls were different from that outside the hood, eye strain would be produced, with resulting discomforts and hazards.

SAFEGUARDING HEALTH IN MILL ROOM

Ventilation and cleanliness are equally important with mechanical safeguards. It is possible that a workman can operate for a lifetime a machine having not a single safeguard, but not so, if he is compelled to work in a poorly ventilated, dirty room, for he may eventually become as much if not more of a physical wreck as though he had been injured on his machine. Bad ventilation and dry, dusty atmosphere dull the workman, and slow down his productiveness. In mill rooms the installation of a ventilating system is absolutely necessary. Oftentimes natural ventilation may accomplish fairly good results, especially in a small mill room having a high ceiling. However, it is impossible to handle a few pigments, such as lampblack, zincs and leads, as well as soapstone, satisfactorily, without mechanical ventilation. The ideal ventilating system is one which will heat, ventilate, clean and humidify the air. Local conditions and first cost often prevent a near approach to this ideal. Because the maintenance of air washers handling rubber pigments has been difficult, many systems have been installed without the washers, with success. A brief description of such a system is as follows:

Heat, dust, and fumes arising over the mills are carried away by an exhaust system. Each mill is provided with a sheet iron hood covering the mill. The under side of this hood should not be less than 6 feet 6 inches above the floor upon which the workman stands. Fig. 4 illustrates this hood and the air ducts. The two sides of the hood over the housings are enclosed with sheet iron, but the front and rear are open. However, conditions often demand that canvas curtains on spring rollers be mounted upon the front or rear of the hood to prevent the operator actually throwing compounds across the rolls and out on other side of the mill. Fig. 4-A illustrates a cross-section of the

preferred type of mill hood. The preferred type is the ordinary box style of hood with the air duct connected to the middle of the top through a flared connection. This style of hood insures that the air currents carrying dust and heat from workmen will go directly to the middle of the top of the hood, where the duct connection is made. An alternate type of hood is also illustrated in Fig. 4-A. This type of hood has a so-called false ceiling which makes a small space through which the air passes near the outside edges of the hood. This small space creates a higher velocity near the edges of the hood. There is also an opening in the top of this ceiling directly into the air duct. This alternate type does not carry all the dust-laden air directly from operator to the middle of the hood. It has the objection of carrying a great portion of the dust to the front or rear edge, where there is a possibility of its rolling out from underneath the hoods, and it is necessary in order to overcome this last objection to maintain a very high velocity of air which will actually carry away all of the dust.

In the preferred type a slower air velocity may be maintained, and it is found that near the center of the hood a considerable amount of the dust actually drops back onto the rolls and is mixed in with the rubber. This is one of the best features of this type of hood, for it does away with the necessity of an air washer, and the small amount of dust which is carried away through the ducts is easily collected. The hood should be connected to the air ducts by a flexible connection so that the vibration created on the mill will not be carried to the ducts and cause leaky joints. The ducts are carried to a centrifugal multivane exhaust fan which discharges into, preferably, a vertical flue carried to the top of the building. In the case of a one-story building it is preferable to carry this exhaust flue at least forty feet above the ground level. At the base of this flue is a collecting chamber located below the entrance of the fan duct, into which nearly all the dust descends by gravity and may be removed through a cleaning door. For an 84-inch mill the volume of air for the preferred type of hood is 3,800 cubic feet per minute, at a velocity of 1,300 feet per minute. The static pressure necessary to be maintained in the ducts varies according to the design of the ducts and the length of runs. Such pressure will rarely exceed one and one-half inches of water.

In order to offset the large volume of air removed from the mill room through the hoods, it is necessary to feed in fresh air. In summer time this is easily accomplished by opening the windows, but in winter it is necessary to force heated air into

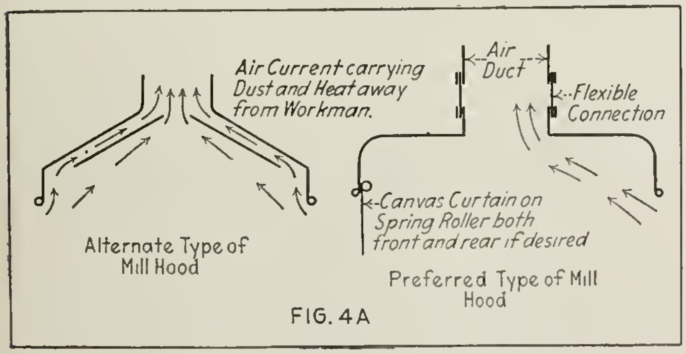

Fig. 4-A. The Preferred and the Alternate Type of Hood

the room by fans. This air ought to be heated to about 90 degrees F. and distributed equally over the entire room. It is also possible, in order to save expense of heating the entire volume of air, to recirculate a portion fed into the flue by exhaust fans, and also to draw air from other portions of the building, preferably from stair and elevator towers.

With the best type of ventilating system, as described, there is still an opportunity for dust to collect in various parts of the mill room. Perhaps the most frequent cause is from dusting batches of stock with bags of soapstone. This dust will accumulate on the floor and stock racks. To keep these parts of the building and floor in the cleanest condition a vacuum cleaner is advisable. With this system of cleaning there is no dust stirred up, as is the case with brooms or brushes, and the cleaning is more easily facilitated. With the vacuum cleaner system one man under ordinary circumstances, ought to clean 3,500 square feet of floor per hour. This system is also very desirable to clean walls, ceilings, pipes, machinery and equipment, and motors. Another aid to cleanliness is the running of curbs around all pits, so that rubbish, etc., may not be kicked into them.

SAFETY IN OPERATION OF CALENDERS

SAFEGUARDS ON CALENDER PARTS

The various methods of quickly stopping mills, previously described, are equally adaptable to calenders. The dynamic braking of the motor is perhaps most simply applied and operated and requires no extra floor space. A throw-out bar is necessary in both front and rear of the calender, and this bar should be a steel rod or pipe and be placed full width between the calender housings.

Signal bells, or their equal, should give warning each time the calender is to start or stop; one bell to be so connected that any workman may signal when he desires the calender started or stopped, and another bell directly connected with the motor controller or other starting and stopping device. The latter bell will automatically give warning to all workmen. If calenders are operated in trains, the safety appliances should be so arranged that operation of any one of the safety switches on the various calenders will instantly stop the entire train. The operation of a train of calenders should be as a unit, and under the control of one operator, the only person who can start the machines.

All switches and control boards should be of the enclosed type, making it impossible for the operator to be in contact with live parts. Control panels are best situated in a separate room open only to authorized electricians. Rubber floor mats are necessary in front and rear of all control boards.

Feeding stock into calenders has caused more accidents on these machines than any other operation. Nearly all of them resulted from feeding fabric or sheet rubber into the calender rolls, and into the wind-up. Statistics show that comparatively few accidents have occurred from feeding batched gum, and there is no good reason why any should occur. A sheet metal table about twelve inches wide and the same length as the rolls, located about six inches below the bite of the rolls, will hold the gum while feeding. If it is necessary to feed small pieces of gum this may be done with the aid of a wooden paddle or pusher.

Feeding fabric or sheet gum is not so easily accomplished, and it is necessary for the operator to place his hands close to the rolls, unless it is possible to use a guard which will also assist in starting the fabric into the rolls. Although numerous efforts have been made, it seems that no really efficient guards of this type have been devised, and experimental ones have generally met antagonism from the workmen as being a hindrance to rapid and successful work. Such a safeguard is most needed to feed sheet stock between closed rolls, but the space available is not sufficient to provide safety without impeding production by making it impossible for workmen to place the sheet within a reasonable distance from the rolls.

If a calender does not require the two bottom rolls to be in contact with each other, and if the bottom roll is used only as an idler roll to return the stock to other side of calender, then the bottom roll should be lowered about three inches so that

a man's arm can pass between the rolls and not be pinched. Where the rolls cannot be thus separated, it may be possible to separate them to such an extent that a guard can be used successfully. A guard used in several factories consists of two horizontal steel plates about 1½ inches apart, extending in between the rolls. (See Fig. 7.) The lower plate does not extend so far inwardly as the upper plate, and this allows workman to place the stock on the lower roll; and if the travel of the roll should carry his fingers forward they will strike the upper plate without harm. To be successful, this guard must be constructed very heavily, and be very rigidly attached to the machine. A scraper bar is attached to the lower section of the guard after the guard is in place, and so adjusted to the roll that there is only a very small clearance between the scraper and the roll. This scraper is for any stock which may get around the lower roll and which would have a tendency to roll up under the guard and bend it out of shape. It must be urged most forcefully that a man who is working on a calender with separated rolls shall never be transferred to another calender having its rolls in contact, for the knowledge of not being subjected to danger on the first type, forms a habit of placing the hands between the rolls, and this habit will unconsciously be continued on the latter type and result in severe injury.

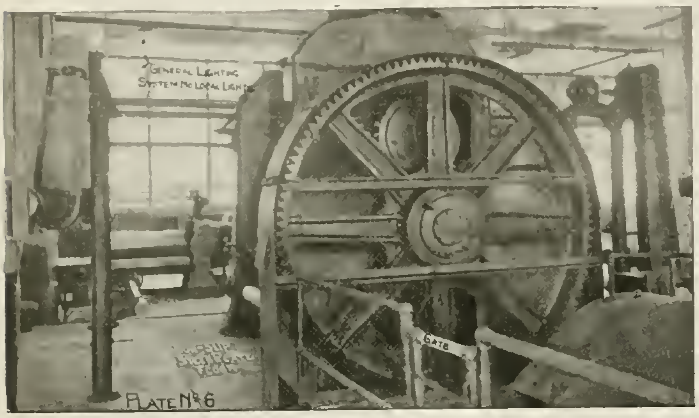

Fig. 6. Non-Slip Floors Are Necessary Around Calenders

All wind-ups and let-offs should have a stationary hand-wheel for adjusting the tension in stock. This can be accomplished by mounting the hand-wheel on the wind-up bearing, the outside of the bearing having screw threads upon which the hand-wheel adjusts itself against the friction disk. To hold the stock shell bar within the wind-up spindle, a smooth ring should slide on the spindle and cover the end of the bar. This ring can be locked in position by a pin with a spring. No projecting set-screws or pins should be placed on any revolving part of the wind-up.

All idler rolls ought to be placed as far as possible from calender rolls. Particularly is this true where the stock passes between the idler and the calender rolls, for serious accidents have occurred where the operator was caught by the stock and drawn between the rolls.

Gear guards and pipe railings as described under the subject of mills, are equally adaptable on calenders. Fig. 6 illustrates excellent guards.

Non-slip floors are particularly necessary around calenders. A concrete floor with carborundum treatment, previously described, will not become slippery from soapstone because the grains of carborundum cut the soapstone and prevent it from adhering to the floor finish. Between the housings of the calender it is usually not practical to lay a concrete floor, and therefore a metal floor predominates. This metal floor surface ought to be rough. Objections are often heard against this, and it is contended that a rough floor may damage the tail end of the stock which drags along the floor before being wound up. However, this objection is greatly overdrawn. Fig. 6 shows such a floor under a calender which has been doing a high grade of work for years.

Illumination for calender work is important, not only to safeguard the workman, but particularly to produce work of highest quality. Too many calenders are being operated with local lights attached to the machine. The general lighting system described for mill rooms is recommended for calender rooms, except that the maximum amount of light should be given the calenders, and a lower intensity in the aisles. The intensity on the calenders ought to be 10 foot-candles uniform lighting, and about 5 to 6 foot-candles uniformly in the aisles. If glare is eliminated this difference in intensity will not produce eye strain.

The tendency in calender work has been toward increased width of stock and greater lengths, which has produced rolls of stock of great weight and unwieldy size, and consequently greater chance of injury to operator. Careful consideration of methods of handling heavy rolls of stock becomes very important. An electric or air hoist mounted on a trolley is perhaps the simplest and quickest means of lifting these rolls.

A calender may produce excessive heat or fumes, making it advisable to install a ventilating hood above, and connected to an exhaust fan. However, it is far better to have a high calender room, preferably one story, with saw-tooth skylights to give good ventilation and light. If the room has a low ceiling then mechanical ventilation is necessary, especially during summer months and times of high humidity.

Where excessive soapstone or stock dusting accumulates on the floor under the calender wind-up and let-off, a suction system should be provided. This dust should fall onto and through a latticed or perforated floor into a chamber from which it is drawn into a duct and thence to a fan exhausting into a stack as described for mill room ventilation.

The vacuum cleaner principle has been applied to the cleaning of liners and this obviates most of the flying dust around calender let-offs and wind-ups. A vacuum cleaner is of even more importance in a calender room than in a mill room, for in addition to the benefit to workmen, there is an extreme necessity for cleanliness of calendered stock. All pits and openings in the floors should be free from rubbish and grease, and should have proper curbs around them.

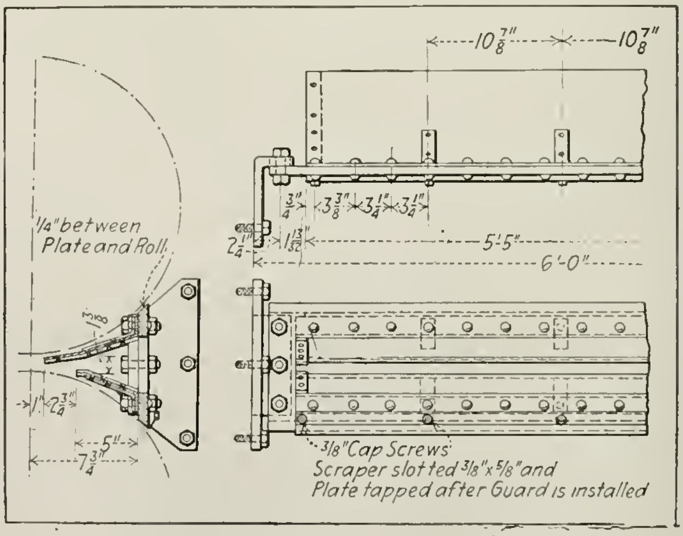

Fig. 7. An Efficient Calender Guard

CONCLUSION

The foregoing descriptions have covered mechanical safeguards which for a large part depend upon a little common sense on the part of workmen in providing personal care. Workmen

should be educated to know thoroughly the dangers which a safeguard covers, that they may furnish the precautions which the safeguard cannot. It may be possible to safeguard a machine so thoroughly that it would be impossible for a workman to injure himself deliberately, but with the result that the workman would eventually dismiss from his mind any thought of danger. It would be folly to place such a man on another machine which cannot be so well guarded. Thorough education in safety is, after all, the most important requirement, and it not only provides protection in his mechanical duties, but it expands his mental capacity and alertness to provide protection for himself and his fellow-men at all times, everywhere.

The Effect of Certain Accelerators Upon the Properties of Vulcanized Rubber—II[1]

By G. D. Kratz and A. H. Flower[2]

In a recent paper,[3] H. P. Stevens has given new figures, and from them made a number of deductions in regard to certain discrepancies between results obtained by the present authors[4] and earlier results obtained by him.[5] We do not entirely agree that these latest deductions will suffice for the complete coordination of his former results with ours. This view is confirmed by the repetition and amplification of our former experiments, including work with extra light instead of heavy calcined magnesia.

This work was carried out with a sample of the rubber previously employed and also with another rubber of similar physical appearance. Entirely different results were obtained with the two rubbers. In neither instance, however, was extra light magnesia found to develop greater activity than Accelerator A, and, in one case, it was markedly inferior to the latter. In both cases where Accelerator A was employed, the load required to effect a given extension led to erroneous conclusions, if used as a criterion of the rate of cure.

As these results were obtained with accelerators of definite composition and purity, the differences may be attributed to variations existing in the rubbers themselves, and most probably in the nature, amount, or condition of the extraneous materials present. As a considerable portion of this extraneous matter was extractable with acetone, an investigation was made of the relative effect of the two accelerators upon the two rubbers after extraction. Since the nature of the substances removed by the extraction[6] was not studied, no attempt can be made to correlate the effect of the extra light magnesia with any definite one of the extraneous substances originally present in the rubber. Certain facts, however, have been well enough established to deserve brief consideration.

It was noted by Spence[7] that the nitrogen in rubber was not entirely of protein origin, and that nitrogenous bodies of well-defined alkaloidal character could be detected in the acetone extract of Pará rubber. This was subsequently confirmed by Spence and Kratz[8] for plantation crêpe (*Hevea*), although a difference in the character of the protein material in the two rubbers was found. Further, certain of their results indicated that in plantation *Hevea* the non-protein nitrogenous substance was not easily extractable with acetone. Dekkar[9] also noted the presence of nitrogen in the acetone extract, and gave figures for nitrogen distribution in the extracted rubber and its acetone extract which closely confirmed those originally obtained by Spence. Prior to Dekkar's observations, Beadle and Stevens[10] noted that the rate of vulcanization of certain rubbers decreased if the rubbers were previously extracted with acetone. After vulcanization the physical properties of the acetone-extracted samples were so greatly impaired, due either to the loss of the resin or the physical effect of the solvent upon the rubber, that the decrease in the rate of cure was considered of secondary importance.

It would therefore appear that the removal of the acetone-soluble nitrogenous constituent is responsible for the decrease in the rate of cure of the rubbers, rather than either of the causes originally assigned by Beadle and Stevens.[11] This is also in accordance with the later results of Eaton, Grantham and Day,[12] and of Stevens,[13] wherein the accelerating substance of plantation *Hevea* rubber was found to be an organic base or mixture of bases, probably formed by the degradation of the protein portion of the nitrogenous material originally present in the rubber.[14]

The possibility that magnesia may hasten this degradation, with the formation of an accelerator similar to that produced by the biological decomposition of the proteins, has already been pointed out by Eaton[15] in commenting upon the patent of Esch.[16]

In view of the well-known action of many synthetic organic accelerators in the presence of certain mineral oxides, such as that obtained by Cranor[17] with zinc oxide, we are led to the conclusion that the effect of small amounts of magnesia in accelerating the vulcanization of rubber is of a secondary or contributory, rather than a primary nature, and consists largely in effecting a response from the natural accelerator in the rubber. This finds further confirmation in the observation of Stevens in his previous paper, wherein he pointed out that the accelerating effect of extra-light magnesia decreases when a sulphur coefficient of 2.0 to 2.5 has been attained. At this point, increased amounts of magnesia would have no effect, as they would be in excess of the amount required by the natural accelerator, which is present in the same definite and limited amount in all of the mixtures.[18]

The same would not be true for Accelerator A, which is regarded as a primary accelerator and is present in the various mixtures in increasing amounts up to 1 per cent of the rubber.

In conclusion, we wish to draw a distinction between the terms "effect of accelerators" and "action of accelerators." This paper deals primarily with the effect produced by certain accelerators upon the sulphur coefficient and the physical properties of the

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[1] Published by courtesy of the American Chemical Society. Paper read before the Rubber Division of the Society at St. Louis, Missouri, April 12-16, 1920:

[2] The Falls Rubber Co., Cuyahoga Falls, Ohio.

[3] The India-Rubber Journal, 58 (1919), 527.

[4] Chemical and Metallurgical Engineering, 20 (1919), 417.

[5] Journal of the Society of Chemical Industry, 37 (1918), 156t.

[6] A qualitative determination showed the presence of nitrogen in the extracts of both rubbers.

[7] Herbert Wright, "Hevea Brasiliensis, or Pará Rubber," 1912, p. 439. London.

[8] Kolloid-Zeitschrift, 14 (1914), 268.

[9] Communications of the Netherland Government Institute for Advising the Rubber Trade and the Rubber Industry, Part II, p. 55.

[10] International Congress of Applied Chemistry, 25 (1912), 581.

[11] In a previous paper [The Journal of Engineering and Industrial Chemistry, 12 (1920), 317], we have mentioned that results obtained with certain synthetic organic substances indicate, in some cases, that the accelerator may be closely bound to the rubber. Should this also be found true in the case of the natural accelerator, the removal of this substance by extraction would markedly impair the physical properties of the sample after vulcanization, as well as slow down the rate of cure. (Compare with footnote 25.)

[12] "Variability in Plantation Rubber," Journal of the Society of Chemical Industry, 35 (1916), 715.

[13] Journal of the Society of Chemical Industry, 36 (1917), 365.

[14] The protein portion of this nitrogenous material which is insoluble in acetone and benzene has been shown to act as an accelerator (Beadle and Stevens, Kolloid-Zeitschrift, 11 (1912), 61; 12 (1913), 46; 14 (1914), 91). It has the further advantage of being present in relatively large amount as compared with the acetone-soluble constituent. As it does not, however, respond to magnesia to the same extent as the latter substance, and, as certain results (not included in this paper) indicate that the extraction with acetone does not cause a marked degradation of this protein material into the soluble variety, we have not made reference to it.

[15] Agricultural Bulletin Federated Malay States, 5 (1915), 38.

[16] German Patent 273,482 (November 22, 1912).

[17] The India Rubber World, 61 (1919), 137.

[18] It is interesting to note that Dekkar's figures for the nitrogen in the acetone extract of Hevea crêpe (when calculated on a protein basis) are very close to the amounts of the accelerators employed in these experiments.

rubber after vulcanization. The action of these accelerators, *per se*, is another problem entirely. We are convinced, however, that in many instances both the action and effect of organic accelerators are dependent in great extent upon the presence of certain mineral substances in the mixture.

EXPERIMENTAL PART[19]

The experimental procedure was similar in all respects to that of our former experiments. Essentially it differs from that of Stevens only in the method of vulcanizing, and in the substitution of straight pieces for physical tests in place of the rings employed by him. The relative effects of vulcanization in steam and in a platen press are commented upon later.

Two samples of thin, pale, first latex crêpe (*Hevea*) were used. Sample 408 was from the lot of rubber that was used in our former experiments, while Sample 444 was chosen from another lot of equally good appearance, which was found to have different chemical and physical characteristics when employed in factory mixtures.

A partial analysis of the two rubbers gave the following results. No great importance, however, is attached to the figures for total nitrogen.

	No. 408, Per Cent	No. 444, Per Cent
Total ash	0.26	0.29
Acetone extract	2.62	2.99
Total nitrogen	0.19	0.20

The extra light magnesia (specific gravity 3.45) was the best grade obtainable. It lost 4.00 per cent on ignition, after which it contained 93.67 per cent MgO. Accelerator A was prepared by the condensation of an amine with formaldehyde and was C. P. grade.

The conditions of milling and making physical tests were identical with those previously employed, but, as comparisons were made after the method of Stevens, the physical properties of the different mixtures at break have been omitted.

Sulphur determinations were made by our method[20] in place of that of Rosenstein-Davies.[21] The coefficients represent the combined sulphur of vulcanization expressed as a percentage of the rubber in the mixture.

Throughout the work all cures were made in a platen press of the usual type. Stevens' samples were wrapped with cloth and vulcanized in steam.[22]

Experiment I. This work consisted virtually of a repetition of the previous work, using the sample of rubber (No. 408) previously employed, but substituting extra light magnesia for the heavy calcined material used in our former experiments. The

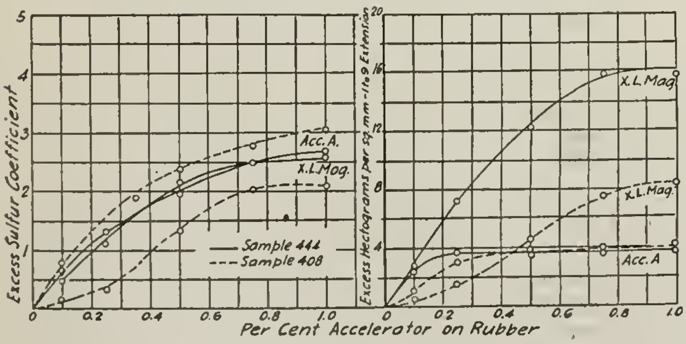

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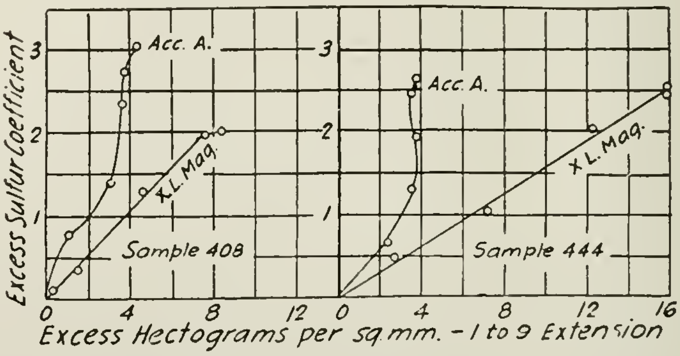
Fig. 1. Relation Between Sulphur Coefficients and Amount of Accelerator, and Between Amount of Accelerator and Load Required to Effect a Given Extension

results are given in detail in Table I,[23] and the relation between sulphur coefficients and amount of accelerator is shown graphically in Fig. 1. The relation between the amount of accelerator and the load required to effect a given extension is also shown in Fig. I. In both cases these results confirm previous ones, even to the shape of the curves themselves. As has already been stated, if accelerators (such as our Accelerator A) are present in the mixture even in small amount, it is evident that the load required to effect a given extension is not a measure of the physical properties of the mixture, nor is it a reliable criterion of the rate of cure of the vulcanized mixtures.

Table I—Tests on Rubber No. 408

Accelerator	Accelerator Per Cent	Sulphur Coefficient Actual	Sulphur Coefficient Excess	Load in Hectograms per Sq. Mm. to Effect Extension: 1 to 7 Actual	1 to 7 Excess	1 to 8 Actual	1 to 8 Excess	1 to 9 Actual	1 to 9 Excess
Extra light magnesia	Control	0.580	.....	0.34	....	0.42	....	0.50	....
	0.10	0.704	0.124	0.58	0.24	0.74	0.32	0.94	0.44
	0.25	0.916	0.336	1.03	0.69	1.37	0.95	1.98	1.48
	0.50	1.874	1.294	2.09	1.65	3.20	2.78	5.11	4.61
	0.75	2.553	1.973	3.03	2.69	4.84	4.42	8.17	7.65
	1.00	2.599	2.019	3.21	2.87	5.17	4.75	8.92	8.42
Accelerator A	Control	0.580	.....	0.34	....	0.42	....	0.50	....
	0.10	1.356	0.776	0.88	0.54	1.10	0.68	1.61	1.11
	0.25	1.987	1.407	1.70	1.36	2.25	1.83	3.57	3.07
	0.50	2.925	2.345	2.14	1.80	2.77	2.35	4.23	3.73
	0.75	3.309	2.729	2.16	1.82	2.72	2.30	4.32	3.82
	1.00	3.603	3.023	2.30	1.96	2.98	2.56	4.81	4.31

Experiment II. This consisted of a repetition of Experiment I upon Sample 444. The results are given in Table II, and the



The Journal of Industrial and Engineering Chemistry

Fig. 2. Relation Between Coefficient of Vulcanization and Load at a Given Extension

relation between sulphur coefficients and the amount of accelerator, and between the amount of accelerator and the load required to effect a given extension, are shown in Fig. 1. On the basis of the sulphur coefficients, Accelerator A and extra light magnesia appear to be of almost equal activity; or, conversely, Sample 444 vulcanizes at the same rate with either accelerator. When judged by the load required to effect a given extension, however, extra light magnesia appears to be much the more active. As it is now almost generally conceded that sulphur coefficients afford the most reliable indication of the state of cure, the load required to effect a given extension is again seen to be unreliable as an indication of the rate of cure of accelerated mixtures. These results have strengthened our former opinion that unless a complete series of stress-strain measurements are made, when

[19] In collaboration with Bernard J. Shapiro.

[20] The India Rubber World, 61 (1920), 356.

[21] The Chemist-Analyst, 15 (1916), 4.

[22] Stevens in his first paper on this subject has mentioned the possibility of a difference in the rate of cure of accelerated mixtures when vulcanized in dry heat. We have found similar mixtures which contained magnesia to show increasingly large sulphur coefficients when vulcanized, respectively, in dry heat, platen press, and open steam. This was not found to be true, however, for mixtures which contained organic accelerators. With the latter, results obtained in a platen press were frequently higher than those obtained in open steam. Evidently many organic accelerators are partially soluble in, or volatile with steam and, consequently, results obtained with these substances in open steam are apt to be low. This point is of considerable importance, and accounts in large part for the difference in the results obtained by Stevens and ourselves. We have found that most uniform results are obtained with samples encased in molds and vulcanized in open steam.

[23] The results obtained and shown in this table are somewhat higher than those originally found, and which were given in Table I of our former paper. This discrepancy may be attributed to a change in the rubber itself, as the sample used in the present instance had aged for over one year in roll form in a partially broken-down condition before the experiment was repeated. Also, the method previously employed for the estimation of combined sulphur was found to give slightly low results for mixtures which contained but small amounts of mineral substances.

the results of physical tests are taken as measure of the rate or state of cure of accelerated mixtures, such measurements must be made at or near the point of break of the respective mixtures. The effect of such small amounts of accelerators on the elongation of vulcanized mixtures has already been commented upon in our previous article. In contradistinction to Stevens' view, we do not regard the composition of a mixture as fixed when different accelerators are used, even if they are employed in amount less than 1 per cent on the rubber.

Table II—Tests on Rubber No. 444

Accelerator	Accelerator Per Cent	Sulphur Coefficient Actual	Sulphur Coefficient Excess	Load in Hectograms per Sq. Mm. to Effect Extension 1 to 7 Actual	1 to 7 Excess	1 to 8 Actual	1 to 8 Excess	1 to 9 Actual	1 to 9 Excess
Extra light magnesia	Control	1.009	.....	0.53	....	0.67	....	0.78	....
	0.10	1.482	0.473	1.55	1.02	2.08	1.41	3.44	2.66
	0.25	2.117	1.108	2.75	2.22	4.42	3.75	8.01	7.23
	0.50	3.132	2.123	3.88	3.35	7.09	6.42	13.08	12.30
	0.75	3.440	2.431	5.11	4.58	8.97	8.30	16.65	15.87
	1.00	3.552	2.543	5.14	4.61	8.37	7.70	16.69	15.91
Accelerator A	Control	1.009	.....	0.53	....	0.67	....	0.78	....
	0.10	1.678	0.669	1.49	0.96	2.04	1.37	3.21	2.43
	0.25	2.317	1.308	1.95	1.42	2.53	1.86	4.41	3.63
	0.50	2.938	1.929	2.20	1.67	3.05	2.38	4.62	3.84
	0.75	3 437	2.428	2.16	1.63	2.83	2.16	4.33	3.55
	1.00	3.685	2.676	2.40	1.87	3.19	2.52	4.64	3.86

In his second communication,[24] Stevens has drawn attention to the relationship between the coefficient of vulcanization and the load at a given extension. Our present results, for Samples 408 and 444, expressed in the same manner, are shown graphically in Fig. 2. It is at once evident in both cases that they differ markedly from the results obtained by Stevens. In the case of the mixtures which contained magnesia, the curves for both rubbers are practically straight lines up to coefficients of about 2.0 to 2.5, and, as Stevens has already noted, the excess load required to effect a given extension affords a fair measure of the rate of cure. In the case of Accelerator A, however, these curves are not straight lines, which shows that the load required to effect a given extension is not a measure of the rate of cure, as indicated by sulphur coefficients. Evidently, both rubbers vulcanize at almost the same rate when this accelerator is employed.

Both Stevens' and our own results are subject to the same interpretation. Our Accelerator A has been shown to decrease the load required to effect a given extension, namely, has increased the elongation as compared with extra light magnesia. It is quite possible, however, that Stevens' Accelerator I induced a greater resistance to extension under a given load than our Accelerator A. Furthermore, it is not entirely out of the question to select an organic accelerator which would actually increase the resistance to extension to more than that obtained with a similar quantity of extra light magnesia.

Experiment III. A comparison was made of the results obtained with the two rubbers before and after extraction with acetone.

A 10-gram sample of the rubber was sheeted thin and extracted with acetone in a Soxhlet apparatus for 36 hours. At the end of this time, the sample was dried *in vacuo* to constant weight and resheeted. The mixture was made by carefully sieving the required amount of sulphur and accelerator into the sheeted rubber and then rolling into a cylinder. The sample thus prepared was squeezed between the rolls of the mill to press the ingredients into the rubber without loss of either sulphur or accelerator. Subsequently, it was thoroughly mixed by resheeting and rerolling until a homogeneous mix was obtained. After the samples had been allowed to age for 24 hours they were vulcanized in a button mold in the platen press and the combined sulphur estimated in the usual manner. Owing to the small size of the samples,[25] no physical tests were made.

The results of this experiment are shown in tabular form in Table III. It is seen that, despite the small size of the samples employed, the results obtained with the unextracted rubbers are in good accord with those previously found for similar quantities of the accelerator (Tables I and II). In the case of the extracted rubbers, however, this was not true.

Table III

	Sample 408: Unextracted Rubber, Sulphur Coefficient	Sample 408: Unextracted Rubber, Excess Coefficient	Sample 408: Extracted Rubber (Ext. 36 Hrs.) Acetone Ext. = 2.62, Sulphur Coefficient	Sample 408: Extracted Rubber, Excess Coefficient	Sample 444: Unextracted Rubber, Sulphur Coefficient	Sample 444: Unextracted Rubber, Excess Coefficient	Sample 444: Extracted Rubber (Ext. 36 Hrs.) Acetone Ext. = 2.99, Sulphur Coefficient	Sample 444: Extracted Rubber, Excess Coefficient
Control ...	0.580	....	0.831	.....	1.009	.....	1.000	.....
Extra light magnesia, 0.5 per cent	1.874	1.294	1.290	0.459	3.132	2.123	1.343	0.343
Accelerator A, 0.5 per cent	2.925	2.345	3.204	2 373	2.938	1.929	3.424	2.424

After extraction with acetone and vulcanization with the assistance of Accelerator A, Samples 408 and 444 were both found to have approximately (slightly higher) the same sulphur coefficients as were obtained with the unextracted rubbers, which have already been shown to be almost equal to each other. The extracted samples which were vulcanized with the assistance of extra light magnesia, however, gave entirely different results. Although the unextracted samples had sulphur coefficients of 1.874 and 3.132, respectively, the same mixtures, when prepared with acetone-extracted rubbers, had approximately the same sulphur coefficient, 1.3.

It would appear that Sample 444 differed from Sample 408 quite markedly in the nature or condition of its acetone-extractable components. Although we recognize that the extraction with acetone may not be without effect upon the rubber or upon the extraneous substances left in the rubber, it would appear that, if the acetone-soluble substances are removed, not only is the response of the two rubbers to the accelerating influence of extra light magnesia decreased in both instances, but also the excess sulphur coefficients obtained are small and almost equal. The excess coefficients obtained were, indeed, so little above their controls that it would appear that a more complete removal of these extraneous substances would prove extra light magnesia to be almost inactive as an accelerator. As Accelerator A functions equally well with both rubbers, either before or after extraction, when judged on the basis of the sulphur coefficients obtained, the results obtained with it require no further comment.

Final emphasis is placed upon the fact that all results were obtained with mixtures of rubber, sulphur, and accelerator only, and that the amounts of accelerators employed were small in all instances.

CONCLUSIONS

In view of the above experimental results, we are warranted in drawing the following conclusions:

I—The activity of small amounts of magnesia as an accelerator is largely of a secondary or contributory character, and acts in conjunction with, or obtains a response from, certain extraneous substances (probably nitrogenous) present in the rubber.

II—The activity of small amounts of magnesia is limited by the amount and nature of these extraneous substances originally present in the rubber.

[24] Loc. cit.

[25] It was obvious that the physical properties of the control mixture and the mixture which contained magnesia were very inferior to similar mixtures of unextracted rubber. This was not true, however, for the mixture which contained Accelerator A; the physical properties of this mixture were good and not greatly below a similar mixture prepared from unextracted rubber.

The Effect of Compounding Ingredients on the Physical Properties of Rubber[1]

By C. Olin North

RUBBER COMPOUNDING

It is generally realized that the compounding of rubber is more or less of an art. It depends solely on a large number of uncorrelated and apparently unrelated facts. It is hoped that in time this art will become a science with facts, theories and laws so well substantiated that guess work and experiments will be reduced to a minimum.

Before this ideal condition can be attained both rubber testing and compounding must make considerable progress. Tensile strength and ultimate elongation are important but tell only a very small part of the whole story. Tests are needed which will give us true measures of hardness, toughness, plasticity, resiliency, internal friction, hysteresis, and many other properties.

The purpose of this paper is to present some data as to the effect of certain common compounding ingredients on rubber and to propose a method of visualizing the peculiar behavior of these substances.

It should be mentioned in the beginning that the tests on which this work is based are very crude from the standpoint of scientific accuracy but it is believed that the values obtained, the curves, etc., are relative and as such will be more or less of interest to other rubber technologists.

COMPOUNDING EXPERIMENTS

It was realized in the beginning that the usual weight method of compounding was not only valueless but misleading. Consequently a basis of 100 volumes of rubber was chosen to which were added volumes of the different fillers varying from zero to fifty.

In the first experiments it was thought desirable to use a small quantity of accelerator, for which purpose thiocarbanilide was selected. Later this practice was discontinued and in all but two of the experiments (barytes and zinc oxide) described below, no curing agent other than sulphur was employed. A selected grade of pale crêpe was used with all fillers except barytes. Stocks were prepared on small experimental mixing rolls and sheets were vulcanized in the usual manner, in molds maintained at 140 degrees C. in a hydraulic press. Physical tests were performed on a Cooey testing machine.

Some years ago Dr. Warren K. Lewis called our attention to the fact that we were measuring tensile strength at the expense of ultimate elongation. In the present methods of testing, tensile strength is figured on the area of the test piece under no load. This is very unfair to a stock high in rubber since the actual area at break is considerably smaller than the original area and the relative decrease in cross-section of a soft stock is much greater than for one heavily loaded.

TENSILE STRENGTH AT BREAK

Assuming that the volume of a stock remains constant throughout elongation, it can be readily shown that the tensile at break can be arrived at by multiplying the tensile strength figured on the area at rest, by the final length and dividing by the original length. Thus,—

Let L = the load necessary for rupture
W = width of a test piece before stretching
d = distance between the marks
t = thickness of the test piece
V = the volume = wdt
T = tensile figured on cross-section at rest
T' = tensile at break

Let $w'd't$ and V' represent the respective dimensions at break

Since $V = V'$ by assumption, then $wdt = w'd't'$

$$T = \frac{L}{wt} \qquad T' = \frac{L}{w't'}$$

$$\therefore\ Twt = T'w't'$$

$$\text{and } T' = \frac{Twt}{w't'} \qquad \text{But } wdt = W'd't'$$

$$\therefore\ \frac{wt}{w't'} = \frac{d'}{d}$$

$$\text{Substituting, } T' = \frac{T \times d'}{d}$$

Unfortunately the volume of a test piece does not remain constant during elongation as has been shown by Schippel.[2] Consequently a correction factor should be used if absolute accuracy is desired.

Another method of taking into account the decrease in area and the corresponding increase in length is by Stevens' "tensile product," which is obtained by multiplying the ultimate elongation by the tensile strength as usually calculated. When dealing with hard rubbers where the elongation is practically zero, this method is absurd since the tensile product becomes zero. However, on soft stocks it is a satisfactory unit of comparison. It is convenient when working in English units to divide by 10,000. Tensile product is a less logical method of attack than tensile at break but since the curves, when plotted against volumes of filler, are parallel and the former is rather generally used by rubber technologists this unit was chosen for the comparisons given below. Correction factors are necessary for absolute accuracy as in the case of tensile at break, but in our experiments we did not use them, partly because of the small error introduced by volume change of the test piece and partly because of the lack of information about this phenomenon.

[1] Read before the Rubber Division of the American Chemical Society, at the St. Louis meeting, April 12-16, 1920.

[2] Industrial and Engineering Chemistry, Vol. 12—1, page 33.

TABLE I

DATA ON BARYTES (GROUND WHITE)

Ratio Vol. Barytes to 100 Vol. Rubber	Per Cent by Weight				Per Cent by Volume		Best Cure at 40 lbs. Steam	Tensile Strength Lbs. Sq. In.	Elong. Per Cent	Permament Set Per Cent	Tensile Product T x E ÷ 10,000	Values Corrected to 100 Volumes of Rubber		
	Rubber	BaSO4	S	Thiocanbanilide	Rubber	BaSO4						Tensile Strength Lbs. Sq. In.	Elong. Per Cent	Tensile Product
0.5	89.5	2.03	5.58	2.79	99.5	.5	1 hr. 45 min.	1805	925	10	167	1820	930	168
1.	87.7	3.99	5.48	2.74	99.	1.	1 hr. 55 min.	2065	975	10	202	2090	986	204
2.	84.5	7.66	5.28	2.64	98.1	1.9	1 hr. 35 min.	2055	988	10	203	2090	1005	207
3.	81.3	11.09	5.06	2.53	97.1	2.9	1 hr. 55 min.	1790	950	10	170	1841	988	175
6.	73.2	19.9	4.58	2.29	94.4	5.6	1 hr. 55 min.	1712	950	10	163	1820	1005	173
8.	68.6	24.95	4.29	2.15	92.6	7.4	1 hr. 55 min.	1960	975	10	191	2120	1050	206
11.	62 6	31.5	3 92	1 96	90 1	9.9	1 hr. 45 min.	1732	950	15	165	1930	1055	183
15.	56.3	38.4	3.52	1.76	87.0	13.0	1 hr. 45 min.	1805	950	20	172	2080	1090	198
20.	49.9	45.45	3.12	1.56	83.4	16 6	1 hr. 45 min.	1695	900	20	153	2030	1080	184
25.	44.8	51.	2.8	1.4	80.	20.	1 hr. 45 min.	1638	925	25	151	2040	1158	189
30.	40.1	56.1	2.51	1.26	76.9	23.1	1 hr. 45 min.	1398	825	25	115	1820	1075	150
35.	37.2	59.2	2.36	1.18	74.1	25.9	1 hr. 35 min.	1328	788	25	105	1790	1060	142
40.	34.4	62.3	2.19	1.1	71.4	28.6	1 hr. 45 min.	1325	788	30	104	1860	1105	146
45.	31.8	64.9	2.18	1.09	68.9	31.1	1 hr. 35 min.	1332	738	25	98	1935	1070	142
50.	29.55	67.6	1.88	.94	66.7	33.2	1 hr. 45 min.	1300	713	35	93	1950	1070	140

TABLE II

DATA ON TRIPOLI

Ratio Vol. Tripoli to 100 Vol. Rubber	Per Cent by Weight			Per Cent by Volume		Best Cure 40 Pounds Steam	Tensile Strength Lbs. Sq. In.	Elong. Per Cent	Permanent Set Per Cent	Tensile Product T x E ÷ 10,000	Values Corrected to 100 Volumes of Rubber		
	Rubber	Tripoli	Sulphur	Rubber	Tripoli						Tensile Strength Lbs. Sq. In.	Elong. Per Cent	Tensile Product
0.5	90.8	.91	8.27	99.5	.5	2 hr. 30 min.	2660	913	13	243	2670	918	244
1.	90.1	1.79	8.19	99.	1.	2 hr. 45 min.	2775	900	15	249	2800	910	251
3.	86.9	5.17	7.9	97.1	2.9	2 hr. 45 min.	3110	875	15	272	3200	900	280
6.	82.6	9.85	7.5	84.4	5.6	2 hr. 45 min.	2960	850	25	252	3140	900	269
8.	80.	12.7	7.26	92.6	7.4	2 hr. 45 min.	2810	813	20	228	3030	876	246
11.	76.3	16.8	6.95	90.1	9.9	2 hr. 15 min.	2530	725	25	183	2800	804	203
15.	71.9	21.5	6.54	87.	13.	2 hr. 30 min.	2275	700	20	159	2620	805	183
20.	67.1	26.7	6.11	83.4	16.6	2 hr. 45 min.	2000	625	35	125	2400	750	150
25.	62.9	31.3	5.72	80.	20.	2 hr. 30 min.	1985	538	35	107	2480	670	134
30.	59.3	35.4	5.4	76.9	23.1	2 hr. 15 min.	1700	588	42	100	2210	765	130
35.	56.	39.	5.1	74.1	25.9	2 hr. 45 min.	1550	450	35	70	2090	608	94
40.	51.5	43.9	4.69	71.4	28.6	2 hr. 15 min.	1400	388	35	54	1970	540	76
45.	48.8	46.8	4.44	68.9	31.1	2 hr. 15 min.	1280	310	25	40	1860	455	58
50.	46.4	49.5	4.24	66.7	33.2	2 hr. 45 min.	1342	310	30	42	2010	460	63

TABLE III

DATA ON LITHOPONE

Volume Lith. to 100 Vol. Rubber	Per Cent by Weight			Per Cent by Volume (Neglecting S)		Best Cure at 40 Lbs. Steam	Tensile Strength Lbs. Sq. In.	Elongation Per Cent	Permanent Set Per Cent	Tensile Product	Values Corrected to 100 Volumes of Rubber		
	Rubber	Lithopone	Sulphur	Rubber	Lithopone						Tensile Strength Lbs. Sq. In.	Elongation Per Cent	Tensile Product
.0	91.	.0	9.	100.	....	2 hr. 15 min.	2660	940	6	250	2660	940	250
2.	83.9	7.58	8.39	98.1	1.9	2 hr. 30 min.	2645	860	8	228	2700	875	232
6.	72.9	19.83	7.29	94.4	5.6	2 hr. 40 min.	2450	840	8	206	2590	891	219
11.	62.5	31.1	6.25	90.1	9.9	2 hr. 30 min.	2340	820	10	192	2590	908	213
15.	56.1	38.1	5.61	87.	13.	2 hr. 40 min.	1910	790	16	151	2200	910	174
20.	49.9	45.1	4.99	83.4	16.6	2 hr. 30 min.	1970	810	16	160	2370	973	192
25.	44.7	50.9	4.47	80.	20.	2 hr. 30 min.	2020	740	16	150	2520	927	188
30.	40.6	55.4	4.06	76.9	23.1	2 hr. 30 min.	1960	690	20	135	2550	898	176
35.	37.3	59.	3.73	74.1	25.9	2 hr. 30 min.	1595	630	26	101	2150	848	136
40.	34.5	62.1	3.45	71.4	28.6	2 hr. 30 min.	1525	600	16	92	2140	841	129
45.	31.9	65.	3.19	68.9	31.1	2 hr. 20 min.	1355	545	22	74	1970	794	108
50.	29.7	67.4	2.97	66.7	33.2	2 hr. 40 min.	1495	570	18	85	2240	855	128

TABLE IV

DATA ON MAGNESIUM CARBONATE

Ratio Volumes $MgCO_3$ to 100 Vol. Rubber	Per Cent by Weight			Per Cent by Volume		Best Cure at 40 Lbs. Steam	Tensile Strength Lbs. Sq. In.	Elongation Per Cent	Permanent Set Per Cent	Tensile Product	Values Corrected to 100 Volumes of Rubber		
	Rubber	$MgCO_3$	Sulphur	Rubber	$MgCO_3$						Tensile Strength Lbs. Sq. In.	Elongation Per Cent	Tensile Product
.0	91.	.0	.9	100.	.0	2 hr. 15 min.	2660	940	6	250	2660	940	250
2.	87.5	3.76	8.75	98.1	1.9	1 hr. 50 min.	3120	850	8	266	3180	866	271
6.	81.4	10.5	8.14	94.4	5.6	1 hr. 40 min.	3480	810	16	282	3690	860	299
11.	74.85	17.69	7.48	90.1	9.9	1 hr. 40 min.	3480	770	32	242	3480	855	269
15.	70.3	22.7	7.03	87.	13.	1 hr. 50 min.	3320	790	44	262	3820	908	302
20.	65.4	28.	6.54	83.4	16.6	1 hr. 40 min.	2920	685	52	200	3500	822	241
25.	61.1	32.8	6.11	80.	20.	1 hr. 20 min.	2670	630	44	168	3340	788	210
30.	57.4	37.	5.74	76.9	23.1	1 hr. 20 min.	2170	505	48	110	2830	658	144
35.	54.	40.6	5.4	74.1	25.9	1 hr. 20 min.	1950	455	42	87	2630	600	117
40.	51.1	43.8	5.11	71.4	28.6	1 hr. 20 min.	1670	350	32	58	2340	490	81
45.	48.3	46.8	4.83	68.9	31.1	1 hr. 20 min.	1695	305	44	52	2470	440	76
50.	45.9	49.5	4.59	66.7	32.2	1 hr. 20 min.	1695	210	48	36	2540	315	54

TABLE V

DATA ON ZINC OXIDE

Ratio Volumes ZnO to 100 Vols. Rubber	Per Cent by Weight				Per Cent by Volume		Best Cure at 40 Lbs. Steam	Tensile Strength Lbs. Sq. In.	Elongation Per Cent	Permanent Set Per Cent	Tensile Product	Values Corrected to 100 Volumes of Rubber		
	Rubber	ZnO	Sulphur	Thiocarbanilide	Rubber	ZnO						Tensile Strength Lbs. Sq. In.	Elongation Per Cent	Tensile Product
.0	90.	....	10.	....	100.	.0	2 hr. 15 min.	2560	890	4	228	2560	890	228
.5	86.3	2.55	7.76	3.33	99.5	.5	45 min.	3120	750	5	234	3140	755	235
2.	80.21	9.46	7.2	3.08	98.1	1.9	40 min.	3140	735	8	231	3200	750	235
4.	73.3	17.3	6.58	2.82	96.25	3.75	40 min.	3060	690	7	211	3180	718	220
6.	67.42	23.86	6.06	2.6	94.4	5.6	50 min.	3290	705	10	232	3490	746	246
11.	56.21	36.54	5.05	2.16	90.1	9.9	35 min.	3295	690	16	228	3660	765	252
15.	49.65	43.92	4.46	1.91	87.	13.	35 min.	3295	656	17	216	3790	755	249
20.	43.32	51.04	3.88	1.68	83.4	16.6	35 min.	3070	655	22	201	3690	786	241
25.	38.39	56.7	3.45	1.48	80.	20.	35 min.	3000	585	24	176	3750	732	220
30.	34.5	61.1	3.1	1.29	76.9	23.1	35 min.	2900	550	26	159	3770	715	207
35.	31.31	64.61	2.82	1.21	74.1	25.9	35 min.	2795	510	29	143	3770	687	193
40.	28.7	67.7	2.58	1.10	71.4	28.6	35 min.	2285	485	27	111	3210	680	156
45.	26.45	70.2	2.38	1.02	68.9	31.1	50 min.	2140	455	32	97	3110	660	142
50.	24.48	72.28	2.19	.94	66.7	33.2	35 min.	2105	450	30	95	3160	675	142

TABLE VI

DATA ON GAS BLACK

Ratio Volumes of Black to 100 Vol. Rubber	Per Cent by Weight			Per Cent by Volume		Best Cure at 40 Lbs. Steam	Tensile Strength Lbs. Sq. In.	Elongation Per Cent	Product T x E. ÷ 10,000	Permanent Set Per Cent	Values Corrected to 100 Volumes of Rubber		
	Rubber	Black	Sulphur	Rubber	Black						Tensile Strength Lbs. Sq. In.	Elongation Per Cent	Tensile Product
.0	90.	.....	10.	....	....	2 hr. 30 min.	2600	900	2340	6	2600	900	234
.5	90.2	.83	9.	99.5	.5	2 hr. 45 min.	2720	920	2500	10	2740	925	251
2.	88.	3.23	8.8	98.1	1.9	2 hr. 45 min.	2880	840	2420	13.5	2930	855	247
4.	84.8	6.2	8.5	96.2	3.8	3 hr. 00 min.	2900	820	2388	14	3020	853	247
6.	82.5	9.13	8.25	94.4	5.6	2 hr. 45 min.	2940	790	2320	15	3120	838	246
8.	80.2	11.8	8.	92.6	7.4	3 hr. 00 min.	3040	780	2370	17	3280	843	256
11.	76.8	15.6	7.68	90.1	9.9	3 hr. 00 min.	3260	760	2480	22.5	3620	843	275
15.	72.5	20.2	7.25	87.	13.	3 hr. 00 min.	3420	700	2390	27	3940	805	275
20.	68.2	24.8	6.8	83.4	16.6	2 hr. 45 min.	3770	640	2410	32.4	4530	770	279
30.	60.5	33.5	6.0	76.9	23.1	2 hr. 45 min.	3800	545	2070	40	4940	710	269
35.	57.3	36.9	5.7	74.1	25.9	2 hr. 45 min.	3700	510	1890	43	4980	688	255
40.	54.4	40.2	5.4	71.4	28.6	2 hr. 30 min.	3480	410	1430	40	4880	575	200
45.	51.8	43.	5.18	68.9	31.1	2 hr. 30 min.	3420	365	1250	46	4980	530	182
50.	49.4	45.6	4.9	66.7	33.2	2 hr. 45 min.	3300	320	1055	48	4950	494	158

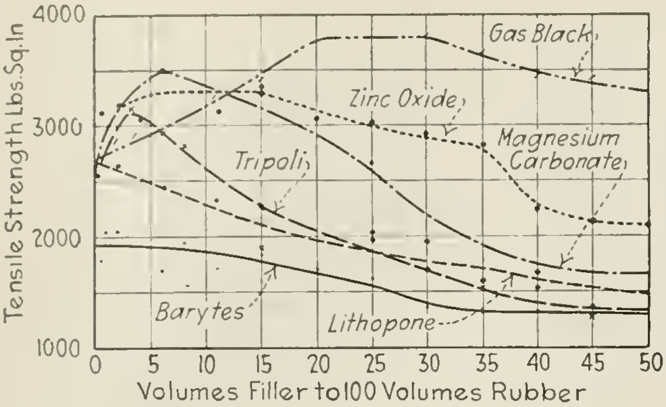


Fig. 1

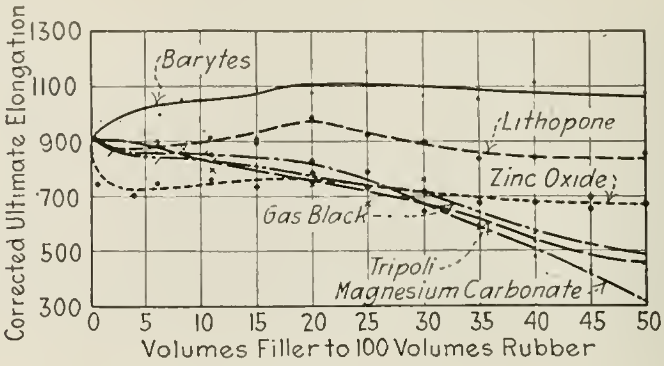


Fig. 5

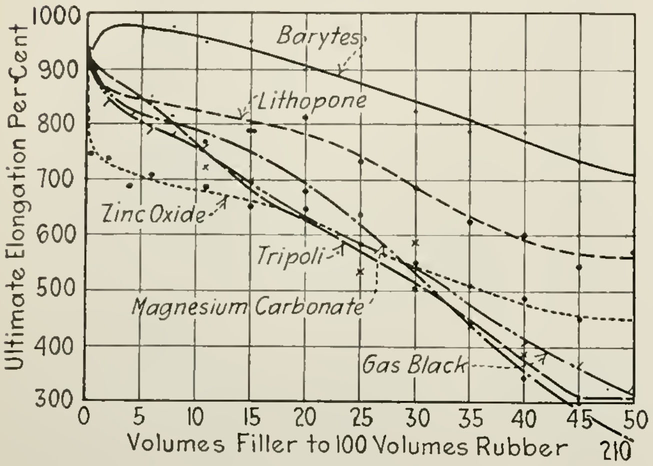


Fig. 2

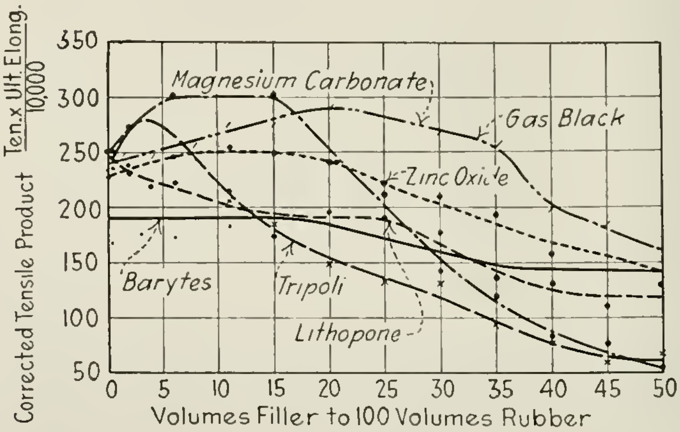


Fig. 6

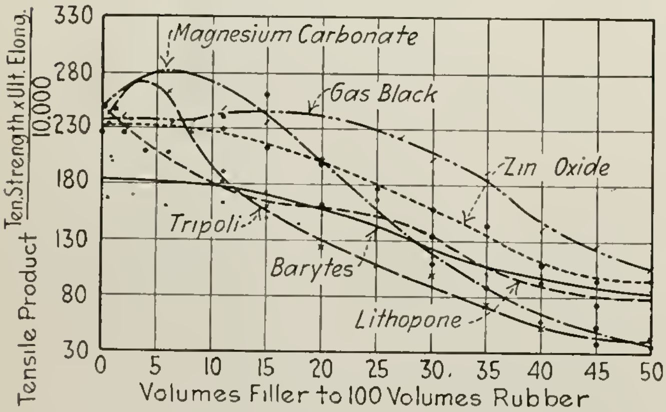


Fig. 3

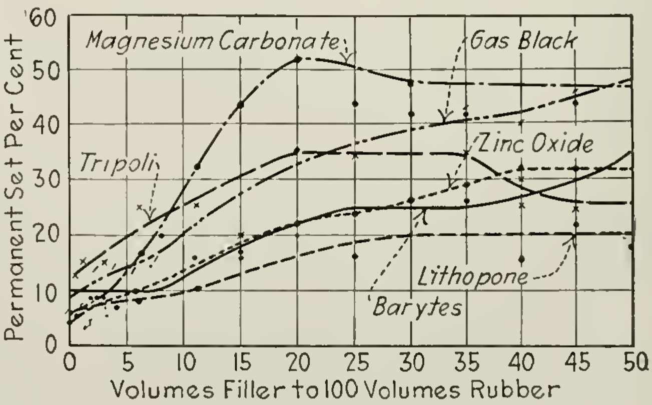


Fig. 7

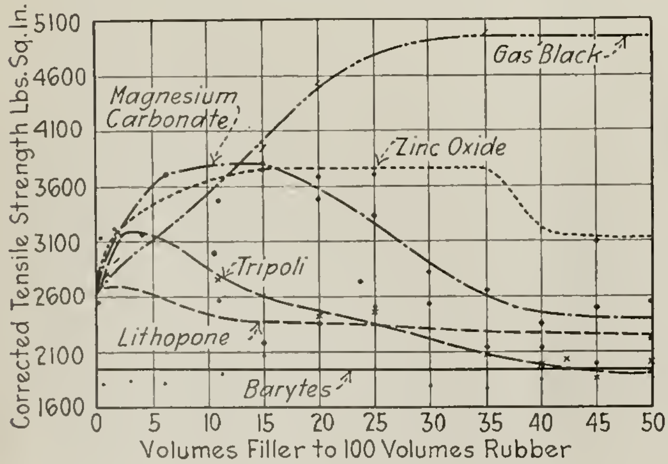


Fig. 4

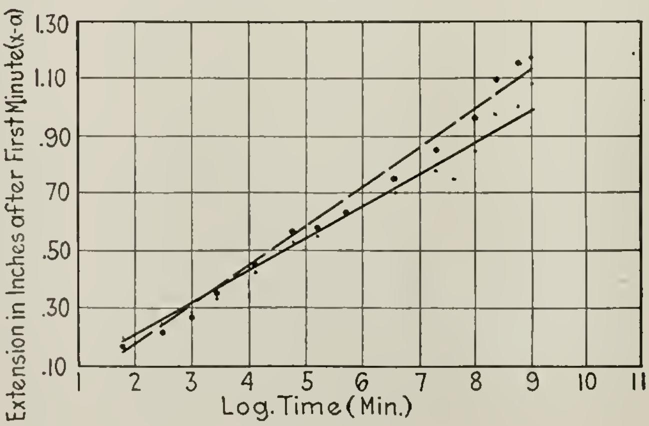


Fig. 8

In order to ascertain the effect of the different fillers on the rubber, the device of figuring tensile strength, ultimate elongation and tensile product back to the actual volume of rubber present was tried out and found to be of value.

The present state of compounding demands a simple procedure whereby fillers can be compared with regard to their effect on rubber regardless as to how that effect is produced.

Assuming that the effective area is that obtained by subtracting the area occupied by the particles of filler from the total area of the test piece one can refer the test back to the proportional quantity of rubber present by dividing the difference by the percentage by volume of rubber and multiplying by 100. For example, referring to Table IV we find that the stock containing 25 volumes of magnesium carbonate to 100 volumes of rubber (80 per cent rubber and 20 per cent $MgCO_3$ by volume) has a tensile strength of 2,670 pounds per square inch. The ultimate elongation is 630 per cent and the tensile product 168. Correcting these values to the relative quantity of rubber present by multiplying them by 100 ÷ 80 gives 3,340 pounds per square inch as the corrected tensile, 788 per cent corrected elongation, and 210 as the corrected tensile product. The term "corrected" which is used throughout the paper always indicates that the value has been corrected back to a basis of 100 volumes of rubber.

Complete data of the various experiments are recorded in tables I to VI, inclusive. This information has been reduced to curves, Figs. 1 to 7 inclusive.

Barytes—You will note that this filler causes a continuous decline in tensile until 35 volumes to 100 volumes of rubber is reached. From this point the curve comes to a "flat."

Lithopone—This filler also causes a decided falling off in tensile.

Tripoli—Infusorial earth, etc., shows a maximum above 3,000 pounds per square inch at 3 volumes to 100 volumes of rubber after which there is a decided falling off, due perhaps to cutting action of the sharp particles.

Zinc Oxide—The variety used here was New Jersey Red XX. You will note that its curve comes up to a flat at 5 volumes to 100 volumes of rubber, remains constant until 15 volumes and then falls gradually until 35 volumes is reached. Beyond this point the fall is rapid.

Magnesium Carbonate—This filler comes up to a maximum at 6 volumes to 100 volumes of rubber and then falls off gradually.

Gas Black—The curve rises gradually to 20 volumes, remains constant until 30 volumes and falls off slowly.

ULTIMATE ELONGATION

Barytes—This filler stands out over all the others as having least effect on the elongation.

Lithopone—Is next to barytes.

Magnesium Carbonate, Gas Black and Tripoli—These all produce about the same falling off.

Zinc Oxide—This produces a somewhat greater drop in elongation, at the beginning of the curve.

TENSILE PRODUCT

Magnesium Carbonate—Shows the highest values but rapidly falls off when over 15 volumes are employed.

Gas Black—Holds practically constant until 20 volumes and then falls away.

Lithopone and Barytes—Both are quite low.

Tripoli—Comes up and then rapidly goes down, indicative that both tensile and elongation are markedly affected by increase in filler.

Zinc Oxide—Shows a rather steady falling off.

The above curves are satisfactory only as far as they go. The methods employed do not permit one to analyze the effects of the filler and to differentiate between simple decrease in tensile with decrease in rubber and increase in tensile due to some peculiar property or action of the filler. By using the corrected values we eliminate the effect of decreasing the actual rubber content of the stock.

TENSILE STRENGTH, CORRECTED VALUES

Barytes—It is remarkable how well the evidence supports the view that this filler has no effect on the stock. The straight line curve is not absolutely accurate considering the data but it is believed to be very close to the truth.

Lithopone—Falls off to about 2,400 pounds per square inch and then very gradually declines.

Tripoli—Shows the same behavior as in other curves which would indicate some peculiar behavior of the filler, probably a cutting action by the siliceous skeletons of the diatoms.

Zinc Oxide—Comes up to a maximum at 15 volumes and remains constant until 35 volumes is reached. At this point we have a decided falling off in corrected tensile. This value can be taken as the maximum quantity which may be added without overloading.

Magnesium Carbonate—Shows a maximum value from 6 to 15 volumes beyond which it shows a marked decline.

Gas Black—Shows a continued increase until 30 volumes is reached. Beyond this point the curve remains constant. Apparently black has a stiffening or toughening action on rubber.

ULTIMATE ELONGATION

Barytes and Lithopone—Have very little effect on the elongation. The values obtained are not far from those secured with pure gum.

Tripoli, Gas Black and Magnesium Carbonate—Show about the same effect, namely, a gradual decrease with increased filler.

Zinc Oxide—Gives a more or less flat curve which does not show such a marked decline as the others.

TENSILE PRODUCT (CORRECTED)

These curves require considerable study. The previous conclusions are substantiated.

Magnesium Carbonate—Is shown to give excellent results up to 15 volumes.

Gas Black—Increases the corrected tensile product up to 20 volumes after which the curve declines, thus indicating that the increase in tensile, as ordinarily figured, is more or less at the expense of elongation.

Zinc Oxide—Comes to a maximum at 11 volumes to 100 volumes of rubber.

Lithopone, Barytes and Tripoli—Function as before.

PERMANENT SET

On Fig. 7 data as to the relative permanent sets of the respective stocks are plotted. The method of obtaining permanent set was worked out by E. L. Davies and the writer and was described by my colleague in a letter accompanying the methods proposed by the Rubber Testing Committee.

The curves all show a decided increase in set, namely, plasticity, with increased filler. The very high set obtained with 20 volumes of magnesium carbonate explains why American compounders have not used this filler to any marked extent.

NETWORK STRUCTURE OF RUBBER

It is desirable for the better understanding of compounding phenomena to form a mental picture of the probable internal structure of rubber. The conception presented below is given solely as a vehicle for thought.

As a working hypothesis let us assume that vulcanized rubber consists of plastic material and elastic fibers. There is evidence that some such condition actually exists. For instance, elastic fibers are indicated by the following:

(1) It is well known that high-grade stocks have a noticeable grain when calendered, that is, they tear in the direction the stock has been run. This is as true for pure gum as for compounded stocks. Grain in rubber is somewhat analogous to grain in wood. See Table VII.

(2) Calendered stocks have higher tensile strength and lower ultimate elongation with the grain than across it.

(3) Previous stretching (see Bulletin No. 38, Bureau of Standards) increases tensile strength. See Tables VIII and IX.

That plastic material is present is indicated by:

(1) Test pieces in which a set has been developed tend to recover their original length. Set decreases with time after release. Pure gum recovers in 8 hours 75 per cent of the original set (measured after 10 minutes). See Table X.

(2) Schwartz (Schidrowitz, "Rubber," page 241) pointed out that elongation under constant load follows the equation:

$$x = a + b \log t$$

when x = elongation at the end of an interval of time t
a = elongation at the end of the first minute
b = a constant depending on the plastic flow of the stock.

EXTENSION

Fig. 8 shows $(x-a)$ plotted against $\log_e t$ for a heavily loaded black stock under 25 pounds load. The curve is a straight line which shows that the equation actually holds.

This indicates that rubber consists in part of a plastic substance which may be regarded as a supercooled liquid which probably forms a matrix for the elastic fibers.

(3) That the set is due to plastic material is indicated by the fact that it is decidedly increased when a material known to be plastic, as for example mineral rubber, is added.

Returning to the hypothesis that rubber consists of plastic material and elastic fibers, it is recognized that the colloidal aggregates $(C_{10}H_{16})_x$, doubtless vary considerably in size. The chief difference between plastic and elastic matter would appear to be in the size of the aggregate.

Vulcanization produces a profound change in the properties of rubber. In the uncured condition it is weak and plastic. Properly vulcanized, it is strong, elastic and resistant to repeated flexing. The polymerizing influence of sulphur is well known in organic chemistry.

TABLE VII

Variation of Tensile Strength and Ultimate Elongation with Direction of Grain

Stock	No. 1	No. 2	No. 3
Tensile Strength			
Longitudinal	2,730 lbs. sq. in.	925 lbs. sq. in.	10,550 lbs. sq. in.
Transverse	2,675 lbs. sq. in.	625 lbs. sq. in.	3,160 lbs. sq. in.
Elongation Ult.			
Longitudinal	630 per cent	90 per cent	....
Transverse	640 per cent	210 per cent	....
	Cheap tread	Cheap mechanical	Asbestos packing

Is it not possible that the chief effect of vulcanization is the locking up or polymerization of these colloidal aggregates? Plastic material probably also unites with sulphur but since it is composed of much smaller aggregates the effect is not so marked. If this is the case we may regard vulcanized rubber as consisting essentially of a vast network of very fine fibers linked up and strengthened in some way by sulphur. This network extends throughout the plastic materials present and also completely surrounds and incloses any filling material that may be present in the stock. It is to this network that the writer attributes the desirable properties of rubber such as its strength, its elasticity, its resistance to repeated flexing and its ability to be compounded.

TABLE VIII

Stock	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
Tensile strength, lbs. sq. in.						
Single stretch	2470	1740	990	1710	750	930
Repeated stretch	2610	1960	1180	1790	790	920
Ultimate elongation, per cent.						
Single stretch	645	665	510	460	430	375
Repeated stretch	765	780	645	555	440	465

(Bureau of Standards, Bulletin No. 38, page 41, Table 6.)

Carrying this picture farther let us consider an ordinary fishing net. Empty, it can be stretched out to a rather great length. But when it is full of fish it is no longer possible to alter the shape to anything like the previous extent. The fish act as struts and keep the sides of the net distended. If you will imagine many nets closely interwoven and embedded in plastic material, you have the writer's conception of rubber. When compounding material is introduced the net is distended and there is a strut action which prevents ready change of position.

Examples of similar conditions are found in reinforced concrete and in the mordanting or weighing of fabric. In the second case we have merely interposed particles among the fibers of the cloth in such a way that they are no longer free to move. In other words we have wedged them into position, consequently, the fabric has become stiffer, less pliable, and its tensile strength has been greatly increased.

Applying the same idea to a compounded stock it would appear that the increase in tensile strength of a stock produced by compounding ingredients is due to two principal effects:

First, that filling material so distends the network reinforcement of rubber that the stock becomes stiffer, less stretchy and its tensile strength as measured on the area at rest is increased because a greater area is presented at break.

The second and more important effect is due to the influence of the compounding ingredient on the closeness of weave of this net. Rubber doubtless contains colloidal aggregates of different lengths. When a coarse compounding ingredient is added, only the long fibers become effective in constructing the network around the particles. Consequently the resulting stock has a loose weave. It tears readily, the ultimate elongation is not greatly influenced and the tensile strength of the rubber has not been increased. A typical representative of this class is ground barytes.

TABLE IX

Effect of Repeated Stretching and Suspension Under Load on Tensile Strength and Ultimate Elongation

Stock: Compounded rather heavily; chiefly with gas black.

Tensile strength, lbs. per sq. in.:	
Single stretch	2960
Stretched twice to 75 per cent breaking elongation	3200
Suspended 135 hrs. under 25 lbs. load	3950
Ultimate elongation per cent.:	
Single stretch	585
Stretched twice to 75 per cent breaking elongation	675
Suspended 135 hrs. under 25 lbs. load	475

When the compounding material is very finely divided, the short colloidal aggregates also become effective in looping up the particles of filler. The more finely divided the ingredient the more fibers that are rendered effective. In this case the network reinforcement is closely woven and contains the maximum number of loops, each of which is more or less wedged and anchored in place by the particle it incloses. The resulting stock is close grained. It does not tear easily and has a high tensile strength. Gas black is the best example of this type. It has perhaps the finest state of division of all compounding ingredients known to date and its effect on rubber is more marked than that of any other filler. Its tensile strength and tensile product values, when corrected back to the actual volume of rubber present, are exceptionally high. It produces, when properly handled, a closer grain than can be obtained with any other material. Zinc oxide is a close second to black in point of fineness and from a compounding standpoint its position is admittedly the same.

TABLE X

Decrease of Set with Time

Time After Release	A Per Cent	B Per Cent	C Per Cent	D Per Cent	E Per Cent	F Per Cent	G Per Cent
10 minutes	8	19	10	26	24	34	37
20 minutes	6	18	8	26	22	31	34
40 minutes	4	17	8	24	20	30	33
1 hour	4	17	8	24	20	30	33
2 hours	4	16	6	24	20	29	33
4 hours	2	16	6	23	20	28	32
6 hours	2	15	6	22	19	27	30
8 hours	2	15	6	22	18	27	30
Recovery in 8 hours	6	4	4	4	6	7	7
Recovery based on set in 10 minutes	75	21	40	15.4	25	20.6	19

Method—Stretched to 75 per cent the breaking stretch (ultimate elongation) held 10 minutes. Released and measured at intervals after release.

Stocks: A—pure gum; lbs. B—cheap friction; C—friction; D—low specific gravity tread; E—high specific gravity tread; F—cheap tread; G—mechanical.

The author wishes to thank Messrs. C. W. Bedford, E. L. Davies, and Dr. W. K. Lewis for many ideas and suggestions which have been incorporated into this paper.

What the Rubber Chemists Are Doing

FIREPROOFING AIRSHIP FABRICS[1]

The following notes are abstracted from a report by Guy Barr, B. A., B. Sc., of official tests on proofing airship fabrics against ignition by gum fire.

The special fabric (B. 29) under test was of treble cotton and rubber, and had been doped on the exterior surface with aluminum dust suspended in "soluble gun-cotton." Comparison of results was made with similar tests made on an ordinary yellow treble balloon fabric.

A rubbered fabric does not continue to burn if locally sparked, unless the heat supplied by the lighting agent plus that due to the small quantity of fabric consumed is sufficient to cause decomposition of the subjacent rubber. If the heat reaching the rubber is at any point too small to cause the distillation of volatile vapors therefrom, the conflagration is not transmitted to that point. The combustion of rubber requires a very much greater volume of air than that of cotton, and the supply of air being limited, the diffusion of the inflammable rubber decomposition products is the preponderating agent in the spread of the fire.

The wads used for these comparisons were made by cutting out disks of cardboard of the correct diameter from a sheet of such thickness that the effect of placing one of these disks on a piece of balloon fabric was the same as that caused by wads removed from a few .303-inch cartridges.

COMPARISON OF FABRICS

When the treble yellow fabric was compared with B. 29, it was found that the former was occasionally burnt completely through by the smoldering wad, and nearly always damaged as far as the innermost cotton layer. With B. 29 the dope was not only not a source of danger in this respect, but the fabric was actually somewhat protected. A wad would occasionally damage the innermost layer, but usually the outer two layers were alone attacked, and in no case was a hole burned right through. These results were further confirmed in the presence of hydrogen confined under a pressure of about an inch and a half of water by a piece of the fabric attached to a suitable vessel. In spite of repeated attempts the fabrics were not burnt through by the wad in either case, and even when, by the successive application of three or four wads, a hole had been burned, the gas which escaped did not catch fire. In fact, wads smoldering with sufficient energy to cause their complete combustion were found to be unable, at any rate in the half-dozen tests made under laboratory conditions, to ignite hydrogen or hydrogen-air mixtures.

In the above cases the damage done to the fabric by a smoldering wad was sufficient to cause a considerable local reduction of strength, together with a good deal of softening of the rubber. The position of the damage was, of course, readily visible by the blackening of the yellow fabric, but the aluminum-doped B. 29 showed very little trace of the incident on a cursory examination. It was only when the burnt spot was rubbed with a pencil or other moderately hard body that the white film of metallic powder was removed, and the scorching rendered visible.

FIRE RESISTANCE OF FABRICS

The resistance to fire of these fabrics is thus somewhat small, nor can any considerable protection be expected from any ordinary fireproofing, however efficient, applied to the different plies of cotton. After consideration it was decided that the most promising method of attack lay in the provision of an outer metallic coating. The attachment of metal foil appeared to offer almost insuperable difficulties, but the following method of procedure was found to afford a very gratifying measure of resistance to ignition by smoldering:

Various inventors have occupied themselves with the problem of spraying metallic coatings on woodwork, ironwork, etc., with the idea of forming a coat to resist atmospheric influences. The latest and most practical apparatus for the purpose is one due to Schoop, some details of the use of which are given in a paper by Morcom (Institute of Metals).

The principle of the method is briefly the feeding of a wire of the metal to an oxy-hydrogen blow-pipe flame, where the molten metal is atomized by a blast of air external to and concentric with the oxy-hydrogen flame. The particles of molten metal are rapidly cooled by the air-blast, and reach the surface to be coated at a temperature very slightly above or possibly below their melting-point. In virtue of their velocity, and perhaps also of their high temperature, they adhere firmly to the object to be coated. The cooling and scattering is sufficient to insure that no undue rise of temperature occurs on the sprayed surface.

A small sample of single rubbered fabric was sprayed with aluminum by this process in order to see whether the fireproofing was of any value. It was found that a smoldering wad which would burn a hole through a treble fabric scarcely affected this sample beyond slightly softening a small portion of the rubber. This effect was largely due to the heat conductivity of the metallic surface. The tensile strength of the sample was not affected by the spraying. It is therefore evident that the metallic particles are sufficiently small and well-cooled to do no damage to the cotton. This being the case, it is reasonable to conclude that the rubber, and hence the permeability will also be unaffected.

THE PRESERVATION OF VULCANIZED RUBBER[2]

The statement that vulcanized rubber kept in a tin box over a layer of ordinary kerosene remains in a serviceable condition for a much longer period than if kept in air, led Dr. H. P. Stevens to test the preservative effect of kerosene and other vapors. The results confirmed the claims made for kerosene vapor and also showed that water vapor has a similar or even more marked effect.

From experimental results, particularly the constancy of the acetone extracts after aging, it appears that the preservative action of water or kerosene vapor is due to an actual chemical preservation of the vulcanized rubber. These agencies inhibit or retard the chemical changes, including oxidation of the rubber, which normally take place when vulcanized rubber is aged in air, as shown by increase in weight and increase in acetone extract, but they do not retard the physical changes sometimes known as "after-vulcanization," as shown by the tensile strength and reduction of distensibility (reduced final strength) of test rings kept in air saturated with water vapor. We may therefore distinguish two changes which normally take place when vulcanized rubber ages: firstly, a physical change comprising an initial increase in tensile strength (if the specimen is not appreciably overcured), and a gradual reduction in final length; Secondly, a chemical deterioration, consisting mainly in an oxidation with a slight loss of sulphur in a volatile form. The extent of the chemical change is conditioned (1) by the coefficient of vulcanization, the higher the coefficient the more rapid the oxidation, (2) by the atmosphere surrounding the specimen,

[1]Reports and Memoranda, No. 178, (British) Advisory Committee for Aeronautics.

[2]Journal of the Society of Chemical Industry, July 31, 1920, page 251.

and (3) by the temperature. Doctor Stevens does not at this stage put forward a theory to account for the preservative action of the water vapor, as further experiments to this end are in progress.

CONCLUSIONS

1. The life of vulcanized rubber is prolonged by storing in air saturated with moisture or petroleum vapor. Even overcured rubber can be preserved by this means for six or seven months at tropical temperatures.

2. Preserved under these conditions, the acetone extract does not increase, showing that the rubber is protected from oxidation and decomposition. Nevertheless, the physical changes characteristic of "after-vulcanization" proceed normally.

3. In dry air the chemical change (oxidation) takes place more rapidly than in air containing moisture, and an increase in the acetone extract takes place.

4. As the oxidation of soft vulcanized rubber takes place the more rapidly the higher the coefficient, and is accompanied by an increase in the coefficient, and as vulcanized rubber, when perished, tends to become soluble in acetone, the percentage of combined sulphur or coefficient in such case should be based on the weight of the specimen after acetone extraction.

VISCOSITY OF RUBBER SOLUTIONS[1]

In investigating the viscosity of rubber solutions, the following method was used by the Delft rubber laboratories:

About one gram of the finely cut up rubber sample is placed in a hollow flask and shaken on the machine with 100 cc. chemically pure benzol, boiling point 80 degrees C, until the rubber is about 80 per cent dissolved. The solution is filtered through glass wool and the viscosity measured in Ostwald's viscosimeter, of the Fol type, at constant temperature, in diffused light. The first number is taken as the basis. The test is repeated in order to guard against errors. This always shows low values. The time taken to flow out divided by the time taken to flow out of pure benzol gives the relative viscosity. The concentration was determined by evaporating 25 cc. of the solution.

FACTORS INFLUENCING RESULTS

Influence of the Light and of the Discharge Through a Capillary on the Viscosity of Rubber Solutions. It is recommended that the work be carried out in a subdued light and to use the first observation of the viscosity.

Influence of Moisture and of Acid on the Viscosity of Rubber Solutions. While water appears to play no great part in the determination, acid, even in traces, must be kept out for a correct determination.

Influence of Incomplete Solution on the Viscosity of Rubber Solutions. The resins are more easily soluble than the rubber, therefore if the solution is not complete enough low viscosity numbers will be obtained, while if agitation is carried too far the nitrogen compounds dissolve and the viscosity is raised. In all cases the greatest part of the rubber must be dissolved, otherwise the viscosity numbers must be taken with reservation.

Influence of the Nature of the Solvent on the Viscosity of Rubber Solutions. It was found that the quotient of the relative viscosity of various rubbers for two different solvents is not constant, that it is proportionately greater with rubbers having high viscosities than with those of less viscosity. It is therefore important that the same solvent should be used if a comparison is to be made.

Influence of the Resinous Bodies on the Viscosity of Rubber Solutions. Extracted rubber shows a less viscosity than crude rubber. This is not a fact which applies to all cases. The separation of the resin causes this diminution of the viscosity or it may be the extraction treatment. In any case it is not possible from a solution of the resins on the one hand and the extracted rubber on the other by mixing these to form a mixture in which the original viscosity is raised.

Influence of Sulphur and Compounds on the Viscosity of Rubber Solutions. The simple mixing of sulphur and compounding materials does not change the viscosity. In the calculation it is only necessary to bear in mind the change of the concentration due to the compounding ingredients.

The Importance of the Viscosity Determination. There exists an actual relationship between the viscosity and the tensile strength. The viscosity also shows the important factors concerning the quality of the rubber.

The Measurement of the Swelling Power of the Rubber Gives Valuable Conclusions Concerning the Quality of the Rubber. However, as yet, not enough work has been done on this property to give definite results. The swelling power is proportional to the viscosity.

[1] Communications of the Netherland Government Institute for Advising the Rubber Trade and the Rubber Industry, Delft, Holland.

LABORATORY APPARATUS.

FLASK SHAKING DEVICE

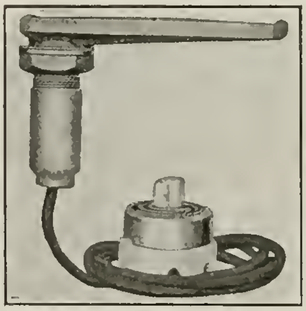
A patented device for securely clamping and shaking a half dozen flasks at one time is shown in the illustration. The size of the flasks held may vary from six to 24 ounces capacity. The use of this machine greatly facilitates the operations of solution or precipitation where much routine work of such character is involved.

Clamp Shaking Machine

The power required for operation of the apparatus is about one-sixth horse-power. The machine is arranged for attaching to a bench by screws and is connected by a round leather belt to a motor.—Eimer & Amend, 211 Third avenue, New York City.

IMMERSION HEATER FOR LABORATORY

The new immersion type water heater shown herewith, consists of nickel-chromium heating elements incased in a flat brass casting which protects them from mechanical injury, and making a simple and durable heater that is easily cleaned. When protected in this manner the life of the heating elements is increased, requiring less frequent renewals than with the ordinary immersion type heater.



Electric Water Heater

This heater is particularly useful in the chemical laboratory for heating or evaporating water in any shallow container, and may also be used with glue pots, paste kettles, sterilizers and other apparatus.

To install the heater, a 1¼-inch hole is drilled through the bottom of the container and the heater inserted from the top, so the extension through which the cord is run projects downward through the hole. Tightening the nuts and washers holds the heater rigid and prevents leakage.

By means of a snap switch on the heater cord three different heats may be obtained: 1,200 watts, 600 watts and 300 watts. Standard heaters are made for 110, 120, and 220 volts, and may

be used on direct-current or alternating-current circuits.—The Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin.

CHEMICAL PATENTS

THE UNITED STATES

Water-Proof Sheet and Process. A flexible, tough and substantially water-proof sheet of material made up of uniform intimately united layers, one of which is composed of nitro-cellulose and rubber, and the adjacent layer being composed of rubber.—Charles Weber, Newark, New Jersey, United States patent No. 1,350,533.

Coated Fabric and Process. The process consists in coating a fabric with rubber, applying a liquid coating constituting a clear vulcanizing varnish, embossing the coated fabric and then vulcanizing both coatings simultaneously.—John A. Wilson, Elizabeth, assignor to The Duratex Co., Newark, both in New Jersey. United States patent No. 1,352,163.

THE DOMINION OF CANADA

Ebonite Substitute Process consisting in dissolving vulcanized new rubber in drying oils to which melted paraffine wax, stearine, resin or similar products have been previously added, heating and mechanically mixing the mixture, subsequently adding finely divided absorbing filling material and vulcanizing to a soft elastic material.—The Naamlooze Vennootschap Nederlandsche Maatschappij tot Exploitatie van Optimietfabrieken, assignee of Salmon van Raap, both of Amsterdam, Holland. Canadian patent No. 202,817.

Tire Filler. A composition of matter consisting of any heavy vegetable oil, 32 pounds; oxide of magnesium, about one pound; ultra-marine, about two pounds; oakum, about one and one-half pounds; and chloride of sulphur, from six to ten pounds.—Irving Gray, Champion, Alberta, Canada. Canadian patent No. 202,966.

Coumarone Resin. The process of making coumarone resin which comprises polymerizing the polymerizable constituents of solvent naphtha boiling from 160-180 degrees C., settling, removing any sludge, distilling the unchanged solvent naphtha from the products of polymerization in subjecting the latter to distillation under a high vacuum whereby a hard resin is obtained.—The Ellis-Foster Co., Montclair, New Jersey, assignee of Louis Rabinovitz, Pomona, New York. Canadian patent No. 203,100.

Packing Ring. A molded and vulcanized piston packing ring comprising in its composition rubber, sulphur, short asbestos fiber, and ground sponge, the rubber constituting a minor proportion of the mass by weight.—The H. W. Johns-Manville Co., New York City, assignee of George Christensen, Plainfield, New Jersey. Canadian patent No. 203,356.

THE UNITED KINGDOM

Synthetic Resins. Polymerized coumarone, etc. The acid solution obtained by the treatment of solvent naphtha with sulphuric acid is neutralized by agitation with dry powdered alkali carbonate or alkaline earth carbonate. The agitation is frequently effected by injection of air. Alkali or alkaline earth peroxides may be added with the carbonate. The solution is clarified by standing, filtering, or centrifuging, and freed from volatile hydrocarbons by distillation.—G. S. Walpole, 121 Victoria street, Westminster, London. British patent No. 145,415, not yet accepted.

Compound Sheet Materials. A method of uniting two or more layers of dissimilar materials, particularly plastic materials which are difficult to stick together, as rubber with other plastic materials. For example, a gas proof and liquid tight fabric may be prepared by coating a fabric foundation with acetyl-cellulose as a gas proof layer, then applying the intermediate layer before the acetyl-cellulose is completely dry; and finally applying a liquid tight layer of nitro-cellulose.—Gesellschaft, fur Verwerthung Chemicher Produkte, 11 Ehrenbergstrasse, Berlin, Germany. British patent No. 145,544, not yet accepted.

GERMANY

Manufacture of Dimethyl-butadiene. Pinacone chlorhydrin is treated with compounds which will combine with hydrochloric acid but do not contain hydroxyl groups, namely, ammonia or organic bases. A mixture of water and dimethyl-butadiene is obtained by distilling a mixture of pinacone chlorhydrin and dimethylaniline between 60 degrees and 80 degrees C.—Farbenfabricken formerly F. Bayer & Co., German patent No. 319,505.

Vulcanization. Method for the acceleration of the vulcanization of caoutchouc.—Dr. Johann Francois Barthold van Hasselt, Rotterdam, Holland. German patent No. 325,306.

Substances Similar to Rubber. Method of manufacture.—Gustav Rath, 136 Feldstrasse and Dr. Erich Asser, 19 Ahornstrasse, both in Wandsbeck, Germany. German patent No. 327,913.

Caoutchouc Products. Method for the prevention of the oxidation of synthetic caoutchouc products.—Badische Anilin-und-Soda-Fabrik, Ludwigshafen, Germany. German patent application No. 85,671, February 26, 1918.

Synthetic Rubber. Method for the production of product similar to caoutchouc.—Badische Anilin-und-Soda-Fabrik, Lud-Farbenfabricken formerly F. Bayer & Co. German patent No. 319,505.

A NEW SOLVENT

In a recent communication to the American Chemical Society at St. Louis, Professor V. Leuber stated that the selenium oxychloride obtained as a waste product in the electrolytic refinery of copper has remarkable solvent properties. It dissolves all the unsaturated hydrocarbon such as acetylene, benzene, toluene, etc., while the paraffine hydrocarbons such as gaseous kerosene and the mineral waxes were unaffected. Some vegetable oils react violently with the selenium oxychloride. This easily dissolves vulcanized rubber as well as the unvulcanized material, and bakelite, waterproof casein glue, asphalt and bitumen also dissolve in the oxychloride. The reagent also extracts the bituminous material from soft coal, leaving a carbonaceous residue.

INTERESTING LETTERS FROM OUR READERS

GUTTA PERCHA IN THE PHILIPPINES

To the Editor:

Dear Sir:—

Are not the opportunities that await American rubber growers in the Philippines almost as great in the cultivation of gutta percha in that territory of the United States? Nearly all the gutta percha produced in the islands (and last year it was 38,030 kilos, valued at $18,476) was shipped to Singapore and thence to Europe and the United States. According to the Secretary of the Department of Commerce and Communications, a considerable export trade in gutta percha with the United States can be built up readily by having American buyers in the Philippines, by establishing a regular market in the United States for gutta percha, and by arranging for direct shipments.

Carlos Luz

Manila, P. I., September 10, 1920.

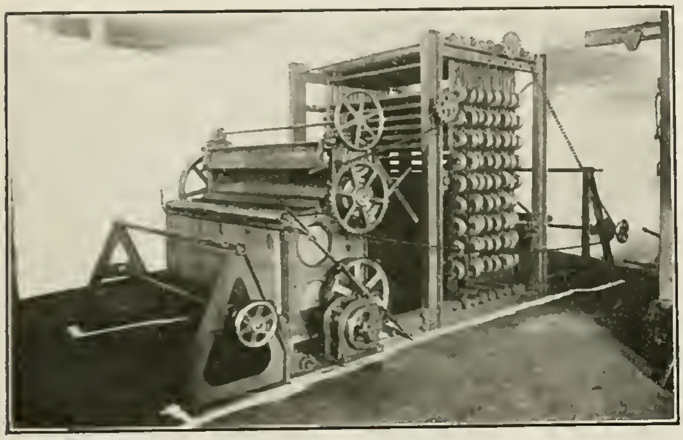
Gutta percha cultivation is of course possible and greatly to be desired. It would, however, be difficult to get capital to back it. The reason is that the tree is of exceedingly slow growth and many years must elapse before a profitable crop could be gathered. So far the only successful cultivation of gutta is that begun years ago by the Dutch in Java, the funds being supplied by the Government.—The Editor.

New Machines and Appliances

MACHINE FOR IMPREGNATING CORD TIRE FABRICS

Cord fabrics used in the manufacture of cord tires are impregnated with rubber solution before the skim coat is applied by the calender. That constant improvement is being made in the design and construction of impregnators is shown in the accompanying illustration.

The fabric from the stock roll is fed over a smoothing roller and into the tank, where it becomes saturated with the rubber solution. From the tank the saturated web passes between pressure rollers as adjusted, that the solution is forced into the



Cord Fabric Impregnator

interstices of the fabric in an even and thorough manner. The impregnated fabric is then passed in festoons between the steam-heated coils of the dryer, where the solvent is evaporated. While not a part of the equipment, a solvent recovery apparatus can be attached to this machine.

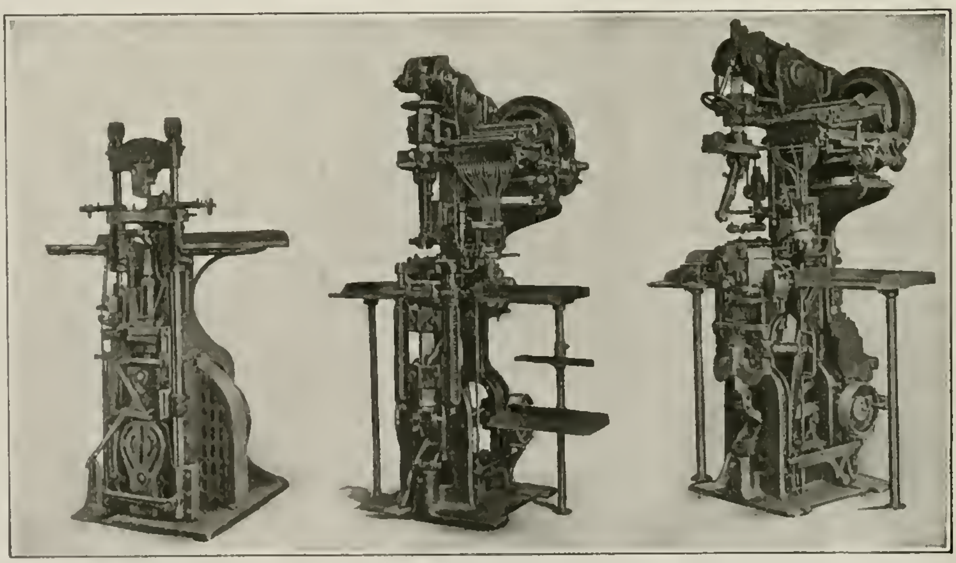
After drying the impregnated fabric is wound up on a stock shell and is ready for the final skim coat.—The Banner Machine Co., Columbiana, Ohio.

RUBBER HEEL ATTACHING MACHINES

Standard machines used for nailing, or for loading and attaching leather heels to shoes are shown herewith. All three can be equipped for rubber heel attaching in connection with rubber heels which have been laid out and constructed for machine attaching.

The type of machine selected is governed by the kind of shoe to be manufactured, the amount per day to be made, and the territorial conditions. It requires a complete special nailing outfit, in comparison with that used for leather heel attaching, this outfit being made from a heel of each size and style to be attached. The outfit includes a rubber heel locating ring which supports the heel while the nails are being driven, to prevent expansion of the heel, which would cause the location of nail holes to be changed.

The celluloid rubber heel template shows the proper alinement of the nail holes in rubber heels for machine attaching. This is a reproduction of the die on the heeling machine, and the celluloid template is in no way used as a drilling template or fixture. Any selection or grouping of nail holes may be made from this template for any size or style of rubber heel, using the back center hole for the men's sizes, and the front center hole, which is ½-inch ahead of the back hole, for women's sizes.

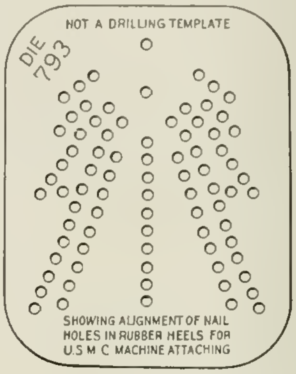


American Lightning Nailing Machine

McKay Automatic Heel Loading and Attaching Machine, Model A

McKay Automatic Heel Loading and Attaching Machine, Model B

As the compound used in heels by different rubber manufacturers varies considerably, the shrinkage in the finished heel varies. Therefore, in order to locate the washer pins in the heel molds correctly, a nailing should be selected from the celluloid template, each manufacturer figuring his individual shrinkage, and the washer pin in the mold located properly to compensate for this shrinkage, so that the holes in the finished rubber heel will line up with the holes in the template, as described above.—United Shoe Machinery Corporation, Albany Building, Boston, Massachusetts.



Celluloid Template

MACHINE FOR CUTTING SAMPLE TIRE SECTIONS

This device, according to the manufacturer, affords a great saving in labor, time and money over the old makeshift methods of cutting sample sections from tires. It cuts clearly through any tire section, fabric or cord, including the steel bead inserts ordinarily used. Each cut is accurate and true toward the center of the tire, clearly showing up the tire construction. It will handle any size tire up to and including an 8-inch cross-section. The maximum width of the sample cut is three inches. An entire tire can be cut up into samples without any waste.

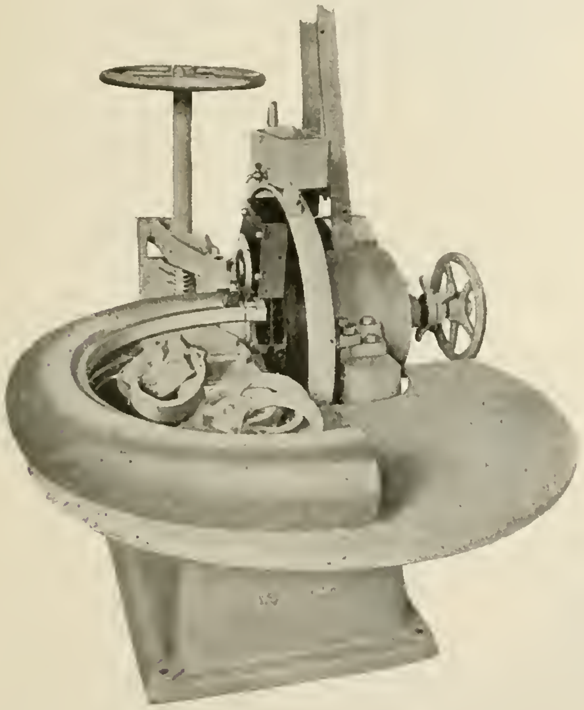
The machine is compactly built on a rigid base casting. The working table in front is adjusted for each size tire. The mandrel for holding the work is located above the end of the table and in line with the main bearing. The circular cutting knife rotates around the forward end of the mandrel.

The operation of the machine is simple. A mandrel of the correct size is set up and the circular knife is advanced into

contact with the mandrel. Then the limit stop on the right-hand side of the machine is set on the feed-screw. The tire is cut and the open end is placed over the mandrel, projecting a distance beyond the knife equal to the width of the sample desired. The vise is adjusted and closed, holding the tire firmly around the mandrel. The knife advances through the work to the limit setting of the feed-screw. A small amount of water from the water tank each minute insures easy cutting.

Each machine is supplied with two mandrels, for 3-inch and 4½-inch tires, and two circular cutting knives.

The manufacturer announces that the sample section cutter is not furnished with motor, but that a ½-h.-p. motor running at 1800 r. p. m. geared down to give a speed of 60 r. p. m. to the rotating knife may be used with it. A belt shaft is constructed to shift the belt on machines equipped with motors.—Peerless Machine Company, Racine, Wisconsin.



Sample Section Tire Cutter

BURT VENTILATORS FOR RUBBER FACTORIES

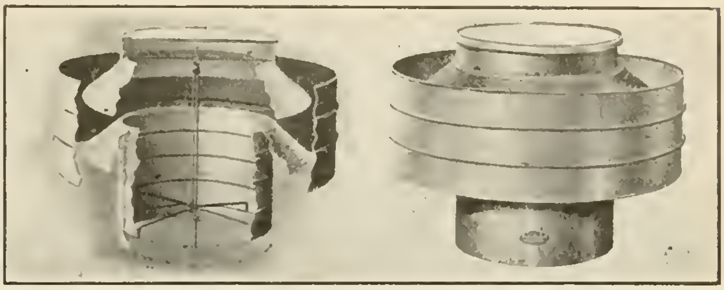
A decided improvement in ventilators is this new glass-top style. It should be of interest to all rubber manufacturers, not only as an aid in economically solving the problem of correct ventilation, but also as a means of securing better lighting facilities.

The ventilator is stationary and immovable. Impure air, steam or gas from the building is automatically drawn up and fresh air supplied without lowering the temperature inside too far for comfort. There is no other expense attached to the equipment outside of the original cost of the ventilators, which are simple in design and noiseless.

The damper is constructed in such a manner that the air shaft always remains free and open. Back currents of air are eliminated. At no time does the ventilator become clogged up with ice, snow or other substances. It is said that during calm weather any movement of the outer air is sufficient to cause an upward flow of air in the air shaft, thus drawing out the hot air and supplying fresh air.

Another advantage of the glass-top ventilator is the fact that the light cannot be shut off, even when the damper is closed. It is further affirmed that where this combination ventilator and skylight is used, no other form of skylight is necessary.

The ventilator is of heavy galvanized iron. The sectional view illustrates the ingenious way in which the damper is opened or closed. A cord attached to the damper is run through a small pulley suspended from the bar at the top. The damper itself is a rounded piece of galvanized iron fitted inside of the outer walls of the air shaft.—Burt Manufacturing Co., Akron, Ohio.



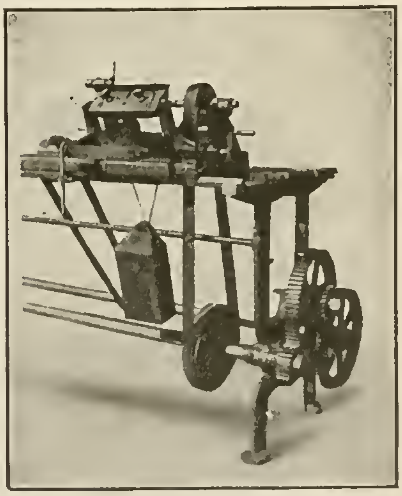
Glass-Top Ventilator

Sectional View — Outside View

MACHINE FOR CUTTING HARD RUBBER COMBS

Dressing combs of hard rubber are molded in presses, and after vulcanization the teeth are cut on specially designed machines of the type shown in the illustration.

This machine feeds and stops automatically. The weight draws the comb down on the saw that cuts the first tooth, and a cam then raises the comb from the saw which is carried along the space for one tooth by a cam and rack. This continues until all the teeth have been sawed, when the machine stops. The rack and cam can be taken out and others substituted if a different number of teeth to the inch are to be sawed.



Dressing Comb Sawing Machine

These machines are usually operated in gangs, 15 machines being operated by one operator who can turn out under favorable conditions 1,200 to 1,500 dressing combs a day.

The machine for sawing teeth in fine combs also feeds and stops automatically. It is similar to the dressing comb sawing machine, except in size.—The College Point Mold & Engraving Co., 714 Seventh Avenue, College Point, Long Island, New York.

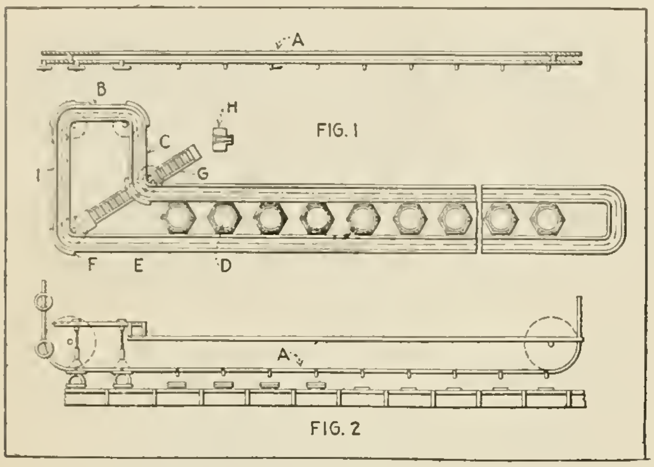
MACHINERY PATENTS

TIRE MOLD CONVEYING SYSTEM

This invention comprises a system of conveyors and mold-handling apparatus operating continuously, whereby the tire molds are filled, moved in and out of the vulcanizers, and the cured tires removed from the molds which are then cleaned and refilled. Referring to the illustration, Fig. 1 is a plan view at the plane of the vulcanizers, and Fig. 2 is a side elevation.

Suspended on hooks, the uncured tires and cores are successively delivered by the conveyor A to the loading station B, where they are placed in the molds. At station C the upper mold halves are lowered and registered with the lower halves, when the molds are delivered to the heaters D. At the same time molds are being discharged from the heaters and conveyed

to station E where they are opened, the upper halves being elevated by the conveyor. The tires are then removed from the molds at station F and placed on the conveyor G which de-



Tire Mold Conveyor

livers the tire to the stripping machine H. As the mold halves pass station I they are cleaned preparatory to receiving the uncured tires.—Carmon A. Meyers, assignor to Firestone Tire & Rubber Co., both of Akron, Ohio. Canadian patent, No. 200,863.

OTHER MACHINERY PATENTS

THE UNITED STATES

No. 1,350,696 Vulcanizing apparatus. O. F. Beck, Lawndale, and J. W. Speers and R. R. Jones, Akron, assignors to Firestone Tire & Rubber Co., Akron—all in Ohio.
1,350,722 Adjustable die for rubber-extruding machines. D. E. Goodenberger, assignor to Firestone Tire & Rubber Co.—both of Akron, O.
1,351,156 Two-part mold for solid rubber tires. C. and A. E. Burnett, Trowbridge, Eng.
1,352,099 Machine and method for building tires. W. C. Stevens, assignor to Firestone Tire & Rubber Co.—both of Akron, O.
1,352,160 Apparatus for forming hard rubber storage battery jars. T. A. Willard, Cleveland, O.
1,352,274 Collapsible tire core. F. L. Johnson, Akron, O.
1,352,383 Apparatus for manufacturing rubber bathing caps. R. E. Riley, assignor to The Miller Rubber Co.—both of Akron, O.
1,352,722 Apparatus for removing pneumatic tires from metal rims by fluid pressure. N. L. Caldwell. Knoxville, Tenn.
1,353,042 Retread vulcanizer. E. Harris, Los Angeles, Calif.
1,353,158 Tire mandrel and method of production. J. R. Gammeter, Akron, O., assignor to The B. F. Goodrich Co., New York City.
1,353,339 Apparatus for forming storage battery boxes. S. E. Hall, Akron, assignor of ⅓ each to E. R. Sloan, Maumee, and E. H. Workinger, Akron—all in Ohio.
1,353,383 Repair vulcanizing pad. J. N. Dieser, assignor of ½ to A. L. Silverstein—both of San Francisco, Calif.
1,353,477 Mold for making rubber tobacco pouches. F. F. Jamieson, Montreal, Que., assignor to Mechanical Rubber Co., Cleveland, O.
1,353,769 Apparatus for manufacturing solid rubber tires. C. Macbeth and W. E. Hardeman, Birmingham, assignors to The Dunlop Rubber Co., Limited, Westminster, London—all in England.

THE DOMINION OF CANADA

203,334 Machine governor. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of B. E. Cederstrom, Detroit, Mich., U. S. A.
203,349 Calender shell for winding fabrics. The W. F. Gammeter Co., assignee of W. F. Gammeter—both of Cadiz, O., U. S. A.
203,350 Tire machine drum. The W. F. Gammeter Co., assignee of W. F. Gammeter—both of Cadiz, O., U. S. A.
203,367 Apparatus and method for making golf balls. The Paramount Rubber Consolidated, Inc., Philadelphia, Pa., assignee of F. T. Roberts, Cleveland, O.—both in U. S. A.
203,522 Tire mold. H. Raflovich, Buffalo, N. Y., U. S. A.

THE UNITED KINGDOM

145,041 Apparatus for making hollow rubber articles. Paramount Rubber Consolidated, 5232 Germantown avenue, Philadelphia, Pa., assignee of F. T. Roberts, 1051 Power avenue, Cleveland, O.—both in U. S. A. (Not yet accepted.)
145,515 Special apparatus for making fabric tires. The Goodyear Tire & Rubber Co., assignee of W. C. Tyler—both of Akron, O., U. S. A. (Not yet accepted.)
145,516 Special apparatus for making fabric tires. The Goodyear Tire & Rubber Co., assignee of E. G. Templeton—both of Akron, O., U. S. A. (Not yet accepted.)
145,590 Special apparatus for making fabric tires. The Goodyear Tire & Rubber Co., assignee of W. C. Tyler—both of Akron, O., U. S. A. (Not yet accepted.)
145,591 Special apparatus for making fabric tires. The Goodyear Tire & Rubber Co., assignee of W. B. Harsel—both of Akron, O., U. S. A. (Not yet accepted.)
145,679 Special apparatus for rotating mandrel in making fabric tires. W. B. Harsel, 1144 East Market street, and E. A. Nall, 152 Grand avenue—both of Akron, O., U. S. A. (Not yet accepted.)
145,680 Special apparatus for applying bead cores to partially built fabric tire covers. W. B. Harsel, 1144 East Market street, and E. A. Nall, 152 Grand avenue—both in Akron, O., U. S. A. (Not yet accepted.)
145,681 Special apparatus for making fabric tires. W. B. Harsel, 1144 East Market street, and E. A. Nall, 152 Grand avenue—both in Akron, O., U. S. A. (Not yet accepted.)
145,682 Special apparatus for making fabric tires. W. B. Harsel, 1144 East Market street, and E. A. Nall, 152 Grand avenue—both in Akron, O., U. S. A. (Not yet accepted.)
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145,685 Special apparatus for making fabric tires. W. B. Harsel, 1144 East Market street, and E. A. Nall, 152 Grand avenue—both in Akron, O., U. S. A. (Not yet accepted.)
146,337. Apparatus for vulcanizing tires and other rubber articles. The Goodyear Tire & Rubber Co., assignee of C. Wattleworth—both in Akron, O., U. S. A. (Not yet accepted.)
146,338 Device for separating mold sections as raised from well of hydraulic press. The Goodyear Tire & Rubber Co., assignee of W. K. Glennon and C. Wattleworth—all of Akron, O., U. S. A. (Not yet accepted.)
146,340 Special apparatus for making cores for beaded edges of tire covers. The Goodyear Tire & Rubber Co., assignee of W. B. Harsel—both of Akron, O., U. S. A. (Not yet accepted.)
14,6341 Tire mold. The Goodyear Tire & Rubber Co., assignee of W. C. State—both of Akron, O., U. S. A. (Not yet accepted.)
146,342 Mold for vulcanizing tires under internal pressure. The Goodyear Tire & Rubber Co., Akron, O., assignee of B. Darrow, Los Angeles, Calif. (Not yet accepted.)
146,343. Special apparatus for treading tires. The Goodyear Tire & Rubber Co., assignee of K. B. Kilborn—both of Akron, O., U. S. A. (Not yet accepted.)
146,344 Special apparatus for making fabric tires, the tread and sidewalls being treated before placed on the carcass. The Goodyear Tire & Rubber Co., Akron, O., assignee of B. Darrow, Los Angles, Calif.—both in U. S. A. (Not yet accepted.)
146,348 Apparatus for applying hard rubber base to metal foundation band of tires. The Goodyear Tire & Rubber Co., assignee of A. Weatherill—both of Akron, O., U. S. A. (Not yet accepted.)

GERMANY

PATENTS ISSUED, WITH DATES OF ISSUE

327,576 (September 16, 1916) Machine for making hollow vessels from rubber. W. W. Weitling, College Point, N. Y., U. S. A.

PROCESS PATENTS

THE UNITED STATES

No. 1,351,856 Manufacturing cushion tires. H. M. Lambert, Portland, Ore.
1,352,161 Forming hard-rubber storage-battery jars. T. A. Willard, Cleveland, O. (Original application divided.)
1,352,170 Manufacture of hard-rubber storage-battery jars. H. L. Boyer, assignor to Joseph Stokes Rubber Co.—both of Trenton, N. J.
1,352,258 Manufacture of garters. R. Gorton, Brookline, Mass.; C. W. Noyes administrator of said R. Gorton, deceased.
1,352,418 Manufacture of hard-rubber storage-battery jars. H. L. Boyer, assignor to Joseph Stokes Rubber Co.—both of Trenton, N. J.
1,352,738 Manufacture of boots and shoes with rubber soles, etc. H. C. Egerton, Ridgewood, N. J.
1,353,421 Manufacture of rubber bathing caps, etc. R. E. Riley, assignor to The Miller Rubber Co.—both of Akron, O.
1,353,621 Manufacture of porous insulating block with ribbed surface of fiber asbestos. H. A. Ashenhurst, assignor of 4/5 to J. J. Reynolds—both of Chicago, Ill.

THE DOMINION OF CANADA

203,433. Manufacture of hot-water bottle. M. B. Clarke, Akron, O., U. S. A.

THE UNITED KINGDOM

146,346. Joining ends of tire tubes. The Goodyear Tire & Rubber Co., assignee of C. B. Orr—both of Akron, O., U. S. A. (Not yet accepted.)

Leaky inner tubes come from a variety of causes. It may be that the valve plunger is worn or sticks; the lock-nut at the base of the valve stem may work loose; or running flat may honeycomb the inside of the casing with tiny holes. In running a tire soft or in changing it along the roadside, foreign substances get in between the rim and beads and work around next to the tube. Particles of rust off the rims also cut the tubes oftentimes. Though these holes are, as a general rule, too small to be seen by the naked eye, yet under pressure they will leak enough air to let a tire down fifteen to twenty pounds pressure in a week's time.—*Miller News Service.*

New Goods and Specialties

FOOTBALL SHOULDER PROTECTOR

The football hero of 1920 goes to battle as heavily armored as any knight of old, protectors of leather, felt and rubber replacing chain shirt and coat of mail. One of the newest safety appliances is a shoulder pad and protector made of heavy white felt, covered with best quality tan fabrikoid and reinforced with elastic flexible ribs of rubber tubing. The shoulder caps are of molded fiber, lined with white felt, with rubber cushions in the center to act as shock absorbers. This protector is very light and comfortable to wear.—Rawlings Manufacturing Co., St. Louis, Missouri.

Football Shoulder Pad

BETTER SHOES FOR BETTER FEET

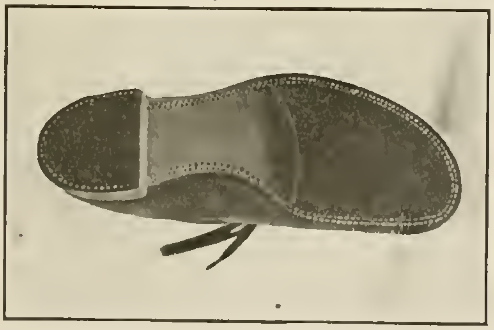
The manufacturer of "Natural Tread" shoes recognizes the value of rubber heels as an essential of the perfect shoe. All of this company's shoes are equipped with low, broad heels of resilient rubber, and one model has in addition a rubber sole. "Natural Tread" shoes are considered by the maker to conform more nearly to the shape of the normal foot than any other shoe in the world, and this company is the only one in Canada manufacturing and dealing exclusively in what it claims is correct footwear. The lasts on which "Natural Tread" shoes are made are based on the lines of the natural human foot. Yet the boots are stylish and made of the best materials. Their construction has been approved by the War Work Council of the Y. M. C. A., and by hospitals and organizations interested in the health welfare of humanity.

Men's "Natural Tread" Oxford.

Women's "Semi-Natural" Boot

Women's "Natural Tread" Boot

The men's shoe here illustrated is recommended by George Cummings, the professional golfer, as an ideal shoe for the links.



View of "Natural Tread" Sole

Wearers of "Natural Tread" and "Semi-Natural Tread" shoes —a modified form combining style and comfort—will not be subjected to the annoyance of ill-fitting rubbers, as the company also manufactures rubbers in black and brown to fit all styles of their shoe.—Natural Tread Shoes, Limited, 310 Yonge street, Toronto, Ontario, Canada.

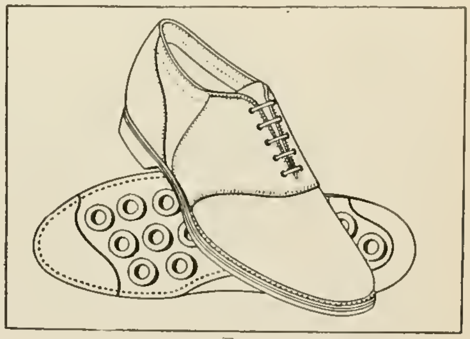
INSTEAD OF AN UMBRELLA

Everyone is familiar with the sight of a newspaper used to protect hats in a sudden shower. They will serve in a pinch, but a more practical and handy article that can be quickly put over a hat in case of rain is the "Stop-A-Drop" hat shield, which, unlike an umbrella, can be carried in pocket or handbag when not needed. It is made of fine quality dark-gray rubberized material fastened with snaps and will fit any hat up to 16 inches in diameter. It is dustproof as well as waterproof and permits the wearing of a stylish, dressy hat in an automobile without danger of dusty or crushed trimming.—Stop-A-Drop Hat Shield Co., Chicago, Illinois.

"Stop-A-Drop" Hat Shield

A GOOD LOCKING GOLF SHOE

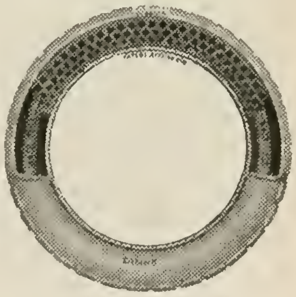
Every golfer knows the importance of wearing shoes that will not slip, inside or out, in stance, back swing or finish. Golf shoes must stand tremendous strain in places that in ordinary shoes receive little wear and unless constructed with this fact in view they do not give the service the buyer has a right to expect. A shoe that fills all requirements for strength and service and has the advantage of smartness and comfort is the Tom Logan golf shoe. The style illustrated is made of the best leather with a stout innersole, and rubber and fiber composition outersole with suction cups.—Thomas H. Logan Co., Hudson, Massachusetts.



"Tom Logan" Golf Shoe.

A PUNCTURELESS INNER TUBE

The Hercules "Airless Punctureless" inner tube is made of specially compounded, perforated soft rubber in two halves for convenience in manufacture and inserting into the casing, and is designed to fill the cavity ordinarily occupied by an inflated inner tube. The two halves of the Hercules tube when together give the appearance of a solid core, as the perforations do not extend through the outer wall of the tube. The system of circular openings consists of rows of perforations of varying diameters, so arranged that the solid rubber between the openings acts tangentially to equalize the strain.



"Airless Punctureless" Inner Tube

Wire, nails, tacks, pebbles and glass, the cause of 90 per cent of the punctures and blow-outs in air tubes, are said to have no effect on this tube. The maker also claims a minimum wear on the casing, indicating that any casing reasonably well built of good material will serve indefinitely when equipped with this tube.—Hercules Rubber Corporation, 908 Union Central Building, Cincinnati, Ohio.

"Fishbrand" Apron

FISHWIFE'S RUBBER APRON

A practical waterproof garment is the "Fishbrand" apron which was originally intended for use of fishwives and market women. Its useful features will be appreciated, however, by all women who have wet, dirty work to do. The apron is made of single rubber sheeting in serviceable black and entirely covers the front of the wearer's dress. It will not wet through and can be cleaned quickly with a damp cloth or sponge. It is a useful article without being very heavy or cumbersome to the wearer.

RUBBER ACID CONTAINER

Acids of necessity require a special container when being carried about in manufacturing processes. Hard rubber is one of the best materials for these containers, as it does not corrode under the action of acid, is practically unbreakable and of little weight. A particularly well-constructed acid bucket is here illustrated. It is made in two styles, one entirely of rubber and the other having double rubber walls reinforced with metal rim at top and bottom, with metal side hooks and rubber handle. The metal-reinforced bucket will probably stand more abuse, but the one of all rubber has no parts to corrode by the action of the acid contents.

Acid Bucket

Both the "Fishbrand" rubber apron and the acid bucket are manufactured by the same company.—W. H. Salisbury Co., Inc., 308 West Madison street, Chicago, Illinois.

NEW PROTECTIVE GARMENTS

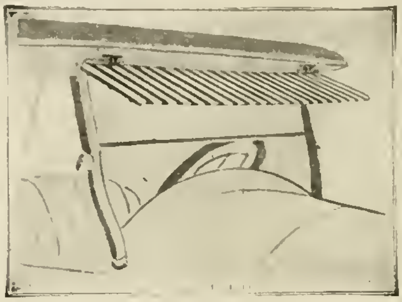
Rubber bloomers have become an indispensable part of the modern infant's layette, "Quickslip" baby bloomers are manufactured especially to fill the need of a cool, sanitary, waterproof garment, easily removed and cleansed, and with no buttons, strings, tapes, or pins. Practically in one piece, of carefully selected all-rubber sheeting in the natural color, they are durable and will stand a great amount of use. The vents at the sides permit air to enter freely, thus preventing over-heating and consequent discomfort. A special feature is the gathered top, cemented without stitching to a strip of rubber.

"Quickslip" Bloomers

The same manufacturer puts out a similarly made large model for women, called the "Protecto" sanitary bloomer. More ventilating holes in the sides remove an objection which many women have made to the use of all-rubber bloomers. The "Protecto" is the popular step-in style, full enough for comfort, with no objectionable bulkiness about waist or hips, and comes in three sizes—small, medium and large. This garment is protected by United States patent No. 1,353,750, listed elsewhere in this issue; also by trade mark No. 131,714.—Rubberized Sheeting and Specialty Co., Inc., 221-227 Fourth avenue, New York City.

A SAFETY APPLIANCE FOR YOUR CAR

Many automobile accidents have been traced directly to snow or rain on the windshield or the glaring headlights of an approaching car. Protection against such danger is assured by the maker of the "Budd Motor-Visor," an awning-like contrivance constructed with welded steel frame. Over this is stretched a detachable and cleanable cover of rubber-covered drill which may be had in various color combinations to harmonize with the enamel of the car. The "Budd Motor-Visor" fits all cars, is easily installed and detached, and can be adjusted to any angle.—Alastic Tire Cushion Co., 1421 Locust street, St. Louis, Missouri.



"Budd Motor-Visor"

SOME TIRES FROM THE MIDDLE WEST

Seven points of superior merit are credited to Wayne Roughshod tires by the maker, who claims to have eliminated rim cuts, tread separation, side wall cracking, bead separation, stone bruises and ply separation, thereby obtaining long life for the tire.

Wayne "Roughshod"

The Wayne ribbed tread is a distinctive design. Wayne casings are all constructed with a heavy wall of resilient anti-friction cushion stock between plies, which is claimed to insure elasticity commensurate with the average service conditions and to maintain a low temperature. The danger of bead separation is overcome by the manufacturers' process of tying the bead firmly where it belongs, turning the plies of fabric over heel and point and protecting the core from all angles. Greatest care has been exercised and every scientific principle used to produce a strictly high-grade long-lived tire which the maker says will exceed the 6,000-mile basis of adjustment.—Fort Wayne Tire & Rubber Manufacturing Co., Fort Wayne, Indiana.

Wayne "Ribbed"

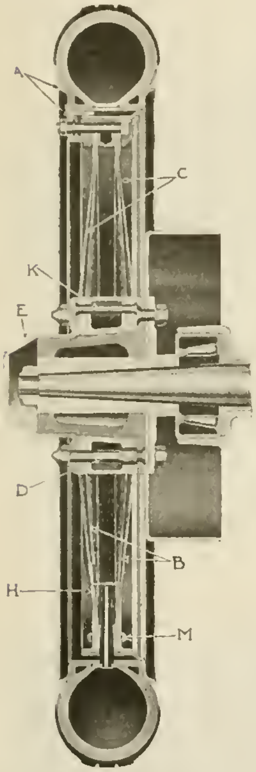
PERFECTLY PACKED TUBES IN THE "EFFICIENT" BOX

The value of an inner tube to the buyer depends largely upon the manner in which it has been packed. An unused tube can be "box worn" to the point of uselessness by careless pack-

ing and boxing. One manufacturer makes a container for inner tubes, the "Efficient" inner tube box, for which it claims especial superiority. The covers are practically dustproof and the heavy quality of stock used, as well as the attractive printing, makes the boxes good-looking and durable.—Gereke-Allen Carton Co., St. Louis, Missouri.

A NEW DISK WHEEL

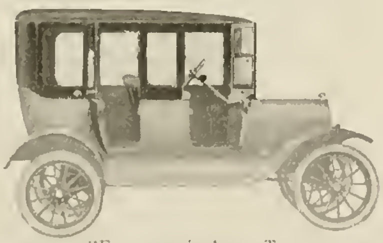
The disk wheel has been characterized as the only wheel ever designed exclusively for motor cars. The "Multidisc" wheel is a detachable wheel with demountable rim in combination and has, the maker claims, many superior advantages over other wheels of the type. A cross-section, shown on this page, may be easily understood by referring to the letters. A, standard demountable rim, making it easy to change tires and eliminating the necessity of carrying an extra wheel; B and C, four inside aluminum disks supporting from four angles, make possible a combination of utmost strength and light weight; D, removing six bolts screwed into driving lugs demounts the wheel; E, specially designed aluminum hub cap adds greatly to appearance of wheel; H, entrance to valve, optional either inside or outside of wheel; K, aluminum tapered hub bearing, making it easy to demount wheel; M, felloe construction of aluminum, held together by thirty ¼-inch bolts; a special hub for each make of car. "Multidisc" wheels impart to any car that air of speed and substantiality which is already expressed in the modern stream-line design, and their beauty is excelled only by their strength and durability.—The Lack Manufacturing Co., Paducah, Kentucky.



"Multidisc" Wheel

A FOUR-SEASON TOP

"How many lives has a Ford?" is the pertinent inquiry of the manufacturer of the "Faultless" top for automobiles. Equipped with this top, a car can be used with comfort in all four seasons, it is claimed. The "Faultless" top is made in styles to fit Ford and Dodge cars and is constructed with steel and hardwood frame, covered with the best quality ⅛-inch "Neverleak" rubber fabric. The top and sides are well padded to give proper shape and a rain trough is provided to prevent water dripping on the sides. This top can be set up without the aid of a mechanic, as complete instructions for installing accompany each top.—The American Auto Top Co., Pittsburgh avenue and Belt Railroad, Delphi, Indiana.


"Faultless" Auto Top

RUBBER INK ROLL IN THE ADDRESSERPRESS

A new system of mechanical addressing is used in the Addresserpress. A stenographer can stencil the address cards on her typewriter without resorting to the expensive embossing machine necessary with many addressing machines. Another practical feature is the ink roll of soft rubber that presses the ink through the address cards, giving equal pressure to each letter. This overcomes the uneven addresses so frequently seen in mechanically addressed matter.—The Elliott Company, 44 Albany street, Cambridge, Mass.

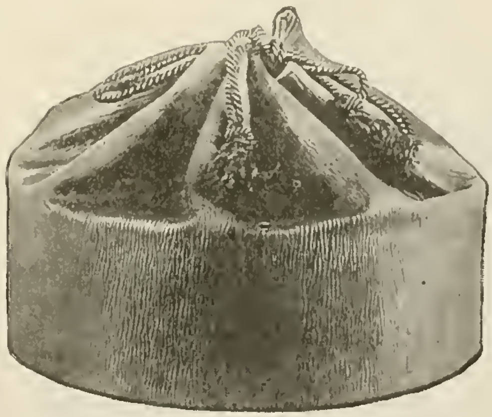
POPULAR RUBBER HEEL

That rubber heels were never more popular than at the present time is attested by the demand for the "Columbia" heel, a new product of a Massachusetts rubber company. Put upon the market less than six months ago, the maker says that salesmen have been requested not to show samples until equipment to turn the heel out faster can be secured. The Columbia heel is well made of high quality rubber.—Taunton Rubber Co., Taunton, Massachusetts.

"Columbia" Heel

TWO "NAUGAHYDE" SPECIALTIES

A feature of articles made of the waterproof material "Naugahyde," having rubber as a base, is their absolute imperviousness to water and their inability to come apart under the roughest usage. They have no sewed or nailed seams, every part being perfectly vulcanized to adjacent parts. The "Naugahyde" collar bag is handy to have when traveling, as it keeps clean collars fresh and in shape. The brief case has all the good points of the more expensive sole leather, besides qualities peculiarly its own that leather does not possess. It is as durable as leather, but much lighter in weight. It is good-looking, capacious, and fitted with lock and key to insure privacy to valuable papers. The "Naugahyde" traveling bag was described in The India Rubber World, April 1, 1918, page 412.—United States Rubber Co., 1790 Broadway, New York.


"Naugahyde" Collar Bag


"Naugahyde" Brief Case

ENGLISH METHOD OF TUBE SPLICING[1]

This method of splicing inner tubes is not only extremely popular in England with all those concerned in tire repairing but is rapidly being taken up by manufacturers as well.

Not only is the lapped joint a constant source of weakness in itself, but whenever a puncture occurs near it the very act of

Fig. 1. Trimming the Ends

putting the repair on the vulcanizer opens the splice and causes further trouble. All this is avoided when a tube is spliced by the present method, which consists in bringing the two ends together and vulcanizing them without lapping. The tube then has an even uniform surface, all parts are equally strong, and the pressure is equally distributed. The tube is in fact endless, because the space between the two ends is filled with vulcanized

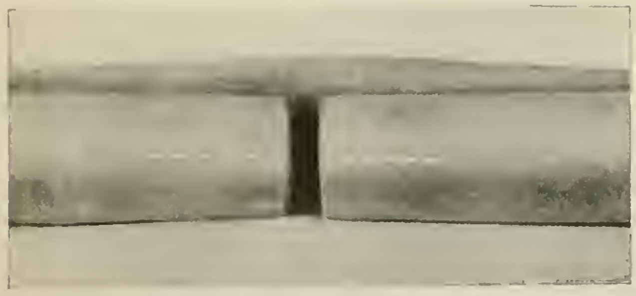


Fig. 2. The Ends Beveled

rubber, which is identical in every way with the tube itself.

The only way in which a butted joint can be made is to vulcanize the tube while it is circular, and as it would be when inflated, and this is done on a special splicer. Following are the instructions for making jointless splices.

Trim both ends of the tube, taking care to press the sides together as shown in Fig. 1. This will preserve the curved shape of the tube.

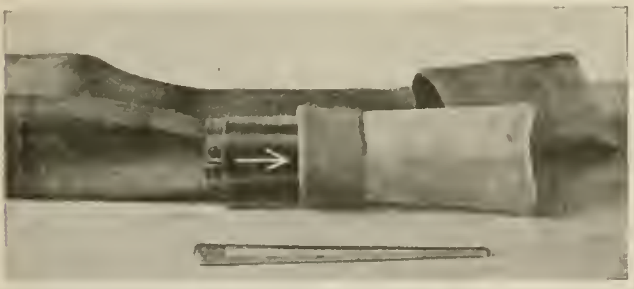


Fig. 3. First End Drawn Over the Expander

Bevel both ends with small shears, giving a good broad bevel, and mark the ends where they should meet. See dotted line in Fig. 2.

Fold back one end of the tube for 12 inches and fold back again for 2 inches, making a double fold as in Fig. 3. Press the tube through the opening at the side of the expanding mandrel, and replace the covering shield. Push the mandrel into the folded part of the tube, as shown by direction of the arrow, until only about ½-inch of the mandrel remains outside. The correct position is shown in the next illustration. The wedge-shaped opening in the mandrel must be the part exposed.

Now bring the other end of the tube over the folded-back portion until the two ends almost meet and form a V-shaped groove between them. Care must be taken that the tube is not twisted. See Fig. 4.

Fit the wedge in the slot and push it until the tube is held tightly on the mandrel. Then rasp the beveled ends. The

Fig. 4. Other End Ready to Be Pulled on Expander

knife-shaped rasp is best used for this operation, and a piece of old rubber should be placed inside to protect the inner part of the tube. This stage is shown in Fig. 5 and the protecting piece of rubber is marked "X." The rasping is an important operation, and should be done thoroughly and carefully.

Apply two coats of Plastene-Saflux, allowing each coat to dry separately. Then remove the protecting piece of rubber and adjust the two ends of the tube until they are 1/16-inch apart. Fill in the groove with Plastene as follows: cut a narrow strip of this material and lay it evenly at the bottom of the groove

Fig. 5. Rasping the Beveled Ends

all around the splice; then a slightly wider strip on top, and so on until the place is well filled.

The subsequent operations of pressing down, rolling, and trimming are the same as in ordinary tube repairs, but care must be

Fig. 6. The Space Filled in with Plastene

taken that the new material is pressed firmly and evenly to the beveled sides, and that the depth of the new rubber corresponds to the thickness of the tube. Apply two coats of red paint, al-

[1] From "The Complete Guide to Tyre Repairing." Harvey Frost & Co., Limited, London, England.

lowing each coat to dry separately, and the splice will then be ready for vulcanizing. Refer to Fig. 6.

Pull out the wedge and wrap a piece of face cloth, slightly damped and chalked, all round the splice. The cloth must be placed evenly in position and have no creases. Remove the key from the splicing mold and pass the tube through the slot as in Fig. 7. Replace the key and fix the tube in the center of the mold. Then put back the wedge and push it in until close contact is secured between the splice and the mold. If it does not fit closely, liners should be used to secure close contact. Fig. 8 shows this stage, and the splicer ready for attaching to the vulcanizing plant.

Let steam into the mold and then open the pet-cocks for a moment to blow out air and condensed steam. Then close the pet-cocks—keeping the main valve open—and time the repair.

Fig. 7. Fitting in the Mold

The pet-cocks should be opened again for a moment after an interval of five minutes.

At the expiration of the correct period the steam valve should be closed, the pet-cocks opened, and the splicer detached from the plant. Remove the mold key, pass the tube through the

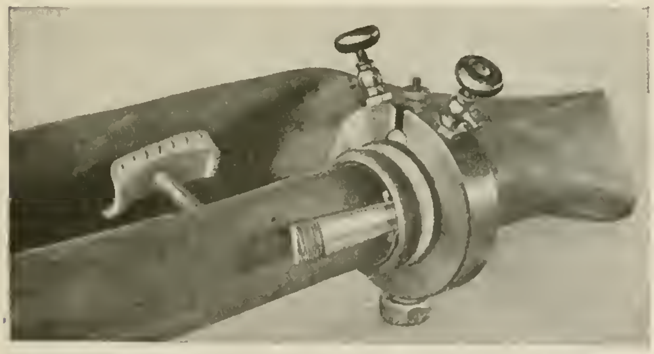


Fig 8. Ready for Attaching to the Vulcanizer

slot, and then, by pulling out the wedge, the mandrel will be contracted and can be separated from the tube. The repair is then completed.

At the end of every 2,500 miles' service, a tire should be deflated, dismounted, soapstone and grit removed, and the inside of the casing washed with gasoline. After drying, the inside should be dusted with talc, the tire mounted and the tube charged with fresh air.

During this operation a close inspection should be made of the tread for cuts and fragments of glass, and the rims should be cleaned of rust and painted.—*Miller News Service.*

IMPORTANCE OF RUBBER IN MODERN RAILROAD TRANSPORTATION[1]

Among the many uses for india rubber, those that apply to modern railroad transportation are of great importance in the economical welfare of the country. In fact rubber today is nearly as essential to the successful operation of railroad trains as coal to create steam and motive power, the steel rails and the material from which locomotives and coaches themselves are manufactured.

Because of its popular use in the form of tires, we are perhaps accustomed to think of rubber as primarily essential only to motoring. We fully appreciate just how essential rubber is to civilization only when we can see its uses and applications with our own eyes, and perhaps there isn't one in a hundred who appreciates just how essential rubber in its various forms is to the successful operation of a railroad train, nor how many separate functions it performs.

Take the brakes, for instance. In the olden days before all the various possibilities of harnessed steam were known to the engineering world, coaches had to be checked in their speed by individual manipulation of hand-operated brakes on each coach. This prevented the engineer attaining any great speed, for should any emergency arise necessitating the quick stopping of the train, it was impossible to operate all brakes simultaneously, or to stop all coaches without their piling up in a heap. But now, thanks to rubber and air, a train of a dozen passenger and Pullman coaches, or of more than a score of heavily loaded freight cars, can be brought to an easy stop by a lever in the engineer's cab. Thanks also to rubber, it is now possible to convey the exhaust steam and heat from the locomotive boilers, through pipes and radiators in every coach.

Rubber is also responsible for the discard of the old gas-lighted passenger coaches, and their being replaced by the more modern coaches equipped with storage batteries and electric lights.

The matter of safety is a mighty important factor. Modern steam transportation has come to be the world asset that it is, not only because of its celerity in covering great distances and in bridging continents, but because of the comparative immunity from danger that this form of travel affords. And safety in railroad transportation depends preponderately upon rubber. The air brake is comparatively simple in operation, yet without rubber never could have been applied to railroad trains, for two specially constructed, multiple-ply pieces of rubber hose form the connecting link of compressed air pipes and cylinders between coaches. With trains swinging around curves and swaying as they speed along it would be impossible to effect the car union of brakes with metal piping.

Air signal hose also connects all coaches of a passenger train, enabling the conductor or trainman to signal the engineer from any part of the train. Steam-heat hose lengths also connect passenger coaches with the engine, the exhaust steam and heat from the boilers being forced through the runner connections and through radiators in each coach.

That makes six pieces of hose to every passenger or Pullman coach—two 22-inch lengths of air-brake hose, two 22-inch lengths of air-signal hose, and two 24 or 25-inch lengths of steam-heat hose. Air-brake hose is also a necessary equipment on all freight cars, there being two lengths to every car.

Latest available statistics show approximately 2,500,000 freight cars rolling in the United States, about 60,000 passenger coaches and at least 10,000 Pullman sleeping and parlor cars. That means a total of 2,570,000 cars and coaches, each equipped with two pieces of 22-inch air-brake hose. Thus, the air-brake hose equipment in the United States today consists of 5,140,000

[1] By Ralph C. Busbey, Goodyear News Service.

lengths. Each hose is replaced every six months, making 10,280,000 pieces of air-brake hose necessary every year. Each piece being 22 inches long, this means a total of 226,160,000 inches of air-brake hose or exactly 3,570 miles. In other words, if all the air-brake hose used in the United States in a year's time could be stretched out, with the individual pieces placed end to end, it would reach across the vast American continent, from Portland, Maine, to Portland, Oregon.

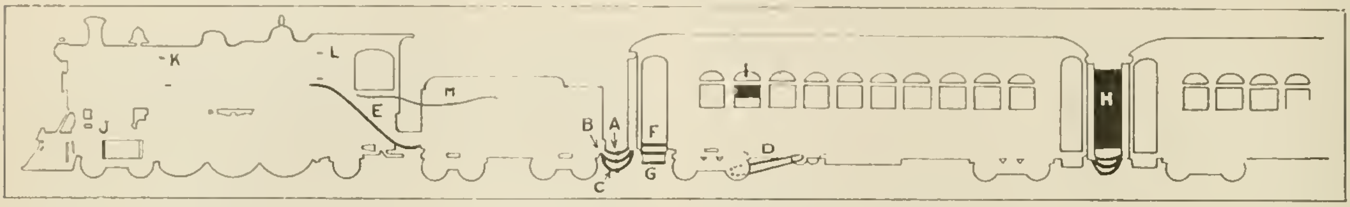
On each of the 70,000 passenger and Pullman coaches there are also two lengths of air-signal hose and two lengths of steam-heat hose. Figuring four such lengths to a coach, and replacement of all hose equipment twice a year, it would take approximately 200 miles of such hose to meet the American railroads' needs every year. Added to the 3,570 miles of air-brake hose already computed, we have the amazing total of 3,770 miles of hose used every year—enough to make a solid line hurdling the ocean and reaching from New York to Gibraltar.

The air-brake hose is of uniform size, measuring one and three-eighths inches in diameter. The steam-heat hose is of slightly larger size, ranging from one and three-quarters to one and five-eighths inches in diameter, while the air-signal hose is one and one-eighth inches in diameter. These differences in size are important, for the three pieces of hose hang together from the end of each coach, and the brakeman making train connections can detect each hose instantly by its size and special branding, and can effect the coupling without confusion.

Modern passenger coaches are equipped with electric lights and large storage batteries in which hard rubber is largely used. These are recharged by means of a dynamo beneath the car body, the dynamo being operated and electricity generated by means of a rubberized fabric belt connected with the axle of one truck. Thus with the train speeding along at 60 miles an hour, the generator axle-lighting belt keeps the batteries well charged. A four-ply belt is used, six inches wide and 10 feet long. The average life of a belt is 25,000 miles, but in winter with trains encountering ice and snow, coaches in swinging around curves frequently throw the belts and lose them. This means a heavy replacement of belts every year. But figuring one ten-foot belt to every one of 70,000 coaches, it takes 700,000 feet of such belt, or 135 miles, for original equipment. To figure the total amount of belting including replacements would be practically impossible.

Every locomotive must have two lengths of tender hose connecting with the tender, to syphon water into the boilers. This hose varies in size from a diameter of two and one-half inches to three and one-half inches, and varies in length from 36 to 72 inches. Each locomotive also has what is known as a squirt hose, connecting the engine-man's cab and the tender.

On locomotives, also, rubber packing of special make is used for cylinder-head packing and air-pump packing, while the gage-glass gaskets in the engine-man's cab are of rubber. Going back through the train we find rubber floor treads and step treads used on the steps and in the vestibules of coaches, with rubber tiling used in many passenger coaches and Pullmans as flooring material. To compute the square foot area of rubber tiling floor and step treading and rubberized curtain material used on railroad trains in America would mount into figures seemingly inconceivable.



Goodyear News Service

Showing Uses of Rubber in Railroad Practice

A—Air-signal hose
B—Steam-heat hose
C—Air-brake hose
D—Generator axle-lighting belt
E—Tender hose
F—Rubber floor treads and tiling
G—Rubber step treads
H—Rubber vestibule curtains
I—Rubber window curtains
J—Cylinder-head packing
K—Air pump packing
L—Gage glass gaskets
M—Squirt hose

And back behind the scenes of railroad transportation we find numerous other uses for rubber. In the round-house, for instance, we find "blow-off" hose used to remove water and steam from engine boilers. Then there is a specially designed "wash-out hose" equipment for cleaning boilers, also "fill-up" hose, engine-washing hose, steam and water hose and pneumatic tool hose, all used every day in the year in hundreds of round-houses.

All these various type of hose are manufactured according to master car-builders' specifications. Needless to say, the best of materials and the best of workmanship available are necessary to the successful manufacture of such rubber equipment for the railroads, for the safety and comfort of railroad travel today depend very largely upon rubber.

RUBBER IN THE MANUFACTURE OF DYNAMITE

More high explosives are used in pursuing the arts of peace than in times of war. The modern farmer would scarcely know how to get along without them. They do the work of the hired man who used to toil patiently rooting out stumps, digging ditches and drains and holes for posts and for young orchard trees.

Hercules Powder Co.

Rubber-Lined Gutters Convey Nitroglycerine to the Storehouse

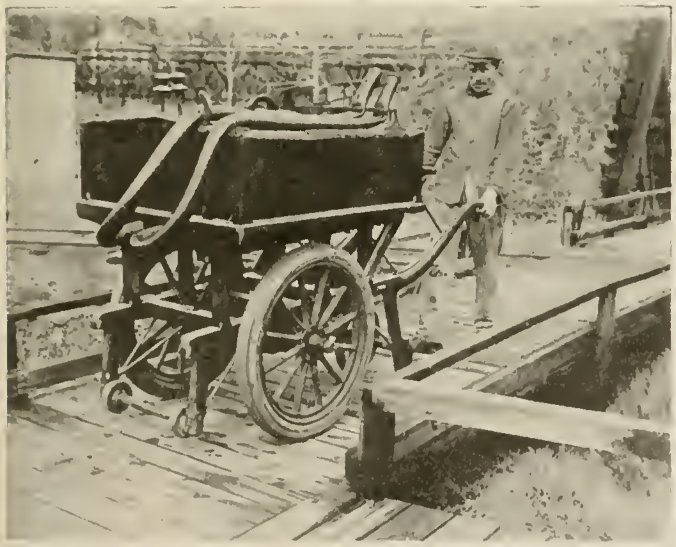
Dynamite does all these things for the farmer nowadays—what would he do without its willing power in these times of high-priced farm labor? It never strikes, never takes holidays, and never objects to working overtime. And even the poorest farmer

can avail himself of its aid because of its low cost. India rubber has much to do with that, although this fact is seldom realized. The use of rubber in the manufacture of high explosives has lessened the attendant dangers to the point where their manufacture is no more costly than that of commodities with no potentialities of destruction. Personal danger has been reduced to a minimum and the lives of the workmen guarded by the use of india rubber. Not an explosive itself, and not even a component ingredient of one, it is safe to say that without the assistance of rubber no explosive could be manufactured.

Dynamite was invented in 1866 by Nobel, a Swedish engineer, and has proven men's greatest ally in his fight to conquer the earth. It wages ceaseless warfare against the forces of Nature, blasting out channels for commerce and transportation, breaking down natural barriers that check commercial intercourse, laying bare hidden stores of precious metals, minerals and oil, and reclaiming for agricultural use desert and swamp land alike.

Many persons who habitually employ dynamite in their daily activities are but hazily aware of its content and totally uninformed as to the processes of its manufacture. They know that nitroglycerine, which it contains, is very dangerous to handle but that dynamite is comparatively safe. Nobel's process was to incorporate nitroglycerine with a kind of infusorial earth. Modern practise has substituted active absorbents containing nitrates of soda, nitrate of ammonia, wood pulp, etc., which assist in the explosion instead of being absorbents only.

Nitroglycerine is made by adding slowly a comparatively pure glycerine to a mixture of nitric and sulphuric acids in a steel tank with a brine coil around its outer edge to remove the heat generated. This is called a nitrator, and the contents are slowly agitated by means of mechanically driven paddles. After all the glycerine is added the mixture is let into a lead tank and allowed to stand until the nitroglycerine rises to the top. This is drawn off to a tank of warm water where it is washed free from acid, afterwards receiving a final wash with soda ash solution to remove the last trace of acid. During all these operations the

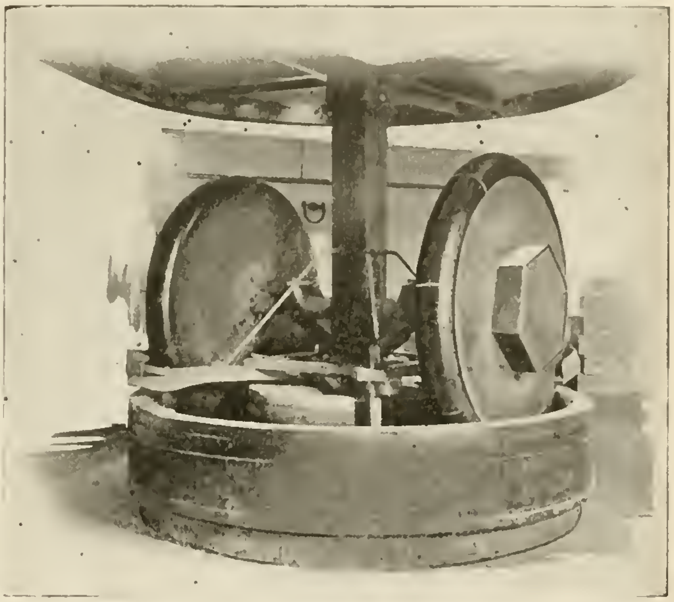


Hercules Powder Co.

Rubber-Tired Buggies Convey Nitroglycerine from Storehouse to Mixer

hands and feet of the workmen are protected from acid burns and toxic absorptions by rubber gloves and boots, and rubber hose is used extensively. The pure nitroglycerine is then conveyed to the storehouses in gutters which are lined with rubber to facilitate gentle handling.

The absorbent material, technically known as dope, is prepared by every manufacturer of explosives according to formulas worked out by his chemists. It is taken to the mixing house in fiber barrels, and the greatest care is required in handling nitroglycerine on its way to the mixing house. The nitroglycerine wheeler uses a copper-lined, rubber-tired buggy for his precious charge. He owes not only his own safety but that of the entire plant to the resilient qualities of india rubber. No one disputes his right of way. A smooth plank walk is constructed especially



Hercules Powder Co.

The Heavy Wheels of the Mixer Are Shod with Hard Rubber

for his use. At one end he fills the buggy from the storehouse. At the other end he transfers the nitroglycerine to the mixing machine by means of long rubber tubes attached to the buggy.

The mixing machine is a wooden bowl in which large wooden wheels revolve. Here again rubber safeguards the workmen, for the wheels are shod with hard rubber, thus allowing no metal in contact with the dynamite during the mixing process. Even the pulleys that drive the mill are made of wood, lest a bit of rubbing metal produce a disastrous spark. Five minutes' mixing by the rubber-tired wheels is sufficient. The loose dynamite is removed by wooden shovels into wooden tubs, thence to the packing machine, where it is packed into paraffined paper shells by means of wooden tamps tipped with rubber, a great improvement over the dangerous old-time hand operation of filling each shell through a funnel.

The dynamite cartridges are placed in paraffine-paper lined boxes containing a small amount of sawdust to lessen shocks and the covers nailed on. This is the final step in the manufacture of the explosive, which is then stored in an isolated magazine until shipped.

Gelatine dynamite was invented to fill the demand for an explosive that would resist the action of water. It is a jelly-like substance and is produced by the addition of small amounts of nitro cotton to the mixture of nitroglycerine and absorbents. Rubber contributes to safety in gelatine dynamite manufacture in the same manner as in making ordinary dynamite. Rubber gloves, boots and aprons are worn by the workmen and rubber hose and tubing are largely used.

The extent to which tires are used west of the Rockies is fairly reflected in the registration of automobiles in eleven Western States for the year 1920 up to July 1. The figures show that California had 421,327, Washington 143,561, Colorado 111,907, Oregon 89,933, Montana 52,100, Idaho 46,360, Utah 37,261, Arizona 29,803, Wyoming 21,250, New Mexico 20,300, Nevada 9,383.

Activities of The Rubber Association of America

DIVISION COMMITTEE MEETINGS

A meeting of the Executive Committee of the Mechanical Rubber Goods Manufacturers' Division was held in New York City on October 19, at which trade conditions in general were discussed.

The Specification Committee of the Mechanical Rubber Goods Manufacturers' Division met in the Association rooms on October 26, when a conference was held with a committee appointed by the American Railroad Association to confer on subjects of mutual interest to both railroads and manufacturers in connection with specifications for the mechanical rubber goods which are used by the carriers.

A most interesting meeting of the Executive Committee of the Tire Manufacturers' Division was held in the Association rooms October 20, when many matters of importance to the tire industry were given consideration. Among the most important of the conclusions reached was the decision to have the Association gather statistics on a monthly basis from members of the Division with respect to the inventory, production and shipments of automobile tires and tubes and the consumption of crude rubber and fabric in that production. Consideration was also given to the proposed organization of a foreign trade department as an adjunct to the Association and to the work which might be done by that department on subjects of interest to tire manufacturers, notably the promotion of the straight side tire equipment in foreign markets.

It was arranged also to appoint a sub-committee of the Tire Manufacturers' Division comprised of advertising or publicity representatives of several members to give attention to matters of an advertising or publicity nature for the Association. It was also recommended that a special committee of the Division be established comprised entirely of those manufacturers engaged in making bicycle tires, in order that due consideration might be given to the problems which are of particular interest to those manufacturers.

THE INQUIRY REGARDING PRICE GUARANTY

Members will recall that in 1919 the Federal Trade Commission initiated investigation proceedings for the purpose of securing definite information regarding the practice of protecting customers against decline in manufacturers' prices. The Commission, therefore, invited all of the important industries in the country to inform it of the manner in which they applied this practice, if at all, and the particular reasons and conditions which made the practice desirable or undesirable from the standpoint of the manufacturer, wholesaler, dealer and consumer.

The two divisions of this Association which are most vitally interested in this practice are the Footwear Division and the Tire Manufacturers' Division, although the practice extends to other specific articles manufactured by the members, namely, clothing, garden hose and possibly one or two others.

A large majority of the members of the Footwear and Tire Divisions responded to the questionnaires submitted to them and a compilation of the facts and views of the members regarding continuance of the present practice was prepared. This was presented to the Federal Trade Commission August 27, with request for permission to appear at the Trade Practice Submittal held October 5.

A joint sub-committee representing both the Tire Manufacturers' and Footwear Divisions attended this meeting, which occupied all of October 5 and 6. The first day of the hearing was taken up almost entirely with arguments from those opposed to the practice of protecting customers against decline in prices. Most of the industries represented by those speaking against the practice do not employ it now and their arguments as to unfairness were based largely upon what would occur if the practice were introduced into those industries. No facts were shown indicating that any unfairness had actually resulted from the use of this practice.

During the second day of the hearing representatives of this Association explained to the Commission the very seasonal nature of the footwear business and the tire business and set forth the various reasons why this practice of protecting against price decline should be continued. With relation to tires the practice may be divided into two classes, first, the protection as applied to spring dating business and, second, protection as applied to current business. The answers to the questionnaire submitted to the members of the Tire Manufacturers' Division showed that an overwhelming majority of the members favored the continuance of this practice with relation to spring dating business.

At the conclusion of the hearing the chairman stated that the Commission had not yet decided what procedure it would follow, but intimated that it might possibly issue some statement with regard to this practice after a full examination of the information which it had gathered, or it might use this information merely as a guide in the case of any specific complaints which might hereafter be considered by it in relation to this practice.

It is the opinion of counsel for the Association that unless and until the Federal Trade Commission issues a definite order directing manufacturers of rubber goods to cease the practice of protecting their customers against price decline such manufacturers will be warranted in continuing this practice, if they so desire.

STATISTICS COMPILED FROM QUESTIONNAIRES NOS. 101 AND 102, COVERING THE YEAR 1919

Number of firms to whom questionnaires were sent	283
Number of firms responding	167
Number of firms reporting statistics	160

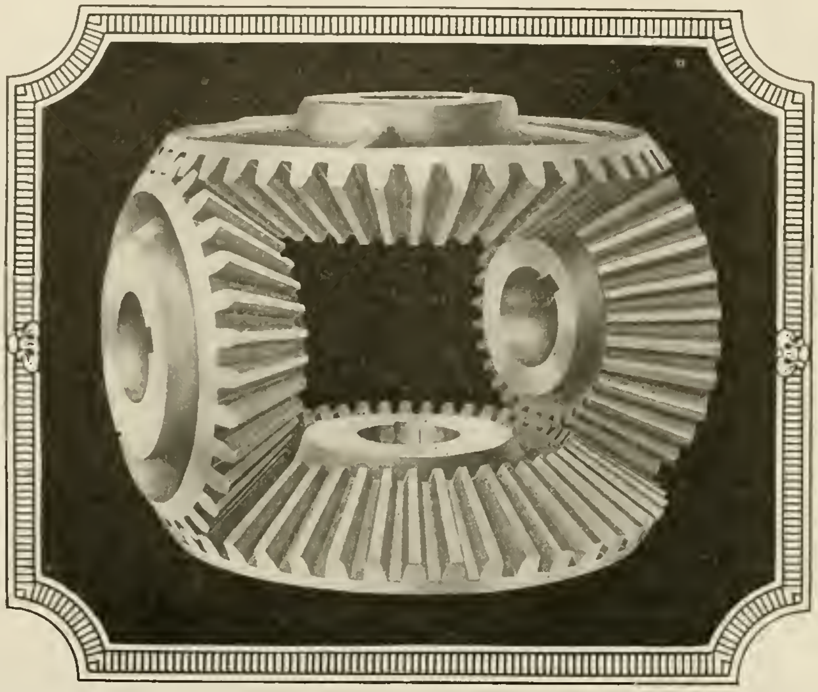
AVERAGE TOTAL DAILY NUMBER OF EMPLOYES, 177,333

	Reported by Manufacturers Who Also Reclaim	Reported by Reclaimers Solely	Total	Approximate Amount Scrap Used per Pound of Reclaimed Produced
Reclaimed rubber produced from raw and cured scrap .... *pounds*	62,010,311	107,494,619	169,504,930	1 lb., 5 oz.
Scrap rubber (including raw and cured scrap) consumed in production of reclaimed rubber. *pounds*	79,107,432	151,877,814	230,985,246	

NUMBER OF POUNDS OF CRUDE RUBBER CONSUMED IN THE MANUFACTURE OF RUBBER PRODUCTS AND TOTAL SALES VALUE OF SHIPMENTS OF MANUFACTURED RUBBER PRODUCTS

Product	Number of Pounds Crude Rubber Consumed	Total Sales Value of Shipments of Manufactured Rubber Products
Tires and tire sundries:		
Automobile and motor truck casings	240,904,417	$194,454,021
Automobile and motor truck tubes	54,025,307	39,550,163
Solid tires	27,989,361	13,111,246
Other tires and tire sundries	14,472,416	13,606,740
*Total—Tires and tire sundries	338,521,064	$674,249,726
Other rubber products:		
Mechanical goods	23,819,144	77,487,032
Boots and shoes	29,042,262	76,539,565
Other products	14,646,895	59,382,707
*Total—Other rubber products	67,712,158	$291,835,550
Grand total—All products	406,231,563	$966,085,276

*NOTE—It should be noted that the above totals of "Tires and tire sundries" and "Other rubber products" include some figures which are not shown under the various items, which is due to the fact that some of the reports received were not itemized.



News of the American Rubber Industry

DIVIDENDS

The American Chicle Co., New York City, has declared a dividend of $1 per share, payable November 1 on its non-par value common stock of record October 20, 1920.

The American Wringer Co., Woonsocket, Rhode Island, recently declared its quarterly dividend of $1.75 per share, payable October 15 on preferred stock of record September 30, 1920.

The American Zinc, Lead & Smelting Co., New York City and St. Louis, Missouri, has declared its regular quarterly dividend of $1.50 per share, payable November 1 on its preferred stock of record October 15, 1920.

The Dayton Rubber Manufacturing Co., Dayton, Ohio, recently declared its 26th consecutive dividend of seven per cent, payable October 1, 1920.

The Firestone Tire & Rubber Co., Akron, Ohio, recently declared a quarterly dividend of one and one-half per cent, payable October 15 on its six per cent preferred stock of record October 1, 1920.

The General Tire & Rubber Co., Akron, Ohio, recently declared its regular quarterly dividend of one and three-quarters per cent, payable October 1 on preferred stock of record September 20; it has also declared a dividend of four per cent, payable November 1 on common stock of record October 20, 1920.

The Hodgman Rubber Co., Tuckahoe, New York, has declared its quarterly dividend of two per cent, payable November 1 on preferred stock of record October 15, 1920.

The Kelly-Springfield Tire Co., New York City, has declared the following dividends: quarterly, $1 per share, and a three per cent stock dividend, both payable November 1 on common stock of record November 15; quarterly, $2 per share, payable November 15 on eight per cent preferred stock of record November 1, 1920.

The Lee Rubber & Tire Corporation, Conshohocken, Pennsylvania, has declared a quarterly dividend of fifty cents per share, payable December 1 on capital stock of record November 15, 1920.

The Manufactured Rubber Co., Philadelphia, Pennsylvania, recently declared its quarterly dividend of one and one-half per cent, payable October 14 on preferred stock of record October 9, 1920.

The O'Bannon Corporation, New York City, recently declared its regular semi-annual dividend of three and one-half per cent, payable October 1 on preferred stock of record September 25, 1920.

The Sterling Tire Corporation, Rutherford, New Jersey, recently declared the following dividends: one per cent, quarterly, on common stock; one and three-quarters per cent, quarterly, on seven per cent preferred stock; and two per cent, quarterly, on Series B preferred stock; all payable October 20 on stock of record September 30, 1920.

The Tyer Rubber Co., Andover, Massachusetts, paid its regular quarterly dividend of $1.50 per share on common stock, October 15, 1920.

The United States Rubber Co., New York City, recently declared quarterly dividends of two per cent, payable October 15 on both common and first preferred stock of record October 30, 1920.

The Van der Linde Rubber Co., Limited, Toronto, Ontario, has declared its regular semi-annual dividend of seven per cent.

The Wellman-Seaver-Morgan Co., Akron, Ohio, recently declared its fifty-ninth quarterly dividend of one and three-quarters per cent on preferred stock. On account of contracts for car dumpers, floating cranes, and rubber machinery, totaling about $1,500,000 and requiring considerable capital, the usual cash dividend on common stock was deferred and instead a ten per cent dividend to be charged to accumulated surplus was voted, payable October 15 to stock of record September 28, 1920.

The Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, recently declared quarterly dividends of two per cent ($1 per share), payable October 15 on preferred stock and October 30 on common stock; both on stock of record September 30, 1920.

FINANCIAL NOTES

Colonel Samuel P. Colt, chairman of the board of directors of the United States Rubber Co., denies the reports that his company will require new financing before January 1. He calls attention to the fact that the business of the United States Rubber Co. is well balanced between footwear, tires and mechanical goods, the former being its largest product, and tires being about one-third of its total production. He stated that there had been no falling off in the volume of the company's sales taken as a whole.

A $500,000 issue of 7 per cent cumulative preferred stock has recently been announced by the Converse Rubber Shoe Co., Malden, Massachusetts. This is the first block to be sold from the last authorized increase of $2,000,000 in the company's capitalization.

The Falls Rubber Co., Cuyahoga Falls, Ohio, increased its authorized capital stock $1,500,000 on October 1, giving the company an authorized capital of $2,500,000, all common stock.

The following is the statement of Boston Woven Hose & Rubber Co., Boston, Massachusetts, as of September 1, 1920.

Assets			
Patents			$1.00
Office furniture			1.00
Land and buildings	$2,352,053.46		
Less depreciation	816,457.90		
		$1,535,595.56	
Machinery and tools	$2,325,961.74		
Less depreciation	1,256,940.37		
		1,069,021.37	
Cafeteria fixtures		5,055.76	
			2,609,672.69
Cash		$465,215.18	
Accounts receivable		1,791,264.77	
Notes receivable		16,392.00	
Merchandise inventory		4,926,299.26	
			7,199,171.21
Notes receivable—Employees' stock subscriptions			234,066.41
Liberty Bonds			405,436.00
			$10,448,348.31
Liabilities			
Capital stock, preferred		$750,000.00	
Capital stock, common		4,200,000.00	
			$4,950,000.00
Loans, bills payable		$2,455,000.00	
Loans, Liberty Bonds		325,000.00	
Accounts payable		515,116.24	
Accrued wages		41,235.96	
			3,336,352.20
Surplus			2,161,996.11
			$10,448,348.31

A group of New York and Chicago bankers has advanced a substantial sum to The Goodyear Tire & Rubber Co. and further amounts will be provided as required. Goodyear business continues on an even keel, showing sales for the first 26 days of September in excess of $14,000,000. With the fiscal year ending October 31 sales to date exceed $195,000,000, and will thus go far above $200,000,000 for the year, as compared with slightly over $167,000,000 last year.

It is reported that The Perfection Tire & Rubber Co. will issue $1,000,000 8 per cent gold notes for one year to be dated October

1, 1920, secured by a trust deed on the company's plant at Fort Madison, Iowa, the funds to be used for expansion purposes.

The Republic Rubber Corporation has reduced its indebtedness about $4,000,000 in the past three months. On September 30 the indebtedness was $2,600,000 compared with $6,443,991 as of June 30. Inventory on hand and in transit shows about $5,000,000 as against $8,972,456 on June 30.

The National Aniline & Chemical Co., Inc., New York City, has increased the common shares of its stock to 554,386 and the capital to $26,296,630.

NEW YORK STOCK EXCHANGE QUOTATIONS

October 23, 1920

	High	Low	Last
Ajax Rubber Co., Inc.	41	40¾	40¾
The Fisk Rubber Co	20¾	20⅛	20½
The B. F. Goodrich Co.	50⅜	48¼	50
The B. F. Goodrich Co., pfd.	84	81	82¾
Kelly-Springfield Tire Co.	53½	51⅜	52½
Kelly-Springfield Tire Co., pfd.	91½	91½	91½
Keystone T. & R. Co., Inc.	15½	14¼	14½
Lee R. & T. Corp.	20⅜	20⅜	20⅜
United States Rubber Co.	77¾	75½	77⅜
United States Rubber Co., pfd.	106¼	105	106¼

CLEVELAND STOCK EXCHANGE QUOTATIONS

The following quotations on the Cleveland Stock Exchange, October 19, of stock of the principal rubber companies were supplied by Otis & Co., Cuyahoga Building, Cleveland, Ohio:

	Last Sale	Bid	Asked
Firestone T. & R. Co.	106	105	...
Firestone T. & R. Co., 1st pfd.	88½	88½	90
Firestone T. & R. Co., 2d pfd.	83½	...	...
General T. & R. Co., pfd.	102	...	102½
The B. F. Goodrich Co.	52¼	...	...
The B. F. Goodrich Co., pfd.	84¾	...	85¼
The Goodyear T. & R. Co.	70	65¼	67½
The Goodyear T. & R. Co., 1st pfd.	77⅜	75	77
Kelly-Springfield T. & R. Co.	156⅛	...	...
Kelly-Springfield T. & R. Co., pfd.	120	...	...
The Miller Rubber Co.	115	...	112
Portage Rubber Co.	45	...	50
Portage Rubber Co., pfd.	60	62½	67
Star Rubber Co.	350¾	...	...
Swinehart T. & R. Co.	80	...	...
Victor Rubber Co.	22	...	24

NEW INCORPORATIONS

American Insulator Corp., The, September 17 (Massachusetts), $1,000,000. E. L. Clarke, 3 Wilshire street; V. M. Kempton, Marshall street, both of Winthrop; G. C. Cutler, Jr., Heath street, Brookline—both in Massachusetts. Principal office, Boston, Massachusetts. To manufacture and deal in plastic and other materials for insulation, heat resisting and other purposes.

Apex Tire & Rubber Co., October 15 (Delaware), $1,000,000. M. E. F. Hawkins; W. L. Iourdan; E. E. Borton—all of Wilmington, Delaware. To manufacture tires.

Armstrong Tire & Supply Co., September 20 (Delaware), $225,000. F. R. Hansell; J. V. Pimm; E. M. MacFarland—all of Philadelphia, Pennsylvania.

Brix Rubber Cement Co., Inc., September 23 (New York), $10,000. L. Knapp, 33 Jackson avenue; T. Brix, 2349 Second avenue; M. Streeve, 153 Ninth street—all of Long Island City, New York. To manufacture rubber cement, tires, etc.

Brock Co., The, September 22 (Massachusetts), $40,000. F. M. Hanson, Saugus; L. M. Marsh, Roslindale; A. M. Monahan, Boston—all in Massachusetts. Principal office, Boston, Massachusetts. To manufacture and deal in rubber goods.

Chalfin & Co., Inc., Joseph, September 25 (New York), $1,500. J. and F. Chalfin, both of 795 Crotona Park North, Bronx; I. Bromberg, 396 Christopher avenue, Brooklyn—both in New York. To do a general rubber business.

Crescent Tire & Rubber Co., September 28 (Delaware), $100,000. M. L. Rogers; M. M. Nicholson; W. G. Singer—all of Wilmington, Delaware.

Dun-Pen Co., October 18 (Delaware), $21,000,000. T. L. Croteau; M. A. Bruce; S. E. Dill—all of Wilmington, Delaware. To manufacture fountain or stylographic pens.

Ewing Rubber Co., September 29 (New Jersey), $100,000. A. F. Updike; J. Schultz; A. Emrick—all of Trenton, New Jersey. Principal office, Homan and Hilton avenues, Hillcrest, New Jersey. Agent in charge, E. F. Updike. To manufacture, buy, sell and deal in all kinds of rubber goods.

General Tire Sales Co., October 6 (Delaware), $550,000. M. L. Rogers; M. M. Nichols; W. G. Singer—all of Wilmington, Delaware. To deal in automobiles and automobile tires.

Gove & Co., Inc., September 21 (New York), $24,000. F. G. Gove, Jr.; W. Liddle, Jr.; F. L. Byrne—25 Beaver street, New York City. To deal in crude rubber.

Greenpoint Rubber & Metal Corp., September 24 (New York), $10,000. M. Fishman, 18 Franklin street, Brooklyn; P. Fogelman; H. Blum, both of 299 Broadway, New York City—both in New York. Principal office, Brooklyn, New York. To do a rubber and metal business.

Henba Balloon Developing & Transport Co., October 18 (New York), $50,000. J. Henba; G. Frey; R. Hyde—all of 9,201 Fort Hamilton avenue, Brooklyn, New York. Principal office, Brooklyn, New York. To make airplanes, etc.

Joburn Rubber Corp., September 29 (New York), $5,000. H. Joseph; A. M. Burnham; E. Levy—all of 1 Madison avenue, New York City. To manufacture rubber.

Le-Rex Products Co., The, September 22 (Massachusetts), $25,000. J. S. Herrick, 164 Strathmore Road, Brighton; S. Olansky; 3 Westminster Road, Roxbury; M. H. Webb, 1340 Commonwealth avenue, Allston—all in Massachusetts. Principal office, Boston, Massachusetts. To manufacture and sell druggists' sundries, etc.

Liberty Rubber & Supply Corp., October 13 (Delaware), $100,000. E. E. and F. C. Jeffords, both of Erie, Pennsylvania; C. C. Densford, Buffalo, New York. To deal in tires.

Lincoln Shoe & Rubber Co., September 16 (Massachusetts), $50,000. J. L. Wiseman, 21 Homestead street; E. Adlow, 35 Elm Hill Park, both of Roxbury; G. L. Kotzen, 86 Orange street, Chelsea—both in Massachusetts. Principal office, Boston, Massachusetts. To buy, sell and deal in shoes, rubbers, etc.

Littell-Coombs Co., Inc., September 28 (New York), $5,000. M. C. Coombs, 607 East 29th street; F. G. and I. H. Littell, both of 32 Chester Court—both in Brooklyn, New York. Principal office, Brooklyn, New York. To manufacture rubber goods.

Mathey Brothers, Inc., September 23 (New York), $15,000. F. A. Mathey, president, 506 West 45th street; J. H. Jackson; M. M. Coughlin, both of 27 William street—both in New York City. Principal office, 506 West 45th street, New York City. To sell truck tires.

National Gasoline Hose Co., Inc., October 5 (New York), $1,000. I. E. Maginn; J. R. Cogen; W. P. Cavanagh—all of 1476 Broadway, New York City. To manufacture hose.

Standard Wire Tire Corp., September 25 (New York), $100,000. B. J. Bowers, 159 Herkimer street; S. S. Shears, 221 Hancock street, both in Brooklyn; A. L. Chauvet, 51 Hamilton Place, New York City—both in New York. To manufacture tires, etc.

Starbestos Textile Co., September 28 (Massachusetts), $100,000. T. J. G. Armstrong, 37 Partridge avenue, Somerville; M. F. Ford, 47 Water street, Hyde Park; G. M. Faulkner, 1870 Commonwealth avenue, Brighton—all in Massachusetts. Principal office, Boston, Massachusetts. To manufacture and deal in asbestos yarns, brake linings and any and all textiles containing asbestos.

Thomas Tire & Rubber Co., The, September 14 (Ohio), $100,000. W. S. Thomas, president; G. B. Thomas, vice-president and sales manager; T. Richards, treasurer; M. S. Lower, general manager; L. H. Jones, secretary. Principal office, Millersburg, Ohio. To manufacture pneumatic automobile tires.

Thrift Garter Co., October 4 (New York), $20,000. C. Cohen; M. L. Blumberg; H. Miller—all of 546 West 146th street, New York City.

Tireheal Manufacturing Co., Inc., October 6 (New York), $150,000. R. H. Raphael; J. Leiman; S. Schnaps—all of 2 Rector street, New York City. To repair tires.

Tompkins Rubber Manufacturing Co., October 16 (Delaware), $300,000. E. E. Tompkins, Narberth; J. M. Stitzer; T. E. Montgomery, both of Philadelphia—both in Pennsylvania.

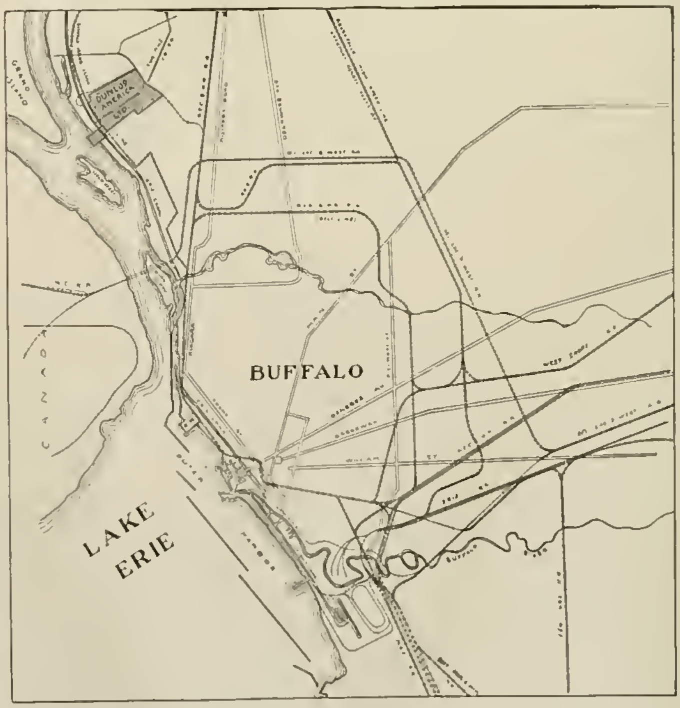
Union County Tire & Rubber Co., October 1 (New Jersey), $100,000. J. A. Kelly, 17 Nutman Place, West Orange; D. Seaman, 798 Hunterdon street, Newark, both in New Jersey; J. Berkelhamer, 34 Lander street, Newburgh, New York. Principal office, 2 South Broad street, Elizabeth, New Jersey. Agent in charge, A. G. Weinberg. To buy, sell, import, export, trade and generally deal in tires and all rubber articles.

United Process Co., Inc., September 24 (New York), $10,000. I. Goldfarb, 134 West 26th street; D. W. and R. Goldfarb, both of 953 Simpson street, Bronx—both in New York City. To manufacture raincoats.

United Tire Stores of Buffalo, September 25 (Delaware), $250,000. W. A. McCoy, Pittsburgh, Pennsylvania; W. J. N. Lofland and F. M. Jackson, both of Dover, Delaware.

WHY DUNLOP WENT TO BUFFALO

Considerable speculation has been aroused as to why the plant of the Dunlop Tire & Rubber Corporation of America was lo-



The Dunlop Corporation Has Purchased Land Extending to the Niagara River That Provides an Abundant Supply of Water and Affords a Convenient Location for Docking Facilities

cated at Buffalo. The accompanying map will give a more exact idea of just where the Dunlop factory is and also illustrates some of the reasons why it is there. Two facts are quite evident from

this map, one being the large number of railways entering the city, and the other that the Dunlop plant is not only on one of the main rail routes but also on what is destined to be a great water highway as well.

There are some fourteen lines of railroads operating into Buffalo and half the population of the United States lives within a circle whose center is Buffalo and whose radius is one night's journey by rail. Buffalo is within easy access of power, fuel, and markets, including New York City, our greatest port of entry and the largest rubber importing port as well. Therefore, after the analysis of a broad survey the company decided that out of twenty different possible locations Buffalo had more points of advantage for an automobile tire manufacturer than any other city.

The factory is situated in the town of Tonawanda, one mile north of the Buffalo city limits on River road, which runs parallel with Niagara River, being separated from it by the Erie canal and a strip of foreshore. The company has acquired land fronting on the river, which will give access to wharves, so that advantage can be taken of any new developments in water transportation. Plans are in prospect which may ultimately make all of our Great Lakes cities ports of entrance and exit for ocean-borne commerce, and there is the practical certainty of water transportation to Chicago, Detroit, Cleveland, and New York, which are all great tire distributing points.

In view of the large amount of power required in a rubber works, it is a point of importance that in Buffalo there are two ample sources of power supply, both of which are turned into the same mains. Manufacturers have available the supply from the great Niagara Falls plant, as well as the new plant of the Buffalo General Electric Co., which was built during the war as a war measure and is now proving to be quite as valuable in peace times.

PERSONAL MENTION

V. G. Thomas, treasurer of L. H. Butcher Co., New York City, importer and exporter of minerals, colors, and chemicals for the rubber and allied trades, has been elected to membership in The Merchants' Association.

E. W. Newell, engineer, Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, and Harry Young Stebbins, engineer for The Goodyear Tire & Rubber Co., Detroit, Michigan, at Warsaw, Poland, have been elected junior and foreign members, respectively, of the Society of Automotive Engineers.

James H. Aldred, for a number of years assistant chief chemist for the Firestone Tire & Rubber Co., Akron, Ohio, has been appointed chemist for the Smith Rubber & Tire Co., Inc., Passaic, New Jersey.

J. J. Williams has been appointed general production superintendent of The Federal Rubber Co., Cudahy, Wisconsin, effective September 1, 1920.

CANCELLATION OF ORDERS DENOUNCED

A country-wide appeal by an executive committee of The National Association of Credit Men urges a return to solid business principles of good sense and honesty in the sale of commodities. The cancellation of orders is denounced as a contributing cause to business paralysis, responsible for failures of many industrial plants, and the return of merchandise is also held an unnecessary waste and one of the abuses that provoke disorders in business.

The committee suggests that the buyer should not be urged to purchase beyond his needs, but should be sold in good faith and buy in good faith. As the committee sizes up the situation, it is time that the entire business community should be controlled by a strong business conscience which will not under any circumstances allow actions which violate business decency.

STERLING AGAIN WINS R. I. A. L. PENNANT

Ever since The India Rubber World donated a silver cup to the Rubber Industries Athletic League we have watched with friendly interest the contests of the baseball clubs for the permanent possession of the trophy. At the close of the season it was announced that the team of the Sterling Tire Corporation of Rutherford, New Jersey, has for the second consecutive year won the pennant in the Rubber Industries Athletic League. The standing of the clubs at the end of the season of 1920 was:

	Games	
	Won	Lost
Sterling	14	2
United States	11	4
Ajax	6	7
Goodyear	2	12
Keystone	2	6
Kelly-Springfield	1	3

This second victory was especially unusual since the Sterling Tire Corporation is probably the smallest of the organizations represented in the league and, unlike some of the others, is composed entirely of amateurs recruited from the factory. None of them had played much more than the normal "open lot" games, although their pitcher, Harvey Davis, has been showing professional class in winning 34 out of 40 games played during the Rubber Industries Athletic League's two years of existence.

One somewhat interesting incident in connection with the second victory was the fact that one of the Sterling 1919 players, to whose work the victory of that year was in some degree attributed, in 1920 became a member of another club in the league Contrary to expectation, this change did not visibly affect the work of the Sterling team.

Sterling Base Ball Team and The India Rubber World Trophy Cup

The India Rubber World trophy must be won three times. Manager Rourke of the Sterling team announces that his organization will be after the third leg on the cup next season.

Batting and fielding averages of the champions were as follows:

Players	Position	Games	Batting Average	Fielding Average
J. Rourke	1st B.	14	413	955
T. Calandriello	S. S.	14	333	918
A. Roache	C.	14	311	984
W. Jackson	L. F.	14	310	900
C. Hess	3d B.	14	283	804
P. Dittrich	C. F.	13	265	1000
W. White	R. F.	14	237	818
H. Davis	P.	13	205	967
T. Brameld	2d B.	13	205	921
A. Jackson	O. F.	2	167	1000
G. Meany	O. F.	4	000	1000
W. Markowsky	I. F.	1	000	1000

THE RUBBER TRADE IN THE EAST AND SOUTH

By Our Regular Correspondent

The Staybestos Manufacturing Co., 5522 Lena street, Germantown, Philadelphia, Pennsylvania, has purchased a lot at Germantown avenue, Apsley and Berkley streets, on which a factory is in course of erection which it is expected will be finished about the first of the year. The new building will be occupied by the Staybestos Manufacturing Co. and the National Asbestos Co., separate concerns but financed by the same people. The National company manufactures woven asbestos products which are sold in the untreated state in which they come from the looms, while the Staybestos company manufactures brake linings and other asbestos products for the automobile industry.

NEW YORK NOTES

The Ackurate Rubber Co., Inc., 253 Broadway, New York City, recently incorporated in New Jersey for the manufacture of insulating tapes, compounds, etc., has already put on the market its "Ackerman" friction tape, in novel paper cartons. The New York trade is being handled direct and agencies in the principal cities of the United States will be established.

The Edward A. Cassidy Co., 23-31 West 43d street, New York City, is the sales division of The Sterling Varnish Co., Pittsburgh, Pennsylvania, which manufactures "Nitrex," a substance for painting spare tires to prevent oxidation and the collection of rust on tire rims. This specialty was described in our January issue.

The Westinghouse Electric & Manufacturing Co., E. Pittsburgh, Pennsylvania, has acquired control of the International Radio Telegraph Co., 326 Broadway, New York City, an operating organization engaged in radio communication, etc. The older International Radio Telegraph Co. has been reorganized with a capital of $1,250,000 preferred stock and 250,000 shares of common stock of no par value.

The officers are Guy E. Tripp, chairman; E. M. Herr, president; S. M. Kintner, Calvert Townley, and H. F. Davis, vice-presidents, and J. V. L. Hogan, manager. All of these are Westinghouse officials except Messrs. Kintner and Hogan, who were president and manager respectively of the older company. The Westinghouse has equipped a special factory at East Springfield, Massachusetts, for the manufacture of wireless apparatus.

Gaston, Williams & Wigmore, Inc., formerly at 39 Broadway, has removed to the Buckley-Newhall Building, 100 West 41st street, New York City, where it has leased three floors and basement for 15 years. The October number of the *G. W. W. Bulletin*, the company's house organ, devoted the first page to a brief account of the removal and the reasons for it, accompanied by a photograph of the building where its new quarters are.

The Fellsen Tire Co., 1995 Broadway, New York City, has increased its capital from $30,000 to $100,000.

The Walters Rubber Co., Inc., of New York, Mineola, New York, is the Long Island distributer for Federal and Amazon tires, Firestone truck tires, and Walters tubes. H. S. Walters is president.

SOUTHERN NOTES

The India Tire & Rubber Co., Akron, Ohio, has appointed The General Auto Supply Co. its distributer in Richmond, Virginia, and vicinity.

The Cumberland Tire & Rubber Co., Inc., Louisville, Kentucky, has purchased the plant, property, and assets of the Ten Broeck Tyre Co. of the same city, including the textile fabric mill. The offices are at 26th and Courtney streets. The Cumberland company will make cord tires and tire fabric exclusively and will be able to sell cord tire fabric to outside buyers above its own requirements. The officers of the company, which was recently incorporated, are: F. W. O'Brien, president; S. J. Dant, secretary and treasurer; and A. L. Henry, chairman of the board of directors. Production is looked for sometime in November. The name "Ten Broeck" will be discontinued, the company featuring its own name, "Cumberland," as its brand.

The McClaren Rubber Co., Charlotte, North Carolina, has appointed the J. D. Bowen Co. its Florida distributing representative at 327 Laura street, Jacksonville, Florida, with a branch at Tampa, in the same state.

The Victory Rubber Manufacturing Co., 259 Peachtree street, Atlanta, Georgia, has its factory at East Point in the same state and was recently incorporated to manufacture "Sealtyte Leak-Proof" inner tubes The officers of the company are: Homer S. Prater, president; George J. Reuter and W. H. Camp, vice-presidents; B. Graham West, secretary-treasurer; and the following directors in addition to the above—A. P. Phillips, C. W. McClure, W. M. Morris, A. McD. Wilson, T. L. Shapard, and Dr. James N. Brawner.

Frederick J. Schlosstein was appointed receiver of the Baltimore Rubber Tire Manufacturing Co., Inc., Monument and 11th streets, Orangeville, Baltimore, Maryland, on October 1, 1920. In addition to the entire stock of finished tires, the equipment of the plant, or the plant and equipment together, will be disposed of. The property, which is located on the main line of the Pennsylvania railroad, consists of several large, modern, daylight brick buildings and tire manufacturing machinery.

It is estimated by the Goodrich News Bureau of The B. F. Goodrich Co., Akron, Ohio, that at least half a million people will spend all or part of this winter in the South. According to the severity of the winter in the North, this number may be twice as large. Florida and California are the popular winter resorts and many people travel to these points by automobile. The Goodrich Travel and Transport Bureau is collecting the latest information regarding the roads throughout the South and on the Pacific Coast and will distribute it to motorists without charge on request.

The Virginian Rubber Co., Charleston, West Virginia, has increased its capitalization from $1,200,000 to $2,500,000. Its plant is nearly completed and will be in operation by the first of December, it is hoped. Tires and tubes will be produced.

The new tire branch recently opened in Louisville, Kentucky, by The Miller Rubber Co., Akron, Ohio, will be managed by G Lund. The branch will cover the territory of western Kentucky and southern Indiana.

THE RUBBER TRADE IN NEW JERSEY

By Our Regular Correspondent

THE NEW JERSEY STATE FAIR

The Thermoid, Semple and Home Rubber companies had attractive booths at the recent Trenton State Fair All three companies showed the raw product in the various stages and explained to the patrons of the booths just how tires and other rubber products are manufactured.

The Thermoid company representative in charge handed out blanks to all persons who stopped at the booth and asked them to sign name and address for the drawing of a tire. The names were deposited in a box, and after the drawing the lucky one secured free one of the best tires made by the company.

For the purpose of distributing advertising literature for the Thermoid Rubber Co., Chester Charles, an aviator connected with the advertising department of the firm, made daily flights at the fair. Those who happened to find one of the Thermoid circulars were entitled to a drawing for an expensive Thermoid tire. Young Charles received his air training while in army service.

The Semple Company, which manufactures tubes exclusively, had a sign displayed bearing these words: "All our energy and thoughts are focused on just one product—tubes."

The Liberty Tire & Rubber Co. had an attractive booth and six representatives engaged during the week in selling stock in the concern.

One of the feature events of the automobile races was the Ajax Trophy Sweepstakes. The distance was fifteen laps and the prize money amounted to $1,200, in addition to a handsome trophy donated by the Ajax Rubber Co., of New York.

Barney Oldfield, president of the Oldfield Tire Co., Cleveland, Ohio, who was one of the judges, distributed several hundred miniature automobile tires—made of real rubber—to his friends and to those whom he met at the fair grounds. The tires were four inches in diameter and can be used as paper weights. Oldfield's special automobile, used in many famous races, was demonstrated.

TRENTON NOTES

While automobile tires and tubes are at present selling at greatly reduced prices, the Trenton dealers announce a 20 per cent increase in the prices of all motorcycle and bicycle tires. This is the second recent jump in motorcycle tires. The demand for bicycle and motorcycle tires has greatly increased of late.

The Bergougnan Rubber Corporation, Trenton, announces that it is the only Trenton tire manufacturer selling tires with mileage insurance. The company claims that buyers are entitled to protection and that mileage insurance protects them. With each tire sold the company gives a written agreement.

Papers of incorporation have been filed by the Ewing Rubber Co., of Trenton, for the purpose of manufacturing inner tubes, patches, etc. The authorized capital stock is $100,000. The offices and plant of the company will be located at Homan and Hilton avenues, where the A. F. Updike Rubber Co. recently ceased business. The incorporators of the new company are Archibald F. Updike, James Schultz and Alice Emrick. The Updike Rubber Co. recently erected a plant in the Hillcrest section, where it manufactured tubes and patches. Edwin H. Steel was president of the corporation, while A. F. Updike was secretary-treasurer.

John A. Lambert, treasurer and general manager of the Acme Rubber Manufacturing Co., and president of the Trenton Chamber of Commerce, is at the head of a committee to urge the building of new homes with the aid of building loans.

The Montclair Rubber Co., Trenton, has changed its name to the Montclair Linoleum & Rug Co.

The Para Rubber Co., 121 East Hanover street, Trenton, has recently changed hands. Irving L. Wright, president and treasurer of the company, has retired from the business. C. E. Bevington and Vernon Jones are the new owners.

J. Cornell Murray, secretary and treasurer of the Empire Tire & Rubber Corporation, Trenton, who recently underwent an operation for appendicitis at the Mercer Hospital, Trenton, has recovered.

The firm of Joseph S. Papier and Philip Papier, dealers in automobile tires and accessories, Trenton, has been dissolved. The former takes over two stores, while Philip Papier will continue the East Front street tire shop.

Judge Lynch in the United States District Court has named John O. Bigelow, of Newark, as receiver for the Trent Rubber Co., Trenton, tire manufacturer. The receiver was named upon the petition of the McLain, Hadden, Simpers Co., a Pennsylvania corporation, and Carl Ludwig, New York, on behalf of themselves and other creditors and stockholders of the company.

H. A. Ludeke, president of the company, in an affidavit, contends that the corporation is solvent, but that because of inability to get its plant in operation upon the date desired, it lost the spring trade, and that it is without sufficient ready cash to meet its obligations. The present stringency of the money market also added to the difficulties of the concern. I. A. Worthington is vice-president of the company, and E. H. Unkles is secretary and treasurer. All are Trenton men.

"The Story of the Tire," a three-reel picture, was recently shown at the K. B. Motor Sales Shop, Trenton, by The Goodyear Tire & Rubber Co., of Akron, Ohio. A special representative was sent from the factory to explain the various abuses which cause a tire to go out of service before it has rendered normal mileage, and how they can be prevented. Just how a tire is made by workers in the Goodyear plant was also shown.

MISCELLANEOUS NEW JERSEY NOTES

De Mattia Brothers, Inc., manufacturers of tire building equipment, will erect a three-story machine shop addition to the plant at Garfield, New Jersey.

The Rubber Products Co., of 411 Wilson avenue, Newark, will shortly erect a one-story brick and cement machine shop to cost $5,000.

The Smith Rubber & Tire Co., Inc., 625 Main avenue, Passaic, New Jersey, invited all of its stockholders to make a personal inspection of its new factory on Columbus Day. A large number responded and refreshments and music were furnished. The company owns eight acres of land on which it plans to build other structures in the spring. The present factory is located on the Erie Railroad, ten miles from New York. Mechanical rubber goods will be added to the company's lines.

THE RUBBER TRADE IN MASSACHUSETTS

By Our Regular Correspondent

A change in buying sentiment is being felt in the New England rubber trade, especially in tires. People are still buying conservatively, but it is believed that the bottom has about been reached. The publicity given by The B. F. Goodrich Rubber Co. to the fact that tires are actually 20 per cent cheaper and of better quality than in 1910, whereas the prices of most other commodities have been sky-rocketing, has had telling effect. After a thorough survey of the national market most Massachusetts dealers are agreed with James J. Rosenfield, general manager of the Boston Auto Tire Exchange, who regards the 1921 outlook most encouraging, as a result of the stabilizing influences of the past few weeks.

Keeping the highways open during the winter months is one of the big problems in making truckportation the success it must be to meet present and future traffic needs. Urged by the leading industries of the state, Massachusetts has taken up the matter with characteristic promptness. The legislature of 1920 passed an act authorizing the Department of Public Works to cooperate with city and town authorities, and to accept financial or other assistance from individuals, partnerships and corporations. The state is to furnish suitable equipment, to supervise its use, and during the years 1920 and 1921 may expend such sums as may be appropriated by the General Court not exceeding $50,000. Forty plows have been purchased to be operated in conjunction with motor trucks, and the commissioner of public works desires to ascertain what individuals or corporations will in time of need furnish trucks and operators to work these plows, as the appropriation is insufficient to carry out the project without considerable cooperation from the industries which are to benefit by it.

The plan is to keep open the trunk line highways in the territory about Boston, including Lowell, Lawrence, Lynn, Salem, Haverhill, Fitchburg, Taunton, Brockton, Fall River, New Bedford, to the State line on the Providence road, Worcester, Springfield to the Connecticut line, Holyoke and Chicopee Falls.

BOSTON NOTES

Highway and housing conferences featured the annual meeting of the Massachusetts Chamber of Commerce at the Hotel Vendome, Boston, October 15. E. F. Broadwell, vice-president of The Fisk Rubber Co., Chicopee Falls, Massachusetts, spoke on "The Business End of Highways; Are Good Highways Good Business?"

Henry C. Link, service supervision department of the United States Rubber Co., and Dr. R. S. Quinby, service manager of the Hood Rubber Co., were among the speakers on the program for the Human Relations Section conferences of the Associated Industries of Massachusetts, held in Boston October 28 and 29.

Stanley L. Blood, district manager for the New England territory of the Dayton Tire Co., has been promoted to general sales manager at the factory at Dayton, Ohio. Mr. Blood enjoys a wide acquaintance in the trade and is regarded not only as a successful distributer but as a general merchandising expert of exceptional ability.

Frederic C. Hood, treasurer of the Hood Rubber Co., Watertown, delivered a notable and timely address on the subject of "Stability of Industrial Capital" at a luncheon October 28 at the Copley-Plaza Hotel, Boston, in connection with the annual meeting of the Associated Industries of Massachusetts.

"Bring your lunch" clubs, as a protest against excessive restaurant prices, are rapidly increasing in Boston. At The B. F. Goodrich Rubber Co. branch both the men and women have a club, and rooms are provided for the purpose, including a fully equipped kitchen, dishes and silver. The men bring their own lunches and the women cook theirs at a total cost of 20 cents a day per person for supplies. Five girls in rotation prepare the meal for the other sixty and splendid cooks many of them are proving to be.

MISCELLANEOUS MASSACHUSETTS NOTES

The biggest boot and shoe ticket in the history of the Converse Rubber Shoe Co., Malden, Massachusetts, is now being turned out and yet the demand for its goods is not being filled. A daily total of 17,500 pairs of all kinds of footwear was recently reached. The tire division is maintaining two shifts of workmen. No reduction is contemplated and no employes have been laid off through lack of work.

Dr. R. S. Quinby, service manager of the Hood Rubber Co., Watertown, is a member of the executive committee, representing the rubber industry of the Council of Management Education which has been created to put into operation the plan for training executives for the principal American industries in colleges and technical schools that was advocated by Dr. Hollis R. Godfrey, of Drexel Institute. It is apparent that the shortage of trained industrial engineers must be relieved by closer cooperation between manufacturers and institutions of learning, and the Council of Management Education has been organized to become a clearing house to promote a better understanding of the mutual problems of college and industry and to keep a perpetual inventory of the educational needs of industry and the ability of colleges to meet them.

The Fisk Rubber Co., Chicopee Falls, Massachusetts, has been a leader in accident prevention work in rubber mills. What such a campaign will accomplish is shown by the success of its recent "no accident week," when no loss-of-time accidents were reported. The campaign was continued for another week with the same result. This is a splendid example of what it means to make factory carefulness a common habit.

A comprehensive plan for the cooperation of the public schools and the industries of Massachusetts in the work of immigrant education was adopted unanimously by the delegates at the recent Plymouth Conference under the joint auspices of the State Department of Education and the Associated Industries of Massachusetts. The recommendations for procedure by the two agencies are as follows:

1. The Schools: (a) accept provisions of Chapter 295, Acts of 1919; (b) appropriate enough money to get the job well done; (c) provide for classes in industries whenever organized; (d) provide a director of immigrant education; (e) train and supervise teachers; (f) provide suitable text material including motion pictures; (g) organize courses of study.

2. The Industries: (a) Centralize responsibility in a plant director or committee or other effective agency; (b) conduct preliminary study to learn the extent and nature of the problem; (c) recruit classes; (d) provide satisfactory school accommodation; (e) establish an efficient follow-up; (f) provide incentives; (g) collaborate in training teachers and in providing special text material.

Loyalty service pins were recently presented by Frederick H. Jones, president of the Tyer Rubber Co., Andover, to all employes who have been on the company's pay-roll for a year or more. Two women received 35-year service pins, and a number of workers, both men and women, received 25-year pins. Mr. Jones has himself been with the company for 35 years.

The Tyer Rubber Co., Andover, Massachusetts, through the athletic committee of the Tyrian Service Association, has arranged a bowling league composed of teams representing different factory departments. This committee has also been instrumental in the organization of a bowling league made up of teams from the different manufacturing plants of the town, and known as the Andover Industrial Bowling League. Schedules for both leagues begin in November.

THE RUBBER TRADE IN RHODE ISLAND

By Our Regular Correspondent

The fuel situation, with its shortage of supply and the increased price of bituminous coal, together with the lack of cars for the shipping of completed products, is causing the manufacturers of rubber goods in Rhode Island and vicinity much concern and it is feared that these conditions may become gradually worse. These problems, together with those concerning labor—wages, hours and the securing of experienced employes—are materially affecting all industrial prospects. Great efforts, however, are being made to establish Providence as one of the principal ports of entry on the Atlantic seaboard and already various projects are under way, fostered by the Providence Chamber of Commerce, for new steamship lines. One of these is the extension of the Merchants and Miners Line from its present terminal to Baltimore; a new line is proposed to Philadelphia; another to Manchester, England, and a fourth to Cuba. The Fabre Line to the Azores, Lisbon, Marseilles and Rome has recently announced an expansion of its service, so that altogether the future for freights, domestic and export, looks very encouraging.

While there is a general policy of curtailment throughout the textile industry with the shutting down of plants to a schedule of three or four days a week, or a reduction of operating force, there has been no indication of general curtailment among the rubber manufacturers. Business among the manufacturing rubber concerns of Rhode Island continues good, though not driving, and most of them have sufficient orders on their books to keep them in full operation for an indefinite number of months.

A majority of the 2,000 operatives composing the working force in the three plants of the Jenckes Spinning Co. in Pawtucket and Central Falls, have accepted a 15 per cent reduction in wages rather than have the mills shut down for an indefinite period. A short time previous to this agreement a cut was made in the wages of a number of the employes at these plants ranging from 12 to 20 per cent, but this has been adjusted on the uniform basis of a 15 per cent cut. The Jenckes Spinning Co. had been running its plants day and night up to about the first of September, when the day schedule alone was introduced. The company controls three plants, the Jenckes Spinning Co. on Barton street, Pawtucket; the Tamarack Mill on Front street, Pawtucket, and the Central Falls Mill, formerly the United States Cotton Co. The company manufactures tire fabrics as its principal product.

During the past summer practically all of the plants in the

state have been thoroughly overhauled and renovated so that they are now in the best physical condition that they have been since the beginning of the World War, six years ago. Additions that have been under way at several of the plants have been completed, thereby increasing the capacities to a very appreciable extent, while several others have been commenced.

Ground was broken about the middle of the month for a new addition to the wire manufacturing division of the National India Rubber Co.'s plant at Bristol, Rhode Island. The structure is to be located east of the main wire building and will be of brick and mill construction, two stories high and about 100 by 180 feet. When completed the new building will give an increase in floor space of upwards of 30,000 square feet. The new building will be used for the braiding departments, and 192 triple-decker, weather-proof, wire-braiding machines will be installed, making a total of 1,400 braiding machines in the company's wire division.

An Americanization school has been established at the plant of the National India Rubber Co. at Bristol, Rhode Island, which is in charge of the Industrial Relations Bureau, and is under the personal supervision of Mrs. Bacon. The school was opened on September 9, when more of the employes of the plant than could be accommodated under the present arrangements applied for admission. A spacious schoolroom has been provided and furnished with all modern appointments, and there is an efficient corps of teachers. Classes are to be held from 8 to 4 o'clock, five days a week, and the employes are to receive their pay during the time that they spend in the school-room. After the school is fully established on its regular schedule of classes it is expected that at least 200 employes will be accommodated, the majority of whom at present are able to speak but little English.

The valuation on the taxable property of Providence has been announced by the Board of Tax Assessors for this year, and the list contains a number of individuals, firms or corporations identified with the rubber manufacturing industry or its kindred and allied trades that are assessed on a valuation of $50,000 or more. Among these are the following, together with the amount of their assessment: American Multiple Fabric Co., $117,580; Walter S. Ballou, $91,840; estate of Joseph Banigan, $1,139,120; Mary Banigan, $50,720; Augustus O. Bourn, $95,140; Bourn Rubber Co., $292,580; Samuel P. Colt, $340,240; Davol Rubber Co., $627,100; Mary E. Davol, $874,200; Glendale Elastic Fabric Co., $217,300; International Braid Co., $1,215,320; Mechanical Fabric Co., $177,400; Eugene R. Phillips, $153,700; Revere Rubber Co., $2,000,000; Rhode Island Hospital Trust Co., trustee under will of Joseph Davol, $391,600; United States Rubber Co., $3,618,920.

More than 250 employes of the Bourn Rubber Co., Providence, attended the annual outing that was held at Emery Park about the middle of the past month. The party proceeded from the company's plant on Warren street by special conveyance to the grounds, arriving shortly after 12 o'clock, when a luncheon was served, after which the boot cutters defeated the boot makers' team, 11 to 8, in an exciting baseball game, which was one of the principal events on the sporting program of the afternoon. The tug-of-war between the married and single women was won by the married team. The day's outing concluded with the clambake at 4 o'clock.

The Westerly Textile Co. and the Ninigret Co., at Westerly, Rhode Island, that have been working on orders for The Goodyear Tire & Rubber Co., Akron, Ohio, have completed their contracts and temporarily discontinued the production of tire fabric, as there have been no renewals with the Goodyear people, although it is expected that new contracts will be made at an early date that will insure active operations for some time to come.

The Atlantic Tubing Co. is taxed on a property valuation of $67,270 in the city of Cranston, Rhode Island, according to the assessments levied for this year by the Board of Assessors as certified to the city treasurer for collection. Others paying taxes on $5,000 valuation and over are; Arch Narrow Fabric Co., $18,075; William B. Banigan estate, $46,900. In the town of East Providence the American Electrical Works is taxed on $838,590, and the Washburn Wire Co. on $585,050.

The Central Warp Co. is one of the busiest concerns in the Blackstone Valley and is running to its full capacity, with an increase of orders coming every day. The manufacture of yarns for tire fabrics is one of the most important branches of the concern's business and is expected to become more important in future operations.

The Lynn Rubber Co., of Warren, Rhode Island, has made a trust deed of $100,000 to the Industrial Trust Co., which has been recorded at Warren. The bonds are guaranteed by the Kleistone Rubber Co., which has leased the property of the Lynn Rubber Co., at Warren, both real and personal, as a going concern for ten years with an option to purchase at a fixed price.

George L. Drown, Jr., for 15 years in the employ of the United States Rubber Co., has been transferred from the National India Rubber Co., where he was foreman of the binding and spreading departments, to the new Colt plant at Providence, where he is in charge of several departments.

Harlow W. Waite, who for some time has been factory manager in charge of the Revere plant of the United States Rubber Co. on Valley street, Providence, has been transferred to a position of greater responsibility in New York.

James Q. Dealey, Jr., son of Professor Dealey, of Brown University, and now associated with the Lycoming Rubber Co., of Williamsport, Pennsylvania, a subsidiary of the United States Rubber Co., has been named as the 1920 Rhodes scholar from Rhode Island. He was chosen by the electors from four candidates for the appointment. He was a member of the class of 1920 at Brown and since leaving college has been connected with the Industrial Relations Department of the Lycoming Co., and is now managing the factory newspaper, which he recently inaugurated.

THE RUBBER TRADE IN OHIO

By Our Regular Correspondent

AKRON NOTES

Akron, the rubber center of the world, is the thirty-second city in size in the United States, according to the Federal census made public recently.

Summit County, of which Akron is the county seat and hub, including Barberton, Kenmore and Cuyahoga Falls, all small but energetic manufacturing cities, has a population of 286,065 persons. This is an increase of 177,812, or 164.3 per cent over the population ten years ago.

Summit County is now the third largest county in the state of Ohio, Cuyahoga County, of which Cleveland is the hub, being first, and Hamilton County, containing Cincinnati, being second.

The population of the state of Ohio has increased more than 1,000,000 the past ten years. The total has been announced as approximately 5,757,461 for 1920 as compared with 4,767,121 in 1910. This is an increase of 20.8 per cent. Only one county is missing from the Ohio census figures. Ohio leads the United States in the number of cities having over 200,000, having five such cities, and ties Massachusetts with seven cities over 100,000, being exceeded by none.

The increased population is mainly in the cities, the rural counties as a rule remaining practically stationary or losing. The increase is obviously due to the greater manufacturing carried on in the state. During the war the Government census of manufacturing districts showed that a circle with a 200-mile radius with Pittsburg as a center would include more than 30 per cent of the manufacturing area of the whole United States. Akron and Summit county are in that area, as is Cleveland, Lorain and other eastern Ohio cities.

The increasing population of cities in Ohio has led to considerable speculation regarding the future food supply of the country, which was one of the principal topics of discussion at the annual meeting of the Federal Highway Council at Akron the latter part of September.

L. J. Taber, master of the Ohio State Grange, at a dinner given the Council by the Akron Chamber of Commerce at the Portage Country Club, warned highway builders, automobile and truck men that the time has come when the food supply of the nation is menaced by the fact that the farms are being depleted because of the wages paid by the industries in the cities. He cited Akron as an example and was frankly pleased to learn that men are going from Akron back to their homes on the farm.

The eight speakers who followed Mr. Tabor dwelt mainly upon the necessity for increased rapidity of transportation from the farm to the cities to overcome the scarcity of help on the farms. Among them were Paul W. Litchfield, factory manager of The Goodyear Tire & Rubber Co.; F. S. Holbrook, vice-president and treasurer of the American Railway Express Co.; S. M. Williams, chairman of the Council; A. R. Kroh, of The Goodyear Tire & Rubber Co.; Dr. R. S. McElwee, of the foreign bureau of the Department of Commerce, and David Beecroft, of the Class Journal Co., of New York City.

Mr. Litchfield asserted that the pneumatic tire will replace the solid tire in truck transportation because it is better able to stand the hard bumps of the road with heavy loads. Multiple-wheel trucks will be the ultimate means of carrying heavier loads at greater speeds. He said that the Goodyear company employs two men in agriculture to each man employed in the rubber mills. For every pound of cotton grown for tires on the Goodyear plantations two pounds of food are raised.

Dr. McElwee believes that the industries of the country are producing more than the home market can consume and the only hope for keeping the mills of America running at top speed is to enlarge our foreign commerce. The United States, he said, has become the trade center of the world, following the world war, and foreign trade alone will make it possible to take care of our increasing manufacturing plants and industrial population.

One of the first problems to be taken up by the Council is an adequate supply of water for home and industrial consumption.

Horseback riding in the home of the automobile tire promises to be revived through the formation of a group of cavalry as one unit of the Ohio National guard stationed at Akron. The troop is being organized by Major Joseph Johnston, son of W. A. Johnston, president of the Rubber Products Co., Barberton, Ohio. It will consist of thirty saddles. Several years ago when automobiles were not as popular as now, Battery B of the national guard made Sunday riding popular. The fact that H. S. Firestone, president of the Firestone Tire & Rubber Co., established a riding school at his home last winter that may be repeated this year lends additional support to the belief that riding horses will again become popular here.

Much speculation has resulted from a visit to Akron by Henry Ford, head of the Ford Motor Co., of Detroit, and his son Edsel, active head of the company. They spent two days late in September with H. S. Firestone, president of the Firestone Tire & Rubber Co. Coming directly after the announcement of decreased prices for Ford automobiles his visit was for a time looked upon as a step to lower the price of automobile tires. Mr. Ford was quoted in Canton and Cleveland newspapers to the effect that he intended building his own tire factory, but Mr. Ford denied having given out such an interview.

The agreement reached with the mine operators, railroads and dealers by the transportation department of the Chamber of Commerce before the Interstate Commerce Commission has resulted in more than 16,000 loads of coal being distributed in Akron during the past month. According to W. W. Hall, traffic commissioner of the Chamber, conditions will not be serious this winter unless strikes prevent the mining or moving of coal.

Ralph H. Upson, holder of the Gordon Bennett International balloon race trophy, Akron's best-known aircraft man, has resigned from his position as head of the aeronautical department of The Goodyear Tire & Rubber Co. to develop a commercial "lighter-than-air" transportation company. Mr. Upson has maintained for several years that the rigid type of lighter-than-air craft is the ultimate solution of the lighter than air problems and this is the type of machine his new company will develop.

According to factory heads the educational literature sent out by Akron tire companies regarding the preservation and care of tires to get maximum mileage has resulted in an increase of more than 20 per cent in the service given by tires, and this as a consequence has decreased the sale of tires to some extent. This campaign will be enlarged during the next few years, it is said.

The first temporary grade separation on Miller avenue, the main artery to the Firestone Tire & Rubber Co. and The B. F. Goodrich Co., has been opened by the city of Akron and the railroads. For many years the traffic to these two plants has been held up by railroad traffic. The city and railroads will spend $3,000,000 in building other separations over railroad tracks during the next few years. This will remove one of the worst handicaps to transportation in the city.

W. R. Ridge, president of the Rubber Engineering Co., Akron, has resigned his position as president of the Andes Tire & Rubber Co., Toledo, Ohio, to which he was elected some time ago, in order to devote his entire time to rubber engineering and other business interests.

W. H. Barkwill, Akron, has purchased the mold manufacturing department of The Die Sinking & Machine Co. of the same city, and will continue the business under the same name. He expects to incorporate and build a larger plant.

J. W. Jordan, for ten years in the accounting department of The B. F. Goodrich Rubber Co., and for the past few years assistant auditor, has been made auditor of the company to succeed W. Murray, who recently resigned.

John R. Gammeter, head of the experimental department of The B. F. Goodrich Rubber Co., advised Akron business men to prepare to do business on a pre-war basis at a dinner given by the Akron Builders' Exchange recently.

J. C. Clinefelter has been promoted from the position of production superintendent to that of sales manager of The Akron Standard Mold Co., Akron, manufacturer of rubber molds and machinery. He was formerly chief engineer of The Portage Rubber Co., Barberton, Ohio, and previous to that was assistant chief engineer for the Republic Rubber Corporation, Youngstown, Ohio.

More than 8,500 employes of The Goodyear Tire & Rubber Co. voted in the second annual election of the company's industrial republic held recently. More than 1,000 women went to the polls.

Six of the ten present members of the Goodyear senate seeking reelection were defeated in their senatorial districts in the factory. Of twenty-three members of the house of representatives, running for second terms, only ten were reelected. Senator E. J. Hard, first president of the Goodyear senate, was defeated by twenty-two votes for reelection by Fred Arbogast. J. B. Long, speaker of the lower house, was reelected.

Both houses of the industrial assembly will convene early in November to elect presiding officers for the year. P. W. Litchfield, vice-president and factory manager, who conceived and established the Goodyear industrial republic, will continue to sit in the same relation to the industrial legislators as the President of the United States to Congress.

In such capacity during the first year of the republic's operation

Mr. Litchfield never was required to exercise his veto power over bills passed by either house.

CLEVELAND NOTES

Lawrence A. Subers and others, Cleveland, Ohio, have filed a bill in equity in the Court of Chancery of Delaware against the American Rubber Products Co. and the Continental Securities Co., alleging the illegal control, holding and sale of a large portion of the common shares of the American Rubber Products Co. and asking for injunctions.

The Ideal Tire & Rubber Co., East 17th street and Euclid avenue, Cleveland, Ohio, manufacturer of "Greyhound" tires and tubes, has taken over the Porter Rubber Co. of Salem, Ohio, and begun to manufacture tires at that plant. I. R. Davies is president and general manager.

MISCELLANEOUS OHIO NOTES

C. C. Mosher, vice-president of the company, has been appointed receiver of The East Iron & Machine Co., Lima, Ohio, by the United States District Court, Northern District of Ohio, Western Division. This action has been taken, it is claimed, to protect creditors and the company itself during the general restriction of credit, pending the realization of financial plans to meet increasing business. It is said that the company has a fine surplus and is doing all the business it can finance. Plans to increase the working capital are already under way.

The Oak Rubber Co., Ravenna, Ohio, which has been building a new and larger factory for the manufacture of dipped rubber goods and toy balloons, expects to start operations at an early date with the production of 150,000 balloons daily. The most modern equipment has been installed, including new types of machines approved after experimentation. The officers of the company are: Paul E. Collette, president and treasurer, and John W. Shira, secretary and superintendent.

Barberton, the home of the Rubber Products Co., has organized a Chamber of Commerce. W. A. Johnston, president of the company, was one of the principal organizers.

The Allied Belting Co., Greenville, Ohio, has completed a new brick, concrete and steel factory building, to which it is moving its factory and equipment from Toledo. It has also increased its capital stock from $60,000 to $100,000.

The Climax Rubber Co., with general offices at 21 West Gay street, Columbus, Ohio, has its factory at Huntington, West Virginia, where it manufactures its specialty, the "Climax Compression" inner tube. The officers of the company are: Irving S. Hoffmann, president; H. A. Longshore, vice-president; Merch E. Swanson, secretary-treasurer; and Clyde B. Turner, assistant secretary-treasurer.

The factory and equipment of The Central Rubber Reclaiming Co., Defiance, Ohio, was recently purchased by I. J. Cooper, Cincinnati, and J. F. Schafer, C. E. Hart and D. E. Reynolds, Findlay, Ohio. The company is specializing on the reclaiming of raw scrap friction and also produces a complete line of reclaims for all uses. The new officers are: J. F. Schafer, president; C. E. Hart, vice-president; D. E. Reynolds, secretary and treasurer. A. T. Oakley is general manager.

THE RUBBER TRADE IN THE MID-WEST

OCTOBER MEETING OF MID-WEST RUBBER MANUFACTURERS' ASSOCIATION

The regular monthly meeting of the Mid-West Rubber Manufacturers' Association was held at the Chicago Athletic Association on October 19, the meeting having been postponed one week on account of the regular meeting date falling on Columbus Day. Forty members were in attendance and after the meeting interesting remarks were made by a number of those present, including Joseph F. McLean, Pequanoc Rubber Co., Butler, New Jersey; H. F. Harrah, National-Standard Co., Niles, Michigan; Thomas M. Gardner, Brighton Mills, Passaic, New Jersey; P. E. Findlay, Bibb Manufacturing Co., Macon, Georgia; Charles W. Bliss, Chicago, Illinois; Raymond T. Bill, *Tires*, New York City; Theodore E. Smith, *The India Rubber Review*, Akron, Ohio; J. E. Grady, Archer Tire & Rubber Co., Minneapolis, Minnesota; W. F. Hendrick, Rotary Tire & Rubber Co., Zanesville, Ohio, and E. A. Armstrong, Cleveland Rubber Corporation, Cleveland, Ohio.

A note of optimism was evident in what nearly all of the speakers said, the apparent feeling being that business in the tire industry was already on a firmer basis and that demand was increasing among the dealers.

President John T. Christie read the brief which he had prepared and filed with the Federal Trade Commission in opposition to the continuance of the practice of guaranteeing tire prices against a decline. This was listened to with great interest and appeared to meet the hearty approval of all present.

The following new members were elected:

Regular Member: Malay Rubber Co., 1035 Guardian Building, Cleveland Ohio.

Associate Members: The Akron Gear & Engineering Co., 42 East South street, Akron, Ohio; The Williams Foundry & Machine Co., 52-56 Cherry street, Akron, Ohio.

MISCELLANEOUS MID-WESTERN NOTES

The Wildman Rubber Co., Detroit, Michigan, broke ground on October 12 for its new factory at Brooks, Bay City, in the same state. The company owns sixty acres of land and its factory will be one of the largest in the city when completed.

The A. Plamondon Manufacturing Co., Chicago, Illinois, removed October 1 to its new location at 5301 South Western Boulevard.

The Monroe Tire Corporation, 1825 Michigan avenue, Chicago, Illinois, has been organized as factory distributer and jobber of tires, tubes and sundries. The officers are: Harold J. Samuels, president, and Leroy Eschner, vice-president and treasurer. They were formerly secretary and sales manager, respectively, of the World Tire Corporation, from which they resigned to go into business for themselves.

The Liberty Vulcanizer Manufacturing Co., Madison street and Ninth avenue, Milwaukee, Wisconsin, is removing to its new building at 1212-1214 National avenue. The company manufactures vulcanizing plants, separate molds, small boilers, various kinds of burners, and other equipment for repairing tires.

The India Tire & Rubber Co., Akron, Ohio, has appointed the Allen & Guard Tire Co. its distributer for the State of Colorado, with headquarters in Denver.

The Forest Products Laboratory, Madison, Wisconsin, has established practical monthly training courses to make available to manufacturers and packers the principles that underlie proper box and crate construction. The course consists of one week's instruction under a staff of competent specialists and the next one will be given from November 8-13, 1920. Those interested may obtain further information from the director of the laboratory.

Earle J. W. Fink, assistant general manager and general sales manager of the Mishawaka Woolen Manufacturing Co., Mishawaka, Indiana, manufacturer of felt and rubber boots and shoes, was married on September 10, 1920, to Miss Nina A. Gabel, a prominent musician and pipe organist, of the same city. The wedding was considered one of the social events of the year.

The Indiana Cord Tire Co., formerly of Mishawaka, Indiana, has changed its name to Burr Oak Cord Tire Co. and is now located at Burr Oak in the same state. The new officers are: R. W. Thomas, president; A. A. Peterson, secretary and general manager; G. E. Watson, vice-president; H. M. Cole, treasurer. The company has raised considerable capital in Burr Oak and is prepared to manufacture a high-class inner liner of merit.

The Oldfield Tire Co., Cleveland, Ohio, has appointed E. H.

Brandt northern district manager, with headquarters at Chicago. He will have charge of sales in eastern Montana, North and South Dakota, Wisconsin, Iowa, Nebraska, Illinois, Indiana, and Minnesota.

The National Association of Waste Material Dealers, Inc., will hold its next quarterly meeting at Chicago, December 8 and 9. The secretary is arranging for a special car from New York and members planning to attend the meeting are urged to reserve accommodations early.

The Prudential Tire & Rubber Co., 813 Hartford Building, Chicago, Illinois, has recently purchased the plant and equipment of The Great Republic Tire & Rubber Manufacturing Co. located at McAlester, Oklahoma, and will operate this modern factory at capacity. W. H. Owens, who was president and general manager of The Great Republic Tire & Rubber Manufacturing Co., has been retained by the Prudential as vice-president and operating manager of the Oklahoma plant.

Organized less than a year ago, the Prudential Tire & Rubber Co. has acquired three plants, the Boone tire plants at Chippewa Falls, Wisconsin, and Sycamore, Illinois, and the Great Republic plant here mentioned, and has also purchased a large tract at Erie, Pennsylvania, where they will build a modern factory early in the spring. Fred A. Seiberling, formerly of the Newcastle Rubber Co., is president of the Prudential, and associated with him is his brother, A. G. Seiberling, vice-president of the Haynes Automobile Co.

THE RUBBER TRADE ON THE PACIFIC COAST

By Our Regular Correspondent

The factories on the Pacific Coast that make tires and other rubber goods are busier than ever. Two of the larger mills, the Pioneer Rubber Works, San Francisco, and the Goodyear Tire & Rubber Company of California, Los Angeles, are steadily adding to their working force and expanding the scope of their operations. A very optimistic view of trade for many months to come is taken by rubber manufacturers and selling agencies on the entire western coast. Three factors referred to as promoting the generally hopeful spirit are: the unusually successful season experienced by the thousands of big fruit raisers, who are counted upon as liberal customers by tire makers and dealers; the rise in railroad freight rates, which is perceptibly aiding truckportation; and the recent reduction in price of some of the well-known makes of automobiles. Tire repairmen also feel very confident that the factors noted will stimulate their business, and better sales of tread gum and other repair stock are reported by mills and supply houses.

LOS ANGELES NOTES

Rubber figured prominently at the National Tractor Show at Verdugo Woodlands, near Los Angeles, recently. Among the notable exhibits were belting for tractors, gasoline hose, steam hose, hose for spray rigs, packing for gas engines, for steam and cold water, and automobile radiator connections. The Goodyear Tire & Rubber Co. of California, made the principal display in these lines. The show was the largest of its kind ever staged in the West, 100,000 square feet of space being used for over 400 different exhibits.

Plans have been perfected whereby Los Angeles banks will lend cotton growers $7,500,000 for picking and ginning the 1920 crop on warehouse receipts, instead of personal credits, which will greatly relieve growers who have been unable to finance their crops beyond the harvest period. The sum of $1,000,000 was made available on October 15.

Business is reported by the several branches of the United States Rubber Co. on the coast to be away ahead of last year, and additions are being constantly made to the sales forces in the Pacific slope cities. The various branch managers are confident of a large increase in business for 1921.

Roy R. Meads, president and general manager of the Pacific Rubber Co., Los Angeles, has gone to Racine, Wisconsin, for a conference with the Horseshoe Tire Co., which concern his company represents on the Pacific Coast.

C. L. Reely, advertising and salesmanager of the Oldfield Tire Co., Cleveland, Ohio, has been visiting Hess & Sackett, Inc., Los Angeles distributers of Barney Oldfield's products.

Over 100 newspaper editors and publishers of Southern California were recent guests of the Goodyear Tire & Rubber Co., of California, and the scribes were much impressed with the magnitude of the plant in Los Angeles, the machinery used in tire-making, and the cotton mill, where cotton spinning and weaving are for the first time conducted on a large scale on the Coast. The Goodyear company has 2,200 men at work and the tire output has risen to 2,300 a day, with 2,500 tubes daily as well as a lot of automobile accessories. September sales were reported the largest in the company's history. An enterprise "on the side" is the Goodyear dirigible passenger-carrying line between Los Angeles and Santa Catalina Island, a 39-mile trip made daily by the Pony Blimp in sixty minutes.

Adolf Schleicher, president of the Samson Tire & Rubber Corporation, Los Angeles, recently spent five weeks studying the big tire factories of the Middle West. The Samson company claims the honor of having produced the first cord tires on the Coast.

SAN DIEGO

The new warehouse of the Spreckels "Savage" Tire Co., San Diego, is nearly ready for use. The building is 670 feet long and its walls and roof are wholly zinc-covered. It will have ten loading doors connecting with a spur of railroad track. The "Savage" factory reports business as excellent, and the company is now considering plans for largely increasing the output.

SAN FRANCISCO AND SACRAMENTO NOTES

The Plant Rubber & Asbestos Works, Inc., 537 Brannan street, San Francisco, California, has taken over the factory and business formerly operated by the Merle Magnesia Manufacturing Co. Magnesia and magnesia pipe and boiler covering are being produced at present and the company plans to offer carbonate of magnesia to the rubber trade in a short time. Plans have already been drawn for an extension to the plant to provide additional space. The officers of the Plant organization are: Sydney L. Plant, president and manager; Charles A. Wright, vice-president; Elliott H. Pierce, secretary; George J. Sivers, treasurer. The company also distributes the products of the Boston Belting Co., Boston, Massachusetts.

The Cleveland Rubber Mold Foundry & Equipment Co., Cleveland, Ohio, is planning to erect a branch plant on the Pacific Coast, in or near Sacramento, California.

A novel display at the recent state fair in Sacramento, California, was the power conservation exhibit of the California Electrical & Mechanical Engineering Co., in which was demonstrated the correct use of rubber belting in operating pumps, cream separators, washing machines, and other farm machinery by power. A unique feature was a threshing machine operated by a 150-foot, 8-inch, 5-ply endless belt, which continuously crushed brick-bats as easily as it threshed wheat.

W. S. Gelette, sales manager for the Rubber Products Co., Barberton, Ohio, who visited the Coast recently, has appointed V. W. Cunningham branch manager for San Francisco, succeeding Stewart Slosson.

The Howe Rubber Co., factory branch for Howe tires and tubes, has moved from 1214 Sutter street to larger quarters at 824 Ellis street, San Francisco.

SOUTHWESTERN NOTES

Long-staple cotton growers in California and Arizona are worried at the slow market for the commodity and the fact that Egypt is looking to the United States as an outlet for thousands

of bales of the long-staple product which Europeans are unable to buy. The Southwest cotton growers fear that the home market will be demoralized if the Egyptian article is allowed to come into this country duty-free, and they point to the fact that Egyptian producers can not only sell the cotton cheaper than the cotton of the Southwest as the labor cost is very much less, but they can also make a good profit on American exchange. Hence many cotton growers and factors are urging a protective tariff to save the Southwest product, especially on Pima or long staple cotton. Little competition is feared on the short staple cotton, as the Southwest practically leads the world in producing the latter, according to Secretary Robert C. Rowland of the Pacific Cotton Exchange in Los Angeles.

The American-Egyptian Cotton Growers' Association of Phoenix, Arizona, has been shipping 10,000 bales of Pima cotton to Los Angeles warehouses, where it will be stored until the market regains its equilibrium. The growers state that many of them would be almost bankrupted if forced to sell at present prices.

The International Cotton League of the West, which includes growers in the United States and Mexico, is now fully organized, and it intends to aid in getting federal legislation or other assistance in stabilizing the industry, as well as in safeguarding crops and seeds from pests. In the league are also state entomologists, state and county horticultural commissioners, and many brokers.

TYPES OF RUBBER FOOTWEAR ON THE PACIFIC COAST

Rubber footwear is gaining decidedly in popularity on the entire Pacific Coast, according to statements made by manufacturers' agents and the leading jobbers in that section. The demand is actually 100 per cent over that of a year ago, say the dealers, whose chief worry now is not so much to sell as to deliver the goods.

For the numerous beaches which line the 1,300 miles of Pacific littoral, and which are available the greater part of the year, there is a steadily-growing demand for women's canvas rubber-soled bathing shoes. Hitherto, they were made almost wholly in black and white uppers. This season, however, manufacturers have not only made the duck shoes more attractive, but they have also introduced many novel effects in tinted satine uppers with corrugated rubber soles. Women's white shoes having a much longer season here, the wearers seek more variety in them. The better class of women's sport shoes are now made quite as modish as leather footwear costing twice as much. They have finely-woven duck uppers, very flexible rubber soles, colored leather trimmings, and rubber-tipped high heels. An old-time objection that rubber shoes made the feet "smart" is said to be entirely removed by improved sole construction.

The high cost of leather footwear is the reason why a great number of men in towns and cities are wearing white duck rubber-soled shoes. Not only have they found that they cost only half as much as leather, but also that the white shoes deflect the hot rays of the sun better than leather, that they are lighter and give the wearer a springier gait. Demand runs strong, especially among the younger men, for white duck shoes trimmed with brown or black leather for every-day use. Among tennis players and athletes generally the canvas shoe with the suction sole is gaining favor, although many wearers of shoes with corrugated soles claim that when well made the latter are superior to "suctions."

In connection with rubbers worn in the rainy or winter season here an odd fact is noted. In the East, where downpours are more general and snow and slush often abundant, low-cut rubbers are in greatest demand. Yet in the Pacific Coast cities where snow is a rarity and the rainfall light high-cut or storm rubbers are preferred by men, and skeleton or toe-hold rubbers by women.

Rubber boots find ready sale among the fishermen who supply the great salmon canneries of the Northwest, the tuna packing establishments of the Southwest, in the logging camps, and in mining and rough construction work.

A type of rubber boot which is being widely used for very heavy service has an upper of coated duck with a rubber-fiber composition sole, which, it is claimed has proved to be more wear-resisting than the toughest leather. For mining work the boots are often ordered with the soles covered with 3/16-inch flat steel studs. Many mining and contracting concerns also use large quantities of rubber boots on which plain leather soles are nailed.

In the logging camps, as well as on the big ranches and in the citrus groves where much irrigation is constantly carried on, high and low red, brown, and black bootees are strongly favored as light, tough, waterproof and durable footwear. They have either stout rubber or composition soles with a heavy mail-bag duck upper, and with the toe given a 2-ply frictioned fabric box. These shoes have either strong linen or leather laces. One of the newer types of such shoes has a particularly well-made sole. It is constructed first with a rubber tap, then an inner rubber sole, two fillers, a treated shank and fiber sole, leather sock lining, a hollow, air-vented rubber heel, and finally a strip of light rubber, the whole being vulcanized to the canvas upper.

CANADIAN NOTES

The luxury tax on shoes in Canada has been increased from ten to fifteen per cent on all shoes retailing above $9, to become effective when the entire budget with the proposed amendments has been dealt with.

Direct exchange of parcel mails between Canada and France has now been resumed, Montreal and Havre being the terminals of the Canadian Pacific Ocean Services steamship line which acts as carrier.

The United Rubber Co., Limited, Bathurst street, Toronto, Ontario, was reorganized in March last, with capital amounting to $1,000,000, and the following officers and directors: Henry Stanyon, president and general manager; C. H. Stanyon, secretary-treasurer; E. A. Pill, Dr. Shier, and G. Wooten, directors. Henry Stanyon was formerly president and manager of the K. & S. Tire & Rubber Goods, Limited, Weston and Toronto, Ontario. The United company will manufacture tires and tubes, toy balloons, nipples and druggists' sundries.

Professor A. B. Macallum has accepted the newly created chair of biochemistry at McGill University, Montreal, Quebec, and has resigned as administrative chairman of the Honorary Advisory Council for Scientific and Industrial Research, to take effect as soon as his successor is appointed. He will, however, continue to be a member of the Council and take a considerable part in its work.

The Oak Tire & Rubber Co., Limited, 19 Dundas Street East, Toronto, Ontario, has reorganized and increased its capital to $3,000,000. It took over the Acme Tire & Rubber Co. and F. D. Law is managing director. The company's tires are sold under the trade mark "Royal Oak."

Arthur H. Marks, formerly with the United States Rubber Co., has acquired a large interest in the Van der Linde Rubber Co., Limited, Toronto, Ontario, and besides being on the directorate is also vice-president of the company. Victor van der Linde, manager of the factory, was formerly associated with The B. F. Goodrich Co. as development manager. The Van der Linde Rubber Co. is one of the most prominent Canadian organizations, and though it has other lines is particularly concerned in the manufacture of V. D. L. tires, the highest-priced made in Canada. The "V. D. L. Radio" cord made its first appearance on the market in 1918, the 30 by 3½ and 31 by 4 clincher "Radio" cord being the original light-car cord made in Canada.

THE EDITOR'S BOOK TABLE

THE COMPLETE GUIDE TO TYRE REPAIRING. HARVEY FROST & Co., Limited, London, 1919. (Boards, 184 pages, 6 by 9½ inches.)

The second edition, revised and enlarged, of a text book of the Harvey Frost process of vulcanization applied to the repair of motor tires. It contains chapters written by experts covering every application of the process. Preliminary hints are given on undertaking repairs, and tube and cover repairs are exhaustively treated. There is an informative chapter on "The Care of Tyres" which includes standard inflation tables, etc. Condensed instructions in French and also in Spanish are a feature of the volume.

CHEMICAL ENGINEERING CATALOG, 1920. FIFTH ANNUAL EDITION. The Chemical Catalog Co., New York. (Cloth, 1,450 pages, 9 by 12 inches.)

This valuable collection of chemical engineering data is published annually under the supervision of an official committee appointed by the American Institute of Chemical Engineers, the American Chemical Society and the Society of Chemical Industry.

The work covers every division of the broad field of the chemical industries, the information being presented as follows: (1) by condensed and standardized catalog data of equipment, machinery, laboratory supplies, heavy and fine chemicals and raw materials used in the industries employing chemical processes of manufacture; (2) a general directory of such equipment and materials, classified and cross-indexed; (3) a technical and scientific book section, cataloging and briefly describing a practically complete list of books in English on chemical and related subjects.

NEW TRADE PUBLICATIONS

The Peachey Process Co., Limited, 40 Gerard Street, London, W. 1, has recently issued a pamphlet covering matters relating to the capitalization of the company; the chief advantages of the Peachey process of cold vulcanization; a short biography of the inventor; and separate reports by Dr. Henry P. Stevens and Frederick Kaye on the technical value of the process and validity of the patents. These are followed by a brief historical review of Goodyear's hot vulcanization process and a statement of its drawbacks.

The Eagle-Picher Lead Company has issued a 16-page booklet listing the lead products which it manufactures, many of them being used largely in the rubber industry. The booklet is illustrated with half-tone illustrations of the various Eagle-Picher plants, and includes a graph showing the derivatives of lead.

At the Chemical Exposition recently held in New York City, the Buffalo Foundry & Machine Co., Buffalo, New York, distributed a booklet covering some recent developments in vacuum dryers, evaporators, vacuum pans, chemical equipment, etc. Many manufacturers of rubber goods are well acquainted with the "Buflovak" line of equipment and will be interested in its newer developments.

The National Aniline & Chemical Co., Inc., New York City, manufacturer of dyestuffs and miscellaneous coal tar products, has issued a handsome 24-page illustrated booklet containing a very readable brief history of the development of the American dyestuff industry, showing the important place this firm occupies in that field and presenting much information regarding its service and products for the treatment of textiles and rubber. The list of intermediates and other coal tar derivatives includes several accelerators, notably aniline oil and thiocarbanilide, much used in rubber manufacture.

"Carspring," the latest catalog of belting and cotton rubber-lined fire hose, published by the New Jersey Car Spring & Rubber Co., Inc., Jersey City, New Jersey, serves for a reference book as well as a catalog. It includes a technical discussion in regard to the construction of belts, together with data compiled from a series of tests made at Stevens Institute of Technology, Hoboken, New Jersey, and offers in handy form some valuable information for plant engineers and students of belting efficiency. The booklet is attractively printed in two colors and is adequately illustrated.

The illustrated catalog of the Davol Rubber Co., Providence, Rhode Island, is said to present the most complete line of druggists' sundries, hospital and stationers' rubber goods on the market today. It is printed on fine quality paper, profusely illustrated with cuts in color and black and white, and will be found by the buyer superior in many respects to a line of samples.

An attractive folder entitled "The A B C's of Refrigeration," issued by The Technical Products Co., 501 Fifth avenue, New York City, describes under the caption "The Technical Way" the high speed vertical single acting ring plate valve compressors which this company is handling. The Technical Products Co. deals in new and used equipment, the latter comprising large purchases from Government munitions plants.

A new publication, of which Volume I, Number 1, has just come to the Editor's desk, is *The Planter,* an illustrated monthly paper, official journal of The Incorporated Society of Planters, and published by them at Kuala Lumpur, Federated Malay States. As is but natural, the magazine is devoted mostly to rubber culture and its constant problems and activities, but its lighter side shows the characteristic trait of the Englishman to take his sports and his jests with him wherever he goes. The August issue contains among others, articles on "The Future of Rubber," "Brown Bast—the Mystery Still Unsolved," and "Sugar in Malaya." We wish success to *The Planter.*

"Commercial Vehicles of Great Britain, Volume II, 1920," published by The B. F. Goodrich Co., Limited, London, England, contains complete specifications of various types of trucks, char-a-bancs, etc., arranged to be of great value to manufacturers, dealers and users of commercial vehicles. Upwards of a hundred types of vehicles are considered, ranging from ½ to 6 tons normal capacity, or to 10 tons when used with trailer.

Analysis of the various tire sizes used shows that out of six 1½-ton trucks considered, three preferred front tires measuring 860 by 90 mm. single (or 90 to 720 mm. rim), while three also agreed upon rear tires 860 by 90 mm. twin. In 2-ton trucks six out of twelve analyzed called for front tires 870 by 100 mm. or 100 for 720 rims single, and rear tires twin of same dimensions. The same dimensions of tires were also popular with four out of seven 2½-ton trucks analyzed. Three-ton trucks showed more diversity in tire sizes, five out of seventeen using front tires 900 by 120 mm. or 120 for 720 mm. rims, while only two used the same rear tire size, 103 by 140 or 140 for 851 twin. Three 3½-ton commercial vehicles used front and rear tires the same size, 930 by 120 mm. or 120 for 771-mm. rims, the remainder of the eleven analyzed calling for many different tire sizes. Among the 4-ton trucks, tire sizes varied still more, three preferring front tires 900 by 130 mm. or 130 for 720 rims, and two each front tires 900 by 120 or 120 for 770 rims, and 880 by 120 or 120 for 720-mm. rims. Rear tires 1,010 by 120 mm. or 120 for 850 were chosen by two 4-ton trucks, while two others agreed upon 1,050 by 120 or 120 for 881.

The others among the nineteen 4-ton trucks analyzed showed wide variations. Among eighteen types of 5-ton trucks there was more uniformity. Three each used front tires 900 by 160 or 160, for 720-mm. rims, and 880 by 120 or 120 for 720-mm. rims. For rear tires five used 1,050 by 160 twin or 160 for 850, and four used 1,030 by 140 twin or 140 for 850. Out of five 6-ton vehicles two used front tires 970 by 160 or 160 for 771 and rear tires 1,050 by 160 or 160 for 850-mm. rims.

Goodrich tires are made in millimeter sizes as well as in inches as used in America, and are in great demand for British-made vehicles.

Other subjects of interest treated in the booklet are: A Standard for Recording the Operating Costs of Commercial Vehicles, Lengthening the Life of the Motor Vehicle, Fifteen Helpful Suggestions for the Fitting and Detaching of Solid Band Tires, and Weights of Materials Commonly Hauled by Commercial Vehicles.

"Markets of the World," published by the First National Bank of Boston, Massachusetts, comprises a series of economic maps and statistical abstracts of the principal countries of the world. The book, which is entirely original in character, has been compiled by H. A. Lyon of the bank's commercial service department and is tastefully and conveniently bound in loose-leaf form with black cloth covers stamped in gold. Owing to the special value of the volume to organizations devoted to foreign trade it has not been prepared for general distribution.

THE OBITUARY RECORD

VICE-PRESIDENT OF THE UNITED STATES RUBBER COMPANY

Elisha Slade Converse Williams, vice-president in charge of the mechanical goods division and a director of the United States Rubber Co., New York, died October 8, at the Ossining Hospital, Ossining, N. Y., aged 47 years. His death was a great shock and a profound sorrow to the host of friends both in and out of the organization, who knew and loved Mr. Williams. Funeral services at the Funeral Church, Broadway and Sixty-sixth street, New York City, were conducted by the Rev. George Caleb Moor, pastor of the Madison Avenue Baptist Church. Burial was made at Malden, Massachusetts, which was Mr. Williams' former home.

Elisha S. Williams

Mr. Williams was born in 1873, and, a namesake of the late Elisha S. Converse, began his career in the rubber industry in 1891 with the Revere Rubber Co., Chelsea, Massachusetts. He was associated with this firm in various capacities, including those of treasurer and general manager, becoming a practical rubber manufacturer of exceptional executive ability. Under his management the firm's annual output reached $6,000,000 in 1909, when the business was taken over by the United States Rubber Co.

Thereafter Mr. Williams was an important factor in the successful growth of the United States Rubber Co. and its subsidiaries. In 1910 he became president, a director and member of the executive committee of the Rubber Goods Manufacturing Co., following the death of Charles H. Dale; a director and member of the executive committee of the United States Rubber Co.; a director and member of the executive committee of the General Rubber Co., and president of the Revere Rubber Co. Since that time he has held several official positions in a number of affiliated companies of the Rubber Goods Manufacturing Co., including the presidencies of the Mechanical Rubber Co. and the Hartford Rubber Works Co. He was also a director of the American Commerce Co. and the Eureka Fire Hose Manufacturing Co.

In 1911 Mr. Williams was instrumental in organizing the United States Tire Co., of which he was made president, to market its entire production. The same year he went to Europe and laid the foundation for the company's export tire trade. In 1915 he resigned this office to devote his exclusive attention to the mechanical rubber business of the United States Rubber Co., of which he had for several years been in charge.

As a member and for ten years a director of The Rubber Association of America, Mr. Williams was prominent in its constructive work. When the War Service Committee of the Rubber Industry was organized early in 1918, to act as a point of contact between the industry and the Government, Mr. Williams was appointed chairman of the mechanical goods commercial division, and under his leadership important recommendations were made tending toward much needed standardization in this line of goods. He was a member of the New York Athletic, Metropolitan, Union League and other New York clubs.

Mr. Williams was a keen judge of men, a natural organizer, a business man to the core, yet possessed of a genuine but quiet friendliness. His passing brings wide-spread sorrow.

ALBERT STEIN

Albert Stein, 54 years old, president and founder of A. Stein & Co., manufacturers of elastic goods in Chicago, New York and Toronto, died last month of pneumonia. Mr. Stein, who was born in 1866 in Germany, came to this country in 1884, and three years later started business in Chicago.

RUBBER TRADE INQUIRIES

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The editor is therefore glad to have those interested communicate with him.

(829) A manufacturer desires the address of a company that regrinds calender rolls in the factory.

(830) A correspondent asks where he can obtain "Glugloss gelatin" in small quantities for investigative work in waterproofing fabrics.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS

Addresses may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or from the following district or cooperative offices. Requests for each address should be on a separate sheet, and state number:

District Offices	Cooperative Offices
New York: 734 Customhouse.	Cleveland: Chamber of Commerce.
Boston: 1801 Customhouse.	Cincinnati: Chamber of Commerce; General Freight Agent, Southern Railway, 96 Ingalls Building.
Chicago: 504 Federal Building.	Los Angeles: Chamber of Commerce.
St. Louis: 402 Third National Bank Building.	Philadelphia: Chamber of Commerce.
New Orleans: 1020 Hibernia Bank Building.	Portland, Oregon: Chamber of Commerce.
San Francisco: 307 Customhouse.	Dayton, Ohio: Dayton Chamber of Commerce.
Seattle: 848 Henry Building.	

(33,795) A merchant in Ceylon desires to purchase bicycle tires and inner tubes. Quote c. i. f. Ceylon port.

(33,819) An American firm which is the representative of a manufacturer's agent in Colombia desires to get into communication with firms for the sale in that country of elastic webbing.

(33,829) The representative in the United States of a manufacturers' agent in Colombia desires to secure an agency for the sale of household and pharmaceutical rubber goods.

(33,834) A commercial agent in Chile wishes to purchase rubber overshoes from manufacturers.

(33,838) An import and export agent in Jugoslavia desires to establish commercial relations with firms handling rubber goods. Correspondence may be in English.

(33,839) An industrial firm in Belgium desires to secure the agency for the sale of balata belting, and all industrial articles for the manufacture of rubber goods, waterproof fabrics, etc. Cash against documents.

(33,843) The representative of a merchant in Haiti is in the

United States and desires to secure an agency for the sale of second-hand automobile tires.

(33,866) A commercial agent in Brazil desires to represent firms exporting industrial and pharmaceutical rubber goods. Quote c. i. f. Brazilian port or f. o. b. American port. Terms, 60 and 90 days' draft. Correspondence may be in English.

(33,867) A commercial agent in Brazil is in the market for automobiles, trucks and rubber goods. Quote c. i. f. Brazilian or f. o. b. American ports. Terms, 60 and 90 days' drafts. Correspondence may be in English.

THE FIRESTONE ESSAY SCHOLARSHIP

In a competition that centered the thoughts of more than 200,000 high school students, their relatives and friends, upon good roads problems, which will be theirs to solve within the next few years, 16-year-old Katharine Flournoy Butterfield, of Weiser, Idaho, won the Harvey S. Firestone university scholarship for the best 500-word essay written in the Ship by Truck-Good Roads essay contest recently concluded.

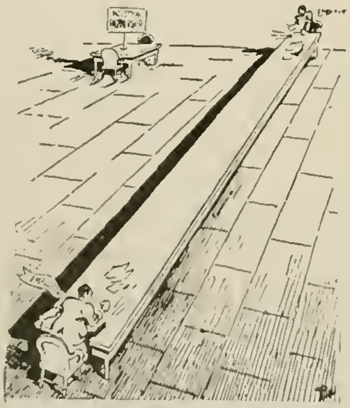
School children from every state in the Union competed under the supervision of educational authorities. The best essays were winnowed out by a process of elimination through city and state committees until the national committee, which sat in Washington, had before it only one essay from each state.

The contest and prize was announced during National Ship by Truck-Good Roads Week last May and was part of Mr. Firestone's contribution to its success. So great was the interest aroused by this effort to turn the thoughts of thousands of young people to one of the nation's greatest problems that motor companies, newspapers, magazine publishers and automotive associations gave hundreds of city and state prizes.

R. J. CALDWELL CO., INC., MANUFACTURERS OF TIRE FABRICS, 15 PARK ROW, New York City, has sent out a paperweight souvenir that has more weight than the heavy plate glass of which it is made. It is backed by two pertinent cartoons suggesting industrial partnership and better cooperation between labor and employer, and on the reverse carries a few paragraphs by Mr. Caldwell on "Mutual Good Will," reprinted from *The Survey*. Such a reminder on one's desk, constantly giving out its good-natured silent message, probably has more psychological effect than many soap-box speeches.

Dispatch, Columbus, Ohio

A STORY WITHOUT WORDS



Star, St. Louis, Missouri

WHY NOT SIT AT THE SMALL TABLE

FOR THE EIGHT MONTHS JANUARY TO AUGUST, 1920, THE VALUE of rubber exports from London to the United States was $30,242,036, as against $9,744,511 for the same period in 1919. Exports of rubber in July, 1920, were $1,069,184 and decreased in August, 1920, to $590,005.

BRAKE INSPECTION DEMANDED

Vice-President F. S. Wilson of the Thermoid Rubber Company, Trenton, New Jersey, and San Francisco branch manager of that concern, certainly "started something" when, in a vigorous address at the recent convention in San Francisco of the National Traffic Officers Association, he emphasized the importance of having automobile brakes officially and systematically inspected. Already plans are being made for securing legislation for the purpose in California, and the indications are that it will not be long before most of the other forty-seven states in the Union will enact laws along the lines suggested. The traffic officers of the country and the accident insurance companies can be depended upon to exert their influence toward getting the desired legislation, and public sentiment in favor of all "safety first" measures will aid the movement powerfully.

It was pointed out by Mr. Wilson that while the brakes on steam and electric railroad cars and on all factory, warehouse, and office building elevators are set up according to strict government specifications and are regularly inspected, there appears to be no effort made in any part of the country to apply the same safeguard to motor cars, which so tremendously outnumber the 150,000 elevators in the United States and rival in number the railroad cars of the country.

Mr. Wilson submitted statistics showing a remarkable reduction in the number of steam railroad accidents since Congress in 1893 passed the law standardizing braking equipment and requiring periodical inspection. He predicted a correspondingly great decrease in automobile accidents (85 per cent of which are due to poor or misused brakes) if braking apparatus be regulated properly by law. As an instance of the universal need of such regulation he cited the fact that in a recent test on numerous motor cars in the city of Oakland, 25 per cent of the brakes on the cars showed a practically worthless and potentially dangerous condition.

STATEMENT OF THE INDIA RUBBER WORLD

Statement of the ownership, management, etc., required by the Act of Congress of August 24, 1912, of THE INDIA RUBBER WORLD, published monthly at New York, New York, for October 1, 1920.

State of New York, } ss.:
County of New York. }

Before me, a notary public in and for the State and county aforesaid, personally appeared E. M. Hoag, who, having been duly sworn according to law, deposes and says that she is the business manager of THE INDIA RUBBER WORLD, and that the following is, to the best of her knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, The India Rubber Publishing Co., 25 West Forty-fifth street, New York City.

Editor, Henry C. Pearson, 25 West Forty-fifth street, New York City.

Managing Editor, Henry C. Pearson, 25 West Forty-fifth street, New York City.

Business manager, E. M. Hoag, 25 West Forty-fifth street, New York City.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.)

Henry C. Pearson, 25 West Forty-fifth street, New York City.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by her.

E. M. HOAG, Business Manager.

Sworn to and subscribed before me this 29th day of September, 1920.

[SEAL] FREDK. SPRENGER,
Notary Public, Westchester County.
Certificate filed in New York County.
New York County Clerk No. 188. Register's No. 2210.
(My commission expires March 30, 1922.)

The Rubber Trade in Great Britain

By Our Regular Correspondent

The topic of the day is the low level to which raw rubber has fallen, a level which has confounded the prediction made by experts a year ago that the price would go to three shillings per pound on the resumption of Continental buying. There is no need to say that the course of trade events in America, in conjunction with the Continental exchanges, has been the chief causes of the slump. The position is sufficiently patent to those who are really interested or concerned. Moreover, it is not the rubber manufacturer but rather the plantation shareholder who is adversely affected by the slump in American tire manufacture and the reselling of raw rubber bought by America. It is the large increase in London stocks which is causing concern, and much advice is being tendered to the plantation authorities as to the necessity for an immediate curtailment of output.

In view of the present state of affairs it is somewhat surprising that the pressure to realize share holdings has not been more pronounced, and it may be taken to indicate a feeling that ultimate recovery is certain. The threatened surplus of about 40,000 tons at the end of 1920 has, of course, caused the Rubber Growers' Association much concern and it is not surprising that at the council meeting on September 24 it was decided to recommend that all producers effect a genuine reduction of 25 per cent of their estimated normal monthly output. Warehouse accommodations being among the questions involved it is a logical argument that the trees provide by far the best storage until the commodity can be absorbed by the trade. Naturally, consumers do not view the situation through the same glasses as the growers, and complaints are appearing in the press about the deliberate and combined attempts to keep up the price of rubber to the disadvantage of the motorist. It is averred that Stock Exchange manipulation is back of the rubber growers' move. Well, I suppose it is, as the rubber growers' shares are dealt with on the Stock Exchange.

THE RESEARCH ASSOCIATION OF BRITISH RUBBER TIRE MANUFACTURERS

The announcement has just been made that the Board of Management has selected J. D. Fry, M. Sc., of Bristol University, to assist the director of research, B. D. Porritt, in the important investigations in connection with the physical properties of rubber which are already under consideration. Mr. Fry was educated at the Merchant Venturers' College, Bristol, and at Bristol University, of which he is a graduate. He subsequently received an appointment on the staff of the University as lecturer in physics, with sole charge of the junior physical laboratories. In addition to designing much of the intricate apparatus used for the experimental work of his department, including an ingenious instrument for measuring minute gas pressures, he has published numerous papers on a variety of scientific subjects. At the outbreak of war he volunteered his service in the capacity of quartermaster and radiographer in connection with Lady Paget's Hospital Unit, which he accompanied through the Serbian campaign, being awarded the Serbian Royal Red Cross and the Serbian Charity Cross decorations. On his return from Serbia he was appointed to take charge of the radiographic department of the Welsh Metropolitan War Hospital, and in connection with his work there he devised a rapid method of locating foreign bodies without the use of photographic plates and also a skin marker which has been widely adopted.

In 1916 the difficult problems arising in connection with balloon fabric rendered it necessary for the R. N. A. S. to seek the services of a competent physicist, and Mr. Fry was appointed senior research officer of the Research Staff. From this date until the termination of hostilities Mr. Fry was occupied in investigating the many intricate questions arising in the manufacture, testing and use of balloon fabric, more especially in connection with the action of light on the physical properties of rubber. I understand that Mr. Fry has already entered upon his new duties, and the Research Association is to be congratulated on having secured the services of a man who is not only a sound scientist and skilful experimenter but who combines a considerable insight into the peculiar problems of the rubber industry.

DUNLOP RUBBER CO., LIMITED

A financial paper in commenting on the recent increase in the Dunlop Rubber Company's capital to £20,000,000 confessed that it was getting somewhat bewildered by Dunlop finance. Although not yet on the scale of Lever Brothers' finance, the figures keep steadily mounting. What with works in Birmingham, France and America, cotton mills in Lancashire, and rubber estates in the East, there has indeed been a startling progress since the days of Byrne Brothers at Birmingham. The increase of capital has been effected by the creation of 12,500,000 additional ordinary £1-shares. Some £7,500,000, representing premiums received on shares and undistributed profits, is to be distributed as a bonus to shareholders in the proportion of three to one. Of the balance, 3,000,000 is to be offered to existing holders of shares at the price of £1.10.0 per share. The financial position certainly seems very satisfactory, showing a considerable increase on the previous year.

LEYLAND & BIRMINGHAM RUBBER CO.

The trading profit of this company for the past year shows a decline of £4,700, as compared with the high level of 1918-19, but as a larger sum was brought forward and it is not thought necessary to devote so much to depreciation, bad and doubtful debts, etc., the sum actually available is larger. The dividend is 15 per cent for the fifth successive year, but it is payable now upon a larger capital, although the 125,000 shares issued last April do not participate in it. No allocation is made to reserve this year.

J. Mandleberg Co., Limited, has declared an interim dividend for the first half of 1920 at the rate of 10 per cent on the ordinary shares up to 300,000. The recently created capital does not share in the above declaration.

SHORTAGE OF CAMPHOR

The present world shortage of camphor threatens to create a serious position in Sheffield, where its use in celluloid for making knife handles and razor hafts has developed ten-fold in the last fifteen years. Sheffield's yearly requirements of celluloid are now estimated at between 400 and 500 tons, representing half a million sterling in value, and millions of dozens of celluloid handles, scales, etc., are on order to provide for the cutlery output of the next six to twelve months. This situation obviously presents an opportunity for hard rubber manufacturers.

NO NOTICE OF DISMISSAL

A rather important case was recently before the Manchester stipendiary magistrate in which a rubber worker who had been discharged without notice sued the firm for a week's wages. The firm's solicitor said that the usual custom in the rubber trade was that no notice was given on either side. The magistrate expressed surprise at this and adjourned the case for the firm to bring evidence supporting this statement. At the resumption of the case witnesses from three firms testified as to it being the custom not to give or require notice, although in none of the works was there any notice posted up to this effect. On this evidence the plaintiff's claim was dismissed. The result of the case has been that some of the rubber works have put up prominent

notices to the effect that no notice is given or required. This summary procedure, which is by no means common in our industries generally, seems to have had its origin in the tendency of a workman under a week's notice to go back or possibly to do damage to a serious amount. It is the few black sheep among the hands that have caused manufacturers to apply this rule to workmen generally.

NEWS NOTES

In a recent British report on progress in the chemistry of oils and fats I read that a new use for lead oleate is reported from the United States, where it has been used successfully to prevent tackiness in manufacturing rubber goods. It is further stated that the consumption for this purpose amounts to about one million pounds a year. I do not remember seeing any reference to this in rubber technical literature. The lead soap takes the place of the ordinary soap which is used by the web mixers in preparing the dough in proofing works.

The writer recently had the pleasure of a call from John Young, chief chemist of the Firestone Tire & Rubber Co., Akron, Ohio, and allowed him to depart without the ordeal of an "interview" on the general conditions of the American rubber trade. On the scientific side Mr. Young was informative on the continuous progress which is being made in American works in the way of laboratory equipment.

A good index of the extent to which sponge rubber manufacture has attained is the large amount of waste now arriving at the reclaimers' premises. This does not consist of individual sponges collected from bath rooms but of factory clippings. Sponge rubber is not limited to its original use but is employed for making a variety of rubber goods, hence the increased volume of waste available.

A business meeting to be followed by a luncheon is to be held at the Queen's Hotel, Manchester, on October 8, in connection with the proposed Rubber Club. It is reported that the initiation of the club is progressing satisfactorily, though from what I hear in the trade there is likely to be considerable opposition to the proposal that agents, travelers, holders of junior posts in works, etc., shall be eligible for membership. In fact, the fixing of a datum line as to eligibility seems likely to prove a difficult matter.

At a recent Government auction of boots all the leather qualities went off easily, while no satisfactory bid was obtained for the rubber boots and galoshes. I suppose buyers were afraid of having them left on their hands, as rubber footwear has not really made much progress in this country in popular estimation.

Walter Wild has severed his connection with the Victory Rubber Co., Leyland, maker of rubber fiber boot soles.

S. J. Peachey is to read a paper on his cold vulcanizing process at the Manchester Section of the Society of Chemical Industry in November.

Horsfall & Bickham, Limited,, Pendleton, Manchester, maker of rubber-faced and composition card clothing, has just completed a large extension to its wire-drawing department and made other alterations to the works, which were founded in 1835. H. H. Worthington is the chairman of directors and P. C. Briggs managing director. There are several firms in Yorkshire which buy card cloth foundations, card and reed wire steel points, etc., from the few manufacturers who do the whole of the processes, and then they assemble the parts into the finished article. Probably there are not as many as half a dozen works in England where the whole process of wire drawing and rubber manufacture is carried on by the same firm.

The American Chamber of Commerce in London is advised by its Automobile Section to remind American exporters, not only of automobile accessories but in all lines of trade, that American trade-marked articles coming into Great Britain must bear the words "Made in U. S. A.," or equivalent indication of the country of origin.

RUBBER GROWERS PLAN TO RESTRICT OUTPUT

Anticipating a large increase in the demand for tires and other rubber goods, the Americans were heavy crude rubber buyers last autumn and in the early months of this year, and as it turns out, the rubber mills have over-manufactured. Transportation difficulties, the limitation of credits and failure of anticipated tire demands, however, beset manufacturers who now hold unusual stocks. We have learned that work forces are greatly reduced in American factories.

The position is much the same in this country. High taxation—especially the increase in excess profits duty—and labor unrest have created uncertainty and thereby limited development. It is unlikely that British manufacturers will take as much crude rubber in 1920 as they did in 1919, and the deficiency may reach, if it does not exceed 10,000 tons. Nor can it be said that the immediate prospects are encouraging. The increased tax on motor cars which will come into operation on January 1, 1921, and the high cost of motor spirit will reduce the use of motor cars, curb development in motor traction and lessen the demand for tires.

The Rubber Growers Association has given the matter serious consideration and has given the Output Control Committee instructions to submit a plan for restriction of crude rubber output. It appears, however, that the situation is now worse than it was in the early part of 1918, when the previous restriction plan was adopted by the Association. Then, about 70 per cent of the acreage represented by the Association restricted production. Not only 30 per cent of membership, but also the local companies of the East and the Dutch interests withheld support. The plan was therefore only a partial success, but it eventually had a most beneficial effect upon the markets.

Entirely different conditions now prevail. As a result of the previous restriction scheme there are now a number of strong producers' associations. The Association of Singapore is a strong body in good hands, and there was formed last May a Chinese Planters' Association. Quite a large area is Chinese-owned. The serious position which has arisen appears to be realized in the East, and telegrams have been sent from prominent agents in Malaya urging restriction.

While the extent of the restriction is not yet known, it is understood that the proposal is to restrict output during the months of October, November and December, and to continue the restriction in a modified form during 1921, or until the present stocks are brought within reasonable limits. An examination of the crops return for the month of August indicates that very large producing companies have followed the advice of the association in the adoption of the alternate-day tapping. It is made clear that there is no occasion for panic, as companies whose directors have sold forward at prices current early in the year will still have a fair average. The matter, however, demands immediate attention and the application of the only possible remedy.

THE RUBBER TRADE IN GERMANY

By a Special Correspondent

THE LEIPSIG FAIR

One of the leading indicators of industrial prosperity in Germany is always the Leipsig Fair. From the attention which this large wholesale market finds among German and foreign buyers an impression may be gained of the state of the German business during the next six months until a new Leipsig Fair lays the foundation for the coming half year. The German rubber industry is interested in two sections of the Leipsig Fair, the so-called technical fair and the general sample fair which follows the first. It may be said that the present autumn fair has been somewhat of a disappointment for manufacturers and buyers alike. But the trouble lies deeper than may be expected from the actual

decrease in business that was done during the fair. The failure of the last fair in fact has its foundation in the occurrences of last year's autumn fair. The German manufacturers, including the rubber manufacturers, went to this fair with very high hopes. They had just passed over the most serious part of the after the war period, the first year of peace, and were ready to do business as before. The foreign buyers were most amenable and the Leipsig Fair was well visited by them. The sales were fairly large, because of the cheap prices offered by the Germans and also owing to the very favorable exchange to the foreign buyer. But the German manufacturers apparently spoiled the success of this first beginning of international trading by not coming up to their promises.

First, the Germans did not keep their promises as to date of delivery. This might have been excused on account of minor revolutions and labor difficulties. Neither England nor France has been able to hold her delivery dates. But the Germans, seeing the market going against them also, failed to keep their promises as to prices. When the exchange value of the mark went down the German manufacturers tried to evade their contracts. In some cases where marks had been quoted and the order accepted, they attempted to substitute dollar or another quotation for marks, and declined to ship unless the buyer agreed to what amounted practically to a hold up. The buyers in consequence suffered great losses and the Germans sacrificed many customers that had remained loyal to them even during the war.

When this year's autumn fair arrived the foreign buyers positively stated that they would not place any orders unless the Germans would undertake to fill them and stick to their promises. Whether this discouraged exhibitors or whether the foreign buyers did not care to place orders under any conditions, it is sufficient to say that the expected business was not realized.

Passing over the business aspects of the last fair, there was a good deal of interest connected with it from the economic point of view. To deal first with the technical fair, the most surprising fact confronting the foreign visitor was the great number of exhibitors and incidentally the nervous temper displayed by the exhibitors. Germany has gone through a technical boom, if a boom be the formation of many firms manufacturing technical articles, including such made from rubber. The impression seems to have gone round in Germany that the country is in urgent want of technical equipment and a great many enterprises have, therefore, centered their activities upon manufacturing such equipment of various sorts. With the comparatively small quantities of raw materials on hand the new firms are finding life very difficult and, having no foreign markets to speak of at the present time, they all have tried to sell to the German consumer, who naturally was soon fed up with this oversupply. The German industry after having once started its machinery and paid heavily during that period for industrial equipment has now become a very careful purchaser.

Nearly all manufacturers of mechanical rubber goods have been compelled to reduce prices. These prices are still far above the 1914 levels but the tendency to lower them is very pronounced and it is time that the competitors of Germany in this field should wake up to the fact that consistent attempts are being made to bring down prices at any cost. Rubber hose, hard rubber goods and many other rubber goods have been marked down, and the promise is made that prices will decline still further if German foreign exchange is again normalized. The German rubber industry has been especially adept in changing from unprofitable products to those for which there is a large demand. Hence one finds hard rubber factories suddenly turning to jar rings. Insulation materials are still in good demand and there is a large business done in rubber gloves. The German mechanical rubber goods industry seems to have realized that during the next few years rubber will be used for many articles for which there was comparatively little demand in the past. Brake linings for horse drawn cars, for instance, have been borrowed from the automobile designers. The brewing industry, which has been kept in very strict limits during the war, is now recovering again and with it comes a very heavy demand for bottle rings, spiral hose condensor rings and a great many other rubber articles. Also the belting industry is busy bringing out many novelties.

The technical fair gave opportunity for showing goods used in other industries. For instance, wringing machine rollers, hard rubber tubes for fountain pens and similar articles. The rubber manufacturers are of opinion that they will have to show these articles to remind the buyers of their existence even if the demand should still be very small. There has been a good demand for rubber made parts from foreign sources, which shows that foreign manufacturers are inclined to make use of German parts even if they should prefer to do the work of assembling in their own factories outside of Germany.

The conditions during the sample fair were very similar to those during the technical fair. The foreign demand was comparatively small and the business suffered from the fact that the German makers being apprehensive about delivery were inclined to err on the other side by asking long delivery periods. As the result a large percentage of all business was done for next year's delivery. Sport articles, of course, are always sold during the autumn fair for delivery at the beginning of the following summer. But it seems that even rubber shoes were ordered for delivery only during the winter of 1921, which seems an unusually long term. The demand for rubber soles and heels is now increasing again after having declined severely during the summer. The growth in the German automobile business was reflected by larger orders for rubber matting, rubber sponges, auto horn bulbs and similar articles. There is of course always a certain demand for house and kitchen articles and the sale of druggist's sundries has remained good ever since the ending of the war. Novelties in orthopedic articles are selling well at the present time in Germany and a careful reader of the German patent reports can notice that the wave of surgical inventions has not come to an end with the war. Artificial limbs are still much in demand and improvements are made practically every day. Germany has developed in recent years a special industry for the supply of office articles. These, including erasers, fountain pens, rulers, etc., were all offered during the fair and sold in normal quantities. The demand for rubber combs and other similar articles of hard rubber still seems to be below normal.

NEW RUBBER FIRMS

Thieme & Co. G.m.b.H., Dresden. Manufacture and sale of rubber goods.

Haka Pannenlose Gummibereifung G.m.b.H., Chemnitz. Manufacture and sale of tire covers for automobiles, motorcycles and bicycles.

Excella Filler Pen Co. G.m.b.H., Neukoelln. Manufacture of fountain pens, penholders, pencil holders and other hard rubber goods.

Frankfurter Gummihandelsgesellschaft m.b.H., Schaalmann & Co., Frankfurt a.M. Sale of rubber goods.

Dresdo Gummiwaren G.m.b H., Dresden. Manufacture of rubber goods.

Gummiwerke Genthin G.m.b.H., Genthin. Manufacture of rubber goods and rubber substitutes.

M. and W. Polack, Merseburg. Manufacture of Polack solid tires. Owners, Max Polack and Werner Polack. Max Polack is known as the founder of the well known B. Polack Gummiwarenfabrik and the B. Polack Aktiengesellschaft at Waltershausen in Germany. Werner Polack is the son of the above. He is known also in the United States, where he was formerly engaged in the tire branch of the rubber industry.

Recent Patents Relating to Rubber

THE UNITED STATES

ISSUED AUGUST 24, 1920

No. 1,350,332 Rubber heel. J. R. Pettit, New York City.

1,350,412 Clip for fountain-pen caps or the like. D. J. La France, Cambridge, and W. P. De Witt, Somerville, both in Massachusetts, assignors by mesne assignments to De Witt-La France Co., a Massachusetts corporation.

1,350,414 Inflatable hydraulic air-cushion. J. D. Langdon, Waterville, Wash.

1,350,467 Pneumatic-tire drive for dynamos of railway cars. E. Posson, Chicago, Ill.

1,350,571 Phonograph motor with rubber wheel. W. G. Shelton, New York City (Original application divided.)

1,350,712 Bonnet or cap with elastic drawstrings. J. G. Dupont, Chicago, Ill.

1,350,719 Eye syringe and massage device. E. H. Galligan, Providence, R. I.

1,350,751 Windshield cleaner. E. A. Tverdahl, Evanston, Ill.

1,350,767 Stethoscope. F. C. Aschburner, Chicago, Ill.

1,350,776 Bathing hat. J. T. Brogden, assignor to Revere Rubber Co.—both of Providence, R. I.

1,350,813 Convertible wheel rim to engage a rail and a tire simultaneously. E. L. Keesling, San Jose, Calif.

1,350,926 Air pump for inflating pneumatic tires. J. M. E. Franc, Andancette, France.

1,350,930 Rubber shoe-bottom. W. Macpherson, Cambridge, Mass.

1,350,935 Toy balloon with valve. F. Pastor, Akron, assignor to the Anchor Rubber Co., Barberton—both in Ohio.

1,350,950 Life-saving suit. J. Tales, Akron, O.

1,350,995 Vehicle tire. H. E. Grabau, Long Island City, assignor to A. C. Schwartz, New York City—both in New York.

ISSUED AUGUST 31, 1920

1,351,015 Tire casing. A. V. Anderson and A. M. Morgan, assignors to Ford Tire & Rubber Co.—all of Fort Worth, Tex.

1,351,052 Metal vehicle wheel for tires. C. Macbeth, Birmingham, assignor to The Dunlop Rubber Company, Limited, Westminster, London—both in England.

1,351,130 Measuring instrument. A. Roesch, assignor to Charles A. Tagliabue Manufacturing Co.—both of Brooklyn, New York.

1,351,145 Golf ball. G. C. Worthington and W. E. Reichard, assignors to Worthington Ball Co.—all of Elyria, Ohio.

1,351,166 Mattress with waterproof insert. E. E. Gundlach, Madison, Wis.

1,351,183 Demountable split rim for tires. J. C. Manternach and C. W. Gressle, assignors by mesne assignments to The Standard Parts Co.—all of Cleveland, O.

1,351,218 Windshield cleaner. O. C. Ritz-Woller, Chicago, Ill.

1,351,237 Whistling pressure gage for pneumatic tires. A. G. Ewing, Los Angeles, Calif.

1,351,250 Rubber-set riffle. J. Horn, Kelvin, Ariz.

1,351,291 Rubber shoe sole having central longitudinal ridge on upper side. F. Holmquist, Mount Jewett, Pa.

1,351,301 Airship with spaced ballonets divided into hydrogen and air chambers. V. Pritelli, Rome, Italy.

1,351,328 Cap for nursing bottles and the like. W. M. Decker, Buffalo, N. Y.

1,351,400 Valve for pneumatic tires. B. Pangrazio, Scottsville, N. Y.

1,351,463 Tire casing and method of manufacture. N. Benjamin, Elmira, N. Y.

1,351,480 Pneumatic or compressed-air-cushion bed. R. A. Leigh, assignor to E. F. Leigh—both of Denver, Colo.

1,351,496 Jar closure with rubber washer. C. H. Spooner, Charlestown, N. H.

1,351,543 Skeleton shoe heel with filling of rubber. A. Santacroce, Cleveland, O.

1,351,567 Garter. R. Gorton, Brookline, Massachusetts; C. W. Noyes, administrator of said R. Gorton, deceased.

1,351,574 Fountain pen. C. R. Keeran, Chicago, Illinois, assignor by mesne assignments to The Wahl Co., Wilmington, Del.

1,351,575 Fountain pen. C. R. Keeran, Chicago, Ill., assignor by mesne assignments to The Wahl Co., Wilmington, Del.

1,351,587 Demountable rim for tires. J. Stungo, New York City.

1,351,591 Fountain pen. J. C. Wahl, Chicago, Ill., assignor by mesne assignments to The Wahl Co., Wilmington, Del.

1,351,691 Rubber resilient heel or lift. H. C. Ridout, Bournemouth, England.

ISSUED SEPTEMBER 7, 1920

1,351,862 Squeegee. J. H. Menkhaus, Cincinnati, O.

1,351,873 Fountain pen. P. P. Sanford, Woodridge, N. Y.

1,351,894 Resilient core for tires. J. H. Dalbey, assignor to Elgin Rubber Ace Co.—both of Elgin, Ill.

1,351,917 Aseptic appliance with rubber tube. A. O. Kuhn, San Francisco, Calif.

1,351,982 Rubber garment-protector made of flat blank with suitable openings shirred and cemented to strips of rubber. M. Zwicke, assignor to I. B. Kleinert Rubber Co.—both of New York City.

1,352,008 Rubber shoe and method of making the same. George L. Lawrence, Jr., Melrose, assignor to Boston Rubber Shoe Co., Malden both in Massachusetts.

1,352,047 Tongue ball. R. W. Boje, Jr., Buffalo, N. Y.

1,552,074 Cushion tire. J. N. McFate, Phoenix, Ariz., and H. L. Glaze, Los Angeles, Calif., said Glaze assignor of four-tenths of his right to said McFate.

1,352,088 Ice-creeper of rubber with openings for prongs of removable metal creeper. T. Saia and M. Butera, Pittsburgh, Pa.

1,352,164 Repaired tire. C. W. Yelm, assignor to the Gates Rubber Co.—both of Denver, Colo.

1,352,306 Syringe. R. L. Mott, St. Louis, Mo.

1,352,370 Pneumatic tire with tread of metal sheathing. C. R. Irvine, Petrolia, Ont., Canada.

1,352,375 Cord tire construction. A. L. Meeks, Gadsden, Ala.

ISSUED SEPTEMBER 14, 1920

1,352,422 Maternity corset with elastic inserts. C. E. Anderson, Park City, Utah.

1,352,470 Resilient ring or annulus and method of manufacture; thin layers of vulcanized rubber built up around circular axis. J. F. Palmer, St. Joseph, Mich.

1,352,504 Windshield cleaner. W. M. Folberth, Cleveland, O.

1,352,614 Soft rubber suction cup for dental plates. J. Lehner, Pittsburgh, Pa.

1,352,650 Rubber bottle closure. C. E. Blanchard, Chicago, Ill.

1,352,677 Eraser attachment for pencils. W. W. Moore, Pittsburg, assignor to J. E. Roach, Oakland—both in California.

1,352,698 Pressure gage for tires. M. C. Schweinert, West Hoboken, N. J.

1,352,730 Shoe sole composed of layers of woven fabric and paper united thereto by cured phenolic condensation cementing material and a rubber composition sole. H. C. Egerton, Passaic, N. J.

1,352,731 Suction cup shoe sole, composed of layers of woven fabric and paper united thereto by cured phenolic condensation cementing material and a rubber composition sole. H. C. Egerton, Ridgewood, N. J.

1,352,732 Weather strip with vulcanized rubber facing strip. H. C. Egerton, Ridgewood, N. J.

1,352,733 Rubber-faced mat composed of layers of canvas fabric, impregnated with cured phenolic condensation cementing material, reinforced with metal and rubberized fabric, vulcanized together. H. C. Egerton, Ridgewood, N. J.

1,352,734 Gripping rubber shoe heel. H. C. Egerton, Ridgewood, N. J.

1,352,735 Tire valve and means of attaching to supporting fabric. H. C. Egerton, Ridgewood, N. J.

1,352,736 Rubber sole for turn shoes with reinforced edge for stitching to uppers. H. C. Egerton, Ridgewood, N. J.

1,352,737 Partially stiffened rubber composition shoe sole. H. C. Egerton, Ridgewood, N. J.

1,352,739 Vulcanized composition fabric, formed of layers of canvas body fabric impregnated with phenolic condensation cementing material, facing fabric, and vulcanizable rubber cementing composition. H. C. Egerton, Ridgewood, N. J.

1,352,740 Vulcanized rubber hose with inner rubber lining and rubber covering stiffened with strips of canvas impregnated with cured phenolic condensation cementing material, having an interposed cushioning layer of rubber between them. H. C. Egerton, Ridgewood, N. J.

1,352,769 Resilient cushion wheel. A. W. Tesch, Lansing, Ill.

1,352,770 Float for boats made of waterproofed flexible material in umbrella form. S. E. Van Horn, Manhasset, N. Y.

1,352,789 Combined dental mirror and syringe. J. E. Craig, Gary, Ind.

1,352,818 Respirator with diaphragm dividing it into eye and mouth spaces. A. B. Lamb, Washington, D. C.; E. W. Miller, Akron, O., and P. W. Carleton, Penns Grove, N. J.

1,352,838 Sun hat formed of a single piece of cloth with an elastic band gathering and dividing it into crown and brim. R. P. Satterfield, San Antonio, Texas.

1,352,863 Waterproof jewel wrist-safe. M. S. Zeitler and W. S. Lloyd—both of Washington, D. C.

1,352,885 Rubber core for tires, with sponge rubber outer strip. K. Fukada, Tokio, Japan.

1,352,942 Artificial pneumatic rubber foot fitted with inflatable inner tube. L. and C. B. Dodge, Morse Bluff, Neb.

1,352,943 Artificial pneumatic rubber foot, reinforced with ankle bracer and fitted with inflatable inner tube. L. and C. B. Dodge, Morse Bluff, Neb.

1,352,957 Blow-out patch. W. Van V. Hayes, New York City.

1,353,061 Dust cap for tire valves. G. B. Mullen, Bay Side, N. Y.

1,353,070 Infants' hose supporter. J. M. Regan, Darby, Pa.

1,353,125 Dust cap for pneumatic tire valves. J. Currie and H. W. Bell, Seattle, Wash.

1,353,130 Parachute. W. H Ruff, Quincy, Ill.

1,353,131 Parachute. W. H. Ruff, Quincy, Ill.

THE DOMINION OF CANADA

ISSUED AUGUST 24, 1920

203,181 Heel with leather base and rubber pad having washers for fastening embedded in the rubber. P. N. Asquith, Toronto, Ont.

203,217 Stiffening shoe element comprising cotton fabric impregnated with cured phenolic condensation cementing material and a rubber portion vulcanized to said fabric. H. C. Egerton, Ridgewood, New Jersey, U. S. A.

203,224 Sanitary belt. E. I. M. Gaylor, London, England.

203,239 Rubber heel. G. A. Huben, Chicago, Ill., U. S. A.

203,248 Boot, shoe and overshoe, with rubber heel, sole and inner sole and copper inner plate. H. A. K. Rolant, Ottawa, Ont.

203,261 Life saver for aviators with compressed gas container and gas bag. W. Marshall, Bridgeton, New Jersey, U. S. A.

203,282 Parachute suit for aviators. W. Peterson, Newark, New Jersey, U. S. A.

203,283 Cushion heel. A. Rabinowitch, Chelsea, Mass., U. S. A.

203,285 Horn for vehicles, with rubber bulb. J. E. Reynolds, Birmingham, Warwick, England.

203,327 Cushion heel. The Anchor Grip Heel Co., assignee of E. M. Cook—both of Oberlin, O., U. S. A.

203,328 Fountain pen. The Autopoint Pencil Co., assignee of The Keeran Products Co., assignee of C. R. Keeran—all of Chicago, Ill., U. S. A.

Chemical Patents will be found on page 105. Machinery Patents on pages 107, 108.

203,333 Rubber sole. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of M. H. Clark, Pelham, New York, U. S. A.

203,338 Microphone having sound-detecting device comprising closed chamber with rubber wall. The Canadian General Electric Co., Limited, Toronto, Ont., assignee of A. W. Hull, Schenectady, New York, U. S. A.

203,347 Rubber heel. The Essex Rubber Co., Trenton, N. J., assignee of A. Troiano, Washington, D. C.—both in U. S. A.

203,353 Rubber heel. The Granger Vacuum Rubber Heel Co., Inc., Cleveland, assignee of D. D. Granger, New London—both in Ohio, U. S. A.

203,354 Rubber heel. The Hill Rubber Heel Co., assignee of R. I. Hill—both of Elyria, O., U. S. A.

203,368 Golf ball. The Paramount Rubber Consolidated, Inc., Philadelphia, Pa., assignee of F. T. Roberts, Cleveland, O.—both in U. S. A.

203,386 Rubber sole, recessed for cement. J. Brenwood, Bury, Lancaster, assignee of A. Thill, London—both in England.

203,387 Rubber sole with non-skid feature. J. Brenwood, Bury, Lancaster, assignee of A. Thill, London, W.—both in England.

ISSUED AUGUST 31, 1920

203,437 Vibratory massaging device. S. McF. Coffman, Kansas City, Mo., U. S. A.

203,439 Devices for crimping fire hose. W. F. Corbin, Grand Rapids, Mich., U. S. A.

203,483 Hose supporter with rubber-covered loop. E. L. Lovejoy, Wakefield, Mass., U. S. A.

203,518 Sponge rubber inking pad. C. H. Payne, Cincinnati, O., U. S. A.

203,564 Belt of rubberized cord fabric with leather ends. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of A. A. Somerville, New York City, U. S. A.

ISSUED SEPTEMBER 7, 1920

203,704 Solid tire, reinforced and yieldingly supported. F. W. Kremer, New York City, U. S. A.

203,740 Garment support and fastener. J. K. Seymour, Elyria, O., U. S. A.

203,784 Teat cup. The Ridd Co., Limited, assignee of A. Ridd—both of New Plymouth, New Zealand.

ISSUED SEPTEMBER 14, 1920

203,844 Anti-slipping ladder attachment with rubber insert. C. J. Brown, River Falls, Wis., U. S. A.

203,852 Collapsible rim for tires. J. E. Castle, Ridgefarm, Ill., U. S. A.

203,880 Metal wheel for pneumatic tires. J. M. Hall, Hamilton, Ont.

203,900 Dust cap for valve stems. A. L. Just, Syracuse, New York, U. S. A. (See The India Rubber World, October 1, 1920, page 35.)

203,921 Inflatable garment divided into compartments separately inflatable. K. Michalowsky, Akron, O., U. S. A.

203,940 Cap for tire valve stems. W. L. Richards, Portland, Ore., U. S. A.

203,962 Dust cap for tire valve. J. T. Ward, Los Angeles, Calif., U. S. A.

203,983 Tire valve. The Griffin Manufacturing Co., assignee of P. J. Griffin—both of Boston, Mass., U. S. A. (See also The India Rubber World June 1, 1920, page 591.)

203,998 Tire valve. A. Schrader's Son, Inc., New York City, assignee of E. Van A. Myers, East Orange, N. J.—both in U. S. A.

203,999 Valve or tire vulcanizing attachment. A. Schrader's Sons, Inc., New York City, assignee of J. Volckhausen, Weehawken, N. J.—both in U. S. A.

THE UNITED KINGDOM

ISSUED SEPTEMBER 1, 1920

145,538 Tire attachments to rims. A. Schrader's Son, Inc., 783 Atlantic ave., Brooklyn, N. Y., assignee of H. P. Kraft, 219 Godwin ave., Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)

145,550 Coupling for tire inflation pump. A. Schrader's Son, Inc., 783 Atlantic ave., Brooklyn, N. Y., assignee of M. C. Schweinert, 42 Riverside Drive, New York City—both in U. S. A. (Not yet accepted.)

145,551 Connection for pressure gage. A. Schrader's Son, Inc., 783 Atlantic ave., Brooklyn, N. Y., assignee of H. P. Kraft, 219 Godwin ave., Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)

145,552 Tire valve. A. Schrader's Son, Inc., 783 Atlantic ave., Brooklyn, N. Y., assignee of E. van A. Myers, 82 Evergreen Place, East Orange, N. J.—both in U. S. A. (Not yet accepted.)

145,553 Nuts for pneumatic tire valve. A. Schrader's Son, Inc., 783 Atlantic ave., Brooklyn, N. Y., assignee of H. P. Kraft, 219 Godwin ave., Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)

145,678 Respirator. J. W. Paul and C. Hall, Pittsburgh, Pennsylvania, U. S. A.

145,692 Cushion tire and shock absorber. C. Noel, 25 rue Gravel, Levallois-Perret, France. (Not yet accepted.)

ISSUED SEPTEMBER 8, 1920

145,858 Stair treads, etc., of rubber or other material, reinforced with metal. H. Frood, Sovereign Mills, Chapel-en-le-Frith, Derbyshire.

146,043 Cover for bottles, jars, etc., with rubber rim. C. V. Childs, 34 Ensbury Park road, Moordown, Bournemouth.

146,066 Closure for receptacles, having rubber gasket inside cap. C. Columbani, 46 avenue de la Republique, Bondy, and J. B. M. Liarsou, 27 rue du Poteau, Paris—both in France.

146,105 Telephone transmitters. Miessner Inventions Corporation, assignee of B. F. Miessner—both of 217 Broadway, New York City, U. S. A. (Not yet accepted. Refers also to Specification No. 140,070.)

146,113 Dust cap for tire valves. J. T. Ward, 511 So. Boylston ave., Los Angeles, Calif., U. S. A. (Not yet accepted.)

ISSUED SEPTEMBER 15, 1920

146,334 Rubber-covered stocking supporter grips. Société Pugniet & Co., 127 avenue Jean Jaures, Paris, France. (Not yet accepted.)

146,339 Means for fastening load-suspension cable loops to balloon fabric. The Goodyear Tire & Rubber Co., assignee of H. T. Kraft—both of Akron, O., U. S. A. (Not yet accepted.)

146,345 Cushion tire. The Goodyear Tire & Rubber Co., assignee of J. E. Hale—both of Akron, Ohio, U. S. A. (Not yet accepted.)

146,347 Wheel tires. The Goodyear Tire & Rubber Co., 1144 East Market street, Akron, O., U. S. A. (Not yet accepted.)

146,361 Collapsible transversely divided rims for tires. E. A. Jones, Los Angeles, Calif., U. S. A. (Not yet accepted.)

146,443 Hydrometer with collapsible bulb. E. Edelman, 616 Waveland ave., Chicago, Ill., U. S. A.

146,458 Heels of cork, etc., with faces of rubber or other material. Suberit-Fabrik Nachfolger R. Messer, Cork and Artificial Cork Works, Mannheim, Germany. (Not yet accepted.)

146,494 Solid or cushion tire. E. Brunswick, 44 rue du Fg. du Temple, Paris, France. (Not yet accepted.)

146,513 Demountable rim for tires. J. C. Lewis, 27 School street, Boston, Mass., U. S. A. (Not yet accepted.)

GERMANY

PATENTS ISSUED, WITH DATES OF ISSUE

327,625 (July 20, 1918) Sectional belt. L. Sussmann, Gartenstrasse 110, Frankfort-on-Main.

327,595 (November 1, 1916) Tire cover of steel, with cloth lamelle, for pneumatic tires. F. Peyerl, Graz.

327,845 (January 22, 1920) Rubber shoe. P. Kuhnt, Bahnhofstrasse 7, Goerlitz.

TRADE MARKS

THE UNITED STATES

No. 111,190 The words Kandee Kote in fancy letters, the initial K serving to begin both words—chewing gum. The Shelby Supply & Manufacturing Co., Cleveland, O.

112,295 The words Beckton White—lithopone. E. I. du Pont de Nemours & Co., Wilmington, Del., and New York City.

114,489 The initials and word S. S. White—dental rubber sundries, etc. The S. S. White Dental Manufacturing Co., Philadelphia, Pa.

118,932 The words Diap-a-wash—combined wringer and washboard in form of a unitary article. The Pierson Co., Rockford, Ill.

120,886 The word Skotchemint—chewing gum. Short & Son Co., Reading, Pa.

121,467 The word Bandobelt—elastic diaphragm confiner. Frolaset Corset Co., Detroit, Mich.

121,898 The word Karlite—belting and packing of rubber, balata, duck, etc., or combinations of them. Imperial Belting Co., Chicago, Ill.

121,899 The word Antisulpho—belting and packing of rubber, balata, duck, etc., or combinations of them. Imperial Belting Co., Chicago, Ill.

121,901 The word Sahara—belting and packing of rubber, balata, duck, etc., or combinations of them. Imperial Belting Co., Chicago, Ill.

122,459 Seal bearing words Boston Belting Corporation, Boston, Mass, Original Manufacturers of Mechanical Rubber Goods, Established 1828, and the figure of an eagle standing on group of rolls of belting—rubber and rubber composition belting, hose and packing. Boston Belting Corporation, Boston, Mass.

125,637 The word Rubtex curved in a semi-circle in the space between upper portions of two concentric circles—rubberized cloth and blankets made therefrom. United States Rubber Co., New Brunswick, N. J., and New York City.

126,340 The word Protexal—protective and safety headgear and leather, rubber, asbestos, fireproofed, waterproofed and acid-proofed gloves, leggings and clothing. The Strong, Kennard & Nutt Co., Cleveland, O. (See The India Rubber World, May 1, 1920, page 204.)

126,687 The word Secupro—endless and long-length belts of rubber-coated canvas or fabric. The Farm Equipment Co., Baltimore, Md.

127,600½ The words Green Cross Reliner within outline of a Greek cross—tire reliners. C. M. Lash, Columbus, O.

127,790 The word Aerograph—air brushes, spray painting apparatus operated by compressed air. The Aerograph Co., Limited, London, England.

128,071 The words Aero-Fount—fountain pens. E. O. Barker, Shanghai, China.

128,646 The word Chums—chewing-gum. Automatic Clerk Co., Newark, N. J.

128,791 The word Benflex—fabric-covered metal hose with rubber lining. Metal Hose & Tubing Co., Inc., Brooklyn, N. Y.

129,106 The words Tu-Way—fabric and rubber carriage cloth. United States Rubber Co., New Brunswick, N. J., and New York City.

130,403 The word Steelaire—rubber tires. J. C. Dawson, Lynn, Mass.

130,421 The word Sprifoot—rubber soles and heels. Kleistone Rubber Co., Boston, Mass.

130,422 The word Kleistone—rubber soles and heels. Kleistone Rubber Co., Boston, Mass.

130,734 The word Staco in staggered letters within a double-outlined diamond bearing in its border the words Stone-Tarlow Co., Inc., Brockton, Mass., U. S. A.—leather, fabric or rubber boots and shoes. Stone-Tarlow Co., Inc., Brockton, Mass.

130,925 The fac-simile signature Patrick—rubber, metallic and composition hose with or without reinforcement, and with or without asbestos jacket. F. A. Patrick & Co., Duluth, Minn.

131,471 The word Picher with conventional outline border—sulfuric acid. The Eagle-Picher Lead Co., Cincinnati, O.

131,541 The word Tru-flite—handballs and tennis balls. (See The India Rubber World, July 1, 1920, page 682.) The Seamless Rubber Co., Inc., New Haven, Conn.

THE UNITED KINGDOM

393,246 Representation of a label bearing the words Adams California Fruit above a group of fruits—Chewing gum, etc. Adams & Beemans, Limited, 89 Great Eastern street, London, E. C. 2.

393,248 Facsimile signature of Thos. Adams—chewing gum, etc. Adams & Beemans, Limited, 89 Great Eastern street, London, E. C. 2.

395,972 Conventionalized representation of a palm tree, dividing the words Trade Mark, behind and eight-sided figure bearing the word Ofi—all goods included in Class No. 42. Naamlooze Vennootschap Oliefabrieken-Insulinde, 12-14 N. Doelenstraat, Amsterdam, Holland; address for service in the United Kingdom, care of Sefton-Jones, Odell & Stephens, 285 High Holborn, London, W. C. 1.

395,974 Conventionalized representation of a palm tree dividing the words Trade Mark, and behind an eight-sided figure bearing the word Ofi—all goods included in Class No. 48. Naamlooze Vennootschap Oliefabrieken-Insulinde, 12-14 N. Doelenstraat, Amsterdam, Holland; address for service in the United Kingdom, care of Sefton Jones, Odell & Stephens, 285 High Holborn, London, W. C. 1

DESIGNS

THE UNITED STATES

No. 56,113 Tire tread. Patented August 24, 1920. Term 14 years. M. L. A. A. Allard, Akron, assignor to W. H. Milliken, Cleveland—both in Ohio.

56,122 Tire. Patented August 24, 1920. Term 14 years. V. Ehrlicher, assignor to The Charles William Stores, Inc.—both of Brooklyn, New York.

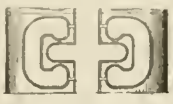
56,123 Swimming cap. Patented August 24, 1920. Term 14 years. W. D. Forbes, Oakland, California.

56,151 Sanitary belt. Patented August 24, 1920. Term 14 years. V. Guinzburg, assignor to I. B. Kleinert Rubber Company—both of New York City.

56,158 Tire. Patented August 24, 1920. Term 7 years. R. H. Holbrook, assignor to The Charles William Stores, Inc.—both of Brooklyn, New York.

56,217 Tire tread. Patented August 31, 1920. Term 7 years. H. B. Bixler, Akron, assignor to the Chillicothe Tire and Rubber Company, Chillicothe—both in Ohio.


56,122


56,217


56,265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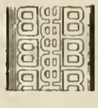
56,267


56,268


56,279


56,270


56,260


56,299


56,271


56,113


56,158


56,243


56,282


56,307


56,300

398,824 The word Thornhills above a representation of a running elephant, in turn above the words Tropical Tyres—tires included in Class No. 40. B. A. Thornhill, Single Tree, Newera Eliya, Ceylon, and The Manor House, Shropshire.

399,696 The words The Lastawl Company and the representation of a fisherman pulling in his net—all goods included in Class No. 40, including those of rubber and fiber composition. E. S. Rowlandson, trading as The Lastawl Co., 132 Boundary street, Liverpool, Lancashire.

400,226 Two intersecting triangles forming six-pointed star bearing the letters BBL in the center—vulcanizing apparatus, etc. Brown Brothers, Limited, 22-34 Great Eastern street, London, E. C. 2.

400,267 Representation of a seal bearing monogram SHM, above the word Newmatthose—hose for use with compressed air plant and pneumatic tools. S. H. Matthews, 20 Royal Arcade, Newcastle-on-Tyne.

400,303 Representation of a carnation beneath the word Carnation—rubber sandalings, webs and cords. Pett, Hammett & Co., Limited, Dr. Johnson Passage, Bull street, Birmingham.

400,913 Representation of a partridge standing within a tire and the words Trade Mark—rubber footwear. The F. E. Partridge Rubber Co., Limited, 1 Metcalfe street, Guelph, Ontario, Canada; address for service in the United Kingdom, care of Abel & Imray, 30 Southampton Buildings, London, W. C. 2.

401,494 The word Goodwill—pneumatic tires and tubes. P. M. Wilson, trading as P. Wilson, 85 rue Quentin-Bouchart, Champs-Elysees, Paris, 8, France; address for service in the United Kingdom, care of Abel & Imray, 80 Southampton Buildings, London, W. C., 2.

401,608 Representation of two monkeys swinging on an inner tube suspended from the word Moco, above the words Monkey Grip and Trade Mark—rubber patches and patching material for repairing tires, rubber boots, garden hose, etc. The Moco Company of America, Inc., Moco Building, West Thirteenth street, Oklahoma, Okla., U. S. A.; address for service in the United Kingdom, care of W. P. Thompson & Co., 12 Church street, Liverpool.

401,805 Representation of a hand holding aloft a spring—rubber and gutta percha goods not included in classes other than No. 40. Herbert Terry & Sons, Limited, Novelty Works, Lodge road, Redditch, Warwickshire.

402,511 Representation of a seal bearing the words Tiny-Tot above a baby lying in a powder puff, and around the edge of the seal the words United Drug Company, Boston, Mass., U. S. A.—manufactured rubber and gutta percha goods not included in classes other than No. 40. The United Drug Co., corner Greenleaf and Leon streets, Boston, U. S. A., and 114 Old Hall street, Liverpool.

403,039 The word Calrub—waterproof garments. W. Currie & Co., Caledonian Rubber Works, Dalry road, Edinburgh.

403,065 Representation of the head of a bulldog—all goods included in Class No. 40, except machine belting and elastic gusset webs. The Beldam Packing and Rubber Co., Limited, 29 Gracechurch street, London, E. C., 3.

403,099 The word Rexean within a double-bordered diamond—fountain and stylographic pens. Rexean Company, Limited, 141 Lord street, Southport.

403,161 Representation of a seal in bas relief bearing profile bust of a man and the word Maharajah—rubber goods included in Class No. 11. Radium Gummiwerke Gesellschaft Mit Beschränkter Haftung, Gummiwaren Fabrik Gravenmüklenweg, Dellbrück, near Cologne, Germany; address for service in the United Kingdom, care of Sefton-Jones, Odell & Stephens, 285 High Holborn, London, W. C. 1.

403,198 Representation of a compass beneath the word Compass, and surrounded by the letters N, E, S and W to indicate direction—all goods included in Class 49. George MacLellan & Co., Limited, Glasgow Rubber Works, Shuna street, Maryhill, Glasgow.

THE DOMINION OF CANADA

27,012. The words Nu-Way Strech on oval enclosing representation of pair of suspenders—suspenders and garters. Nu-Way Strech Suspender Co., Dundee, Mich., U. S. A.

27,058. The word Wids—rubber heels. Wids Co., St. Paul, Minn., U. S. A.

56,243 Tire tread. Patented August 31, 1920. Term 14 years. H. H. Swan, Grand Rapids, Michigan.

56,247 Rubber eraser head for lead pencils. Patented September 7, 1920. Term 14 years. E. Faber, New York City.

56,260 Elastic vehicle tire. Patented September 14, 1920. Term 14 years. J. M. Alderfer, Akron, Ohio.

56,265 Tire tread. Patented September 14, 1920. Term 14 years. E. O. Blekre, Sioux City, Iowa.

56,266 Elastic tire tread. Patented September 14, 1920. Term 14 years. E. O. Blekre, Sioux City, Iowa.

56,267 Elastic tire tread. Patented September 14, 1920. Term 14 years. E. O. Blekre, Sioux City, Iowa.

56,268 Elastic tire tread. Patented September 14, 1920. Term 14 years. E. O. Blekre, Sioux City, Iowa.

56,269 Elastic tire tread. Patented September 14, 1920. Term 14 years. E. O. Blekre, Sioux City, Iowa.

56,270 Elastic tire tread. Patented September 14, 1920. Term 14 years. E. O. Blekre, Sioux City, Iowa.

56,271 Elastic tire tread. Patented September 14, 1920. Term 14 years. E. O. Blekre, Sioux City, Iowa.

56,282 Tire casing. Patented September 14, 1920. Term 14 years. R. Iredell, assignor to The General Tire and Rubber Company—both of Akron, Ohio.

56,299 Tire tread. Patented September 14, 1920. Term 14 years. J. C. McLean, Lakewood, assignor to The McLean Tire and Rubber Company, Cleveland—both in Ohio.

56,300 Tire. Patented September 14, 1920. Term 14 years. J. C. McLean, assignor to The McLean Tire and Rubber Company—both of Cleveland, Ohio.

56,307 Pneumatic tire. Patented September 14, 1920. Term 14 years. R. M. Pierson, Akron, Ohio, assignor to The B. F. Goodrich Company, New York City.

THE DOMINION OF CANADA

4,856 Tire tread. Patented August 26, 1920. W. Seward, Toronto, Ont.

4,857 Tire tread. Patented August 26, 1920. W. Seward, Toronto, Ont.

GERMANY

DESIGN PATENTS ISSUED, WITH DATES OF ISSUE

748,837 (August 11, 1919) Elastic tire. A. Gascard, Neumarkt 8, Leipzig.

749,081 (August 23, 1919) Elastic tire. A. Klein, Werdau.

749,247 (May 3, 1920) Cover for pneumatic tire. G. Rosenbaum, Prager Platz 4, Berlin-Wilmersdorf.

749,113 (July 19, 1920) Rubber disk for sole covering. Deutsche Dunlop Gummi Compagnie A. G., Hanau-on-Main.

749,691 (August 9, 1920) Rubber heel with anti-slipping device. F. W. Hoehn, Schassstrasse 21, Kiel.

749,718 (June 17, 1920) Packing for high pressure steam joints. Fa. R. Schroeder, Elberfeld.

750,006 (July 5, 1920) Pneumatic vulcanizing apparatus with steam conductor and condensed water deductor in one pipe. A. Marschall, Gutleutstrasse 96, Frankfort-on-the-Main.

750,007 (July 5, 1920) Pneumatic vulcanizing apparatus with welded table plate. A. Marschall, Gutleutstrasse 96, Frankfort-on-the-Main.

750,008 (July 5, 1920) Vulcanizing apparatus with exchangeable vulcanizing core for partial and whole tire vulcanization. A. Marschall, Gutleutstrasse 96, Frankfort-on-the-Main.

750,010 (July 6, 1920) Tubeless closed tire of rubber or other materials. J. J. Cairns, Hove, England.

750,100 (July 21, 1920) Steel insert for pneumatic tires. H. Greissinger, Bismarckstrasse 18, Erfurt.

750,101 (July 22, 1920) Non-breakable ruler of special rubber. W. Arnold, Grossmannstrasse 1, Dresden.

750,181 (July 17, 1920) Pneumatic tire. J. A. Andrews, Liverpool, England.

750,184 (July 19, 1920) Repair ribbon for bicycle tire covers. F. Laemmel, Gornsdorf i. Erzgeb.

750,532 (August 11, 1920) Tire connection. Progresswerk Oberkirch A. G., Stadelhofen i. B.

750,533 (August 12, 1920) Pneumatic tire with inserted running band. R. Schnauder, Stephanienstrasse 10, Dresden.

750,534 (August 13, 1920) Rubber running band for pneumatics. R. Schnauder, Stephanienstrasse 10, Dresden.

Review of the Crude Rubber Market

NEW YORK

Continued depression in the crude rubber market during October resulted in lower prices for all grades of spot and future rubber. Spot first latex crêpe sold for 23½ cents, and ribbed smoked sheets for 21 cents, the lowest prices on record. Futures also made low records, January-June, first latex being sold for 27½ cents and ribbed smoked sheets for 26½ cents. The same conditions ruled in Brazilian sorts, spot upriver fine making a low record of 24 cents.

While there was some buying of spot and near-by rubber for manufacturers' account and immediate need, the volume was not large and consisted of small lots sold under the market. Dealers' business has apparently fallen off considerably, which is, doubtless, due to the necessity of avoiding further complications until the monthly commitments have been disposed of.

The market undoubtedly lacks definite support from the consuming trade that, in turn, is holding off on account of the small demand for manufactured rubber goods. The tire manufacturers, in particular, have been forced to curtail production materially, and several have shut down completely.

With an accumulation of 30,000 tons said to be in New York and 40,000 tons in London, the position of spot and near-by rubber is decidedly weak and indicates lower prices.

Arrivals of crude rubber during September, 1920, were 11,636 tons compared with 14,036 a year ago. Total arrivals for nine months ended September 30, 1920, were 192,973 tons compared with 156,795 tons for the same period in 1919.

Spot and future quotations on standard plantation and Brazilian sorts at the first and last of the past month were as follows:

Plantations. October 2, first latex crêpe, 25½ to 26 cents; November-December, 26 to 26½ cents; January-June, 30½ to 31 cents.

October 26, first latex crêpe, 24 cents; November-December, 24 cents; January-June, 27 cents.

October 2, ribbed smoked sheets, 23 to 23½ cents; November-December, 24½ cents; January-June, 29½ cents.

October 26, ribbed smoked sheets, 22 cents; November-December, 22½ cents; January-June, 26 cents.

October 2, No. 1 amber crêpe, 20 to 22 cents.

October 26, No. 1 amber crêpe, 20 cents.

October 2, No. 1, rolled brown crêpe, 17 to 18 cents.

October 26, No. 1 rolled brown crêpe, 16 cents.

South American Paras and Caucho. October 2, upriver, fine, 25 to 26 cents; islands, fine, 25 cents; upriver coarse, 16 to 16½ cents; islands coarse, 15 cents; Cametá coarse, 15 cents; caucho ball, 18 to 18¼ cents.

October 26, upriver fine, 24½ cents; islands fine, 23 cents; upriver coarse, 16 cents; islands coarse, 15 cents; Cametá coarse, 14 cents; caucho ball, 14 to 17 cents.

NEW YORK QUOTATIONS

Following are the New York spot quotations, for one year ago, one month ago, and October 26, the current date:

	November 1, 1919	October 1, 1920	October 26, 1920
PLANTATION HEVEA—			
First latex crêpe	$0.53 @	$0.25 @.26	$0.24 @
Amber crêpe No. 1	.49 @	.21 @.23	.20 @
Amber crêpe No. 2	.48 @	.22 @	.19 @
Amber crêpe No. 3	.47 @	.21 @	.18 @
Amber crêpe No. 4	.46 @	.20 @	.17 @
Brown crêpe, thick and thin	.44 @	.19 @.23	.19 @
Brown crêpe, specky	.41½ @	.20 @	.16 @
Brown crêpe, rolled	.40½ @	.17½ @.18	.16 @
Smoked sheet, ribbed, standard quality	.52 @	.23¾ @.24½	.22 @
Smoked sheet, plain standard quality	.49 @	.22 @	.20 @
Unsmoked sheet, standard quality	.47 @	.19 @	.19 @
Colombo scrap No 1	.35 @	.15 @	.17 @
Colombo scrap No. 2	.32 @	.14 @	.16 @
EAST INDIAN—			
Assam crêpe	$0.48 @	@	@
Assam onions	@	@	@
Penang black scrap	@	@	@
PONTIANAK—			
Banjermassin	.11 @.12	.10 @.11	.09 @
Palembang	.12¾ @	.10½ @.13	@
Pressed block	.22 @	.18 @.21	.18 @
Sarawak	.09¾ @	.09 @	@
SOUTH AMERICAN—			
PARAS—			
Upriver, fine	.52½ @.53	.25 @.26	.24½ @
Upriver, medium	.50 @	.23 @.24	.20 @
Upriver, coarse	.34½ @	.16½ @.18	.16 @
Upriver, weak, fine	.41 @	.21 @.22	.19 @
Islands, fine	.47½ @.48	.25 @.26	.23 @
Islands, medium	.45 @	.23 @	.19 @
Islands, coarse	.21½ @	.15 @	.15 @
Cametá, coarse	.23 @	.15 @.15½	.14 @
Madeira, fine	.53½ @	.29 @	.29 @
Acre Bolivian, fine	.53½ @	.28 @	.25 @
Peruvian, fine	51 @	.26 @	.22 @
Tapajos, fine	.50 @	.23 @	.21 @
CAUCHO—			
Upper caucho ball	.31 @	.19 @	.17 @
Lower caucho ball	.35 @	.14 @	.14 @
MANICOBAS—			
Ceará negro heads	.40 @	*.14 @	*.18 @
Ceará scrap	.30 @	*.12 @	*.10 @
Manicoba, 30% guarantee	.37 @	*.15 @	*.15 @
Mangabeira thin sheet	.40 @	*.18 @	*.20 @
CENTRALS—			
Corinto scrap	.34 @.34½	.17 @.18	@
Esmeralda sausage	.34 @.34½	.17 @.18	@
Central scrap	.34 @.34½	.17 @.18	@
Central scrap and strip	.30 @	.15 @.17	@
Central wet sheet	.24 @.24½	.13 @	@
Guayule, 20% guarantee	.27 @	.25 @	.25 @
Guayule, washed and dried	.36 @	.35 @	.37 @
AFRICANS—			
Niger flake, prime	18 @	.18¾ @	@
Benguela, extra No. 1, 28%	@	.11 @.15	@
Benguela. No. 2, 32½%	.26½ @	@	@
Conakry niggers	@	@	@
Congo prime, black upper	@	@	@
Congo, prime, red upper	@	@	@
Kasai black	@	@	@
Kasai red	@	@	@
Massai sheets and strings	@	@	@
Rio Nunez ball	@	@	@
Rio Nunez sheets and strings	@	@	@
GUTTA PERCHA—			
Gutta Siak	.23 @.25	.19 @.20	.19 @
Red Macassar	2.60 @2.75	3.50 @	2.90 @
BALATA—			
Block, Ciudad Bolivar	.57 @.60	.63 @	.70 @
Colombia	.48 @.50	.48 @	.46 @
Panama	.40 @.45	.35 @	.33 @
Surinam sheet	.84 @.85	.69 @	.70 @
Surinam amber	.87 @.88	.84 @	.76 @

*Nominal.

RECLAIMED RUBBER

Owing to the depressed state of the rubber manufacturing industry generally the demand for reclaims has practically ceased. Such calls for reclaims as do appear come largely from manufacturers of heels and clothing. In all other lines not enough interest exists in reclaims to make a market. The outlook, however, is optimistic for general resumption of rubber manufacturing activity by the first of next year.

The following quotations are nominal and are the same as reported for September 27.

NEW YORK QUOTATIONS.

October 26, 1920

Prices subject to change without notice

STANDARD RECLAIMS:	
Floating	*$0.22 @$0.24
Friction	*.25 @ .30
Mechanical	*.11 @ .12
Shoe	*.14¾ @ .15½
Tires, auto	*.14½ @ .15
Tires, truck	*.12½ @ .13½
White	*.20 @ .21

*Nominal.

THE MARKET FOR COMMERCIAL PAPER

In regard to the financial situation, Albert B. Beers, broker in crude rubber and commercial paper, No. 1 Liberty street, New York City, advises as follows:

"During October the demand for commercial paper has improved somewhat over September, though still almost entirely from out-of-town banks, rates ruling at 8½ per cent to 8¾ per cent for the best rubber names, and 9 per cent for those not so well known."

COMPARATIVE HIGH AND LOW NEW YORK SPOT RUBBER PRICES

	October								
	1920*			1919			1918		
PLANTATIONS—									
First latex crêpe	$0.26	@	$0.23½	$0.53½	@	$0.49¾	$0.62	@	$0.37
Smoked sheet ribbed	.24	@	.21½	.52½	@	.48½	.61	@	.35
PARAS—									
Upriver, fine	.26	@	.24½	.55	@	.52	.66	@	.56
Upriver, coarse	.17	@	.16	.35	@	.33	.36	@	.30
Islands, fine	.24	@	.20	.48½	@	.48	.59	@	.44
Islands, coarse	.16	@	.14½	.23½	@	.22	.38	@	.20
Cametá	.15½	@	.14	.23	@	.22	.29	@	.31

*Figured to October 27.

AMSTERDAM RUBBER MARKET

JOOSTEN & JANSSEN, Amsterdam, report [October 2, 1920]:

The rubber market this week was very excited. Originally prices increased rapidly, but suddenly there came a reaction and prices collapsed, especially on the terminal market.

There was a rather good turnover of spot crêpe and sheets, and also on the terminal market rather big lots were disposed of. The highest price paid for standard crêpe, on the spot, was f.1.08, and crêpe on the terminal market brought f.1.08 for November and f.1.11 for January.

Finally December crêpe was sold at f.0.95, April at f.1.01. Buyers were scarce.

SINGAPORE RUBBER MARKET

GUTHRIE & CO., LIMITED, Singapore, report [September 9, 1920]:

The weekly rubber auction opened yesterday to a weak market and lower prices. Fine pale crêpe sold up to 64 cents (64½ cents was paid for three lots), and ribbed smoked sheet touched 63½ cents paid for two lots only, showing declines of 4½ and 6½ cents on the week. Off quality lots of crêpe and sheet were in some demand at 4 cents down. Lower grades were a poor market at 6/8 cents below last week's prices. The sale closed at best, prices being steady at crêpe 64½ cents, sheet 63½ cents.

Of 991 tons cataloged, 525 tons were sold.

The following is the course of values:

	In Singapore per Pound[1]			Sterling Equivalent per pound in London		
Sheet, fine ribbed smoked	61½c	@	63c	1/ 7⅜	@	1/ 8
Sheet, good ribbed smoked	48½	@	60	1/ 4	@	1/ 7¼
Crêpe, fine pale	63½	@	64	1/ 8¾	@	1/ 8⅞
Crêpe, good pale	50	@	61	1/ 4⅞	@	1/ 8
Crêpe, fine brown	45	@	49½	1/ 3½	@	1/ 4¾
Crêpe, good brown	35	@	43½	1/ 0⅝	@	1/ 3
Crêpe, dark	32	@	38	—/11¾	@	1/ 1½
Crêpe, bark	20	@	34¾	—/ 8⅜	@	1/ 0½

[1]Quoted in Straits Settlements, currency $1 = $0.;567 United States currency.

STRAITS SETTLEMENTS RUBBER EXPORTS

An official report from Singapore states that the export of rubber from Straits Settlements ports in the month of August amounted to 6,673 tons (transhipments, 1,622 tons) as compared with 10,773 tons in July and 8,933 tons in the corresponding month last year. The total exports for eight months of the current year amount to 90,929 tons against 99,476 tons in 1919 and 45,407 tons in 1918. Appended are the comparative statistics:

	1918	1919	1920
January ...tons	4,302	14,404	13,125
February	2,334	15,661	17,379
March	8,858	20,908	5,931
April	6,584	10,848	9,768
May	13,587	15,845	15,617
June	6,515	5,059	11,663
July	1,978	7,818	10,773
August	1,249	8,933	6,673
Totals	45,407	99,476	90,929

Correction—The figures given in previous notifications for the month of April, 1920, namely, 15,720 tons, were incorrect. The correct figures should be 9,768 tons, as in accompanying comparative statement.

RUBBER EXPORTS FROM PENANG

	January 1 to August 25	
	1919	1920
To Great Britain ...piculs[1]	136,246	159,976
Europe	......	2,988
United States	75,225	120,054
Totals ...piculs	211,471	283,018

[1]One picul equals 133⅓ pounds.

PLANTATION RUBBER FROM THE FAR EAST

TOTAL EXPORTS FROM MALAYA

From January 1, 1920, to dates named, excluding all foreign transshipments. Reported by Barlow & Co., Singapore.

To—	From Singapore, July 31, 1920	Malacca, July 31, 1920	Penang, July 31, 1920	Port Swettenham, July 31, 1920	Totals
United Kingdom...lbs.	31,072,306	1,688,907	17,983,467	16,626,998	67,371,678
The Continent	3,947,215	....	398,400	150,007	4,495,622
Japan	7,970,744	....	2,277	....	7,973,021
Ceylon	10,229	....	302,534	1,159,993	1,472,756
U. S. A. and Canada	175,174,820	42,214	15,149,600	....	190,366,634
Australia	240,901	....	....	....	240,901
China (Hong Kong)	....	....	....	....	....
Other countries	....	....	400	....	400
Totals	218,416,215	1,731,121	33,836,678	17,936,998	271,921,012
For the year 1919.	352,338,000	17,849,500	25,779,500	30,805,166	426,772,166
For the year 1918.	225,100,000	837,600	12,479,200	....	238,416,800
For the year 1917.	177,901,200	15,113,200	23,402,000	....	216,416,400
For the year 1916.	135,535,954	7,167,346	30,643,565	3,660,840	177,007,705
For the year 1915.	86,067,657	7,898,984	28,580,663	821,445	123,368,749
For the year 1914.	43,534,177	5,218,379	21,912,567	2,052,620	72,717,743

FEDERATED MALAY STATES RUBBER EXPORTS

An official report from Kuala Lumpur states that the exports of plantation rubber in the month of August amounted to 9,140 tons, as compared with 8,043 tons in July and 10,626 tons in the corresponding month of last year. The total exports for eight months of the current year amount to 72,658 tons compared with 69,983 tons in 1919 and 51,554 tons in 1918.

Appended are the comparative figures:

	1918	1919	1920
January ...tons	7,588	7,163	11,119
February	6,820	10,809	9,781
March	7,709	10,679	9,524
April	7,428	7,664	8,375
May	5,851	7,308	7,627
June	5,161	7,094	9,049
July	5,706	8,640	8,043
August	5,291	10,626	9,140
Totals ...tons	51,554	69,983	72,658

CEYLON RUBBER IMPORTS AND EXPORTS

IMPORTS

	January 1, to September 13	
Crude rubber:	1919	1920
From Straits Settlements ...pounds	1,861,283	1,928,908
India	997,545	1,080,121
Burma and other countries	......	26,259
Totals	2,858,828	3,035,288

EXPORTS

	1919	1920
Crude rubber:		
To United Kingdom ...pounds	19,957,221	27,546,141
Belgium	29,120	147,150
France	330,010	575,254
Germany	......	173,475
Netherlands	......	22,358
Italy	......	112,000
Australia	......	56
Victoria	98,755	190,469
United States	41,143,943	26,101,165
New South Wales	154,212	284,178
Canada and Newfoundland	260,026	425,600
India	2,313	586
Straits Settlements	454	44,800
Japan	186,626	157,667
Totals ...pounds	62,162,680	55,780,899

(Compiled by the Ceylon Chamber of Commerce.)

PLANTATION RUBBER EXPORTS FROM JAVA

	July		Seven Months Ended July 31	
	1919	1920	1919	1920
To Netherlands ...kilos	*	396,000	*	2,608,000
Great Britain	790,000	924,000	4,604,000	4,714,000
Germany	*	24,000	*	59,000
France	*	11,000	*	11,000
Belgium	*	....	*	14,000
Other European destinations	236,000**	....	590,000**	....
United States	458,000	979,000	10,565,000	9,105,000
Singapore	123,000	369,000	3,086,000	2,671,000
Japan	....	....	179,000	184,000
Australia	....	114,000	....	163,000
Other countries	....	....	202,000	....
Totals ...kilos	1,607,000	2,817,000	19,226,000	19,529,000
Ports of origin:				
Tandjong Priok	968,000	1,261,000	10,117,000	9,198,000
Samarang	57,000	34,000	318,000	280,000
Soerabaya	582,000	1,397,000	8,069,000	9,465,000

* Not mentioned in 1919.
** Not specified in 1919.

CRUDE RUBBER ARRIVALS AT ATLANTIC AND PACIFIC PORTS AS STATED BY SHIPS' MANIFESTS

PARAS AND CAUCHO AT NEW YORK

	Fine	Medium	Coarse	Caucho	Totals Pounds
September 30. By the S. S. *Francis*, from Pará.					
Wm. Schall & Co.	38,375	....	....	21,614	59,989
September 30. By the S. S. *Francis*, from Iquitos.					
W. R. Grace & Co.	....	....	....	....	1,764
Various	....	....	....	....	1,176
September 30. By the S. S. *Francis*, from Manáos.					
Poel & Kelly	137,943	5,979	97	226,324	370,343
Bennett, Day & Co.	....	....	....	....	490
G. Amsinck & Co., Inc.	....	....	....	....	3,332
Meyer & Brown, Inc.	257,600	....	11,200	....	268,800
September 30. By the S. S. *Sallust*, from Pará and Bahia.					
Poel & Kelly	6,787	....	6,851	26,204	39,842
General Rubber Co.	....	....	....	....	4,508
Meyer & Brown, Inc.	....	....	9,520	4,480	14,000
Various	....	....	....	....	80,708

PLANTATIONS

(*Figured 180 pounds to the bale or case*)

	Shipment from:	Shipped to:	Pounds	Totals
September 8. By the S. S. *Madioen*, at New York.				
The United Malaysian Rubber Co., Limited	Banjermassin	New York	9,039	9,039
September 20 by the S. S. *City of Spokane*, at Seattle.				
Mitsui & Co., Limited	Singapore	Seattle	43,200	
Various	Singapore	Seattle	41,580	84,780
September 20. By the S. S. *West Cadron*, at San Francisco.				
American Finance & Commerce Co.	Hongkong	San Francisco	80,820	80,820
September 22. By the S. S. *Lisbon Maru*, at New York.				
S. W. Bridges & Co., Inc.	Tokyo	New York	90,000	
Fred Stern & Co.	Kobe	New York	78,400	168,400
September 24. By the S. S. *West Cactus*, at San Francisco.				
Mitsui & Co., Limited	Singapore	San Francisco	43,200	43,200
September 25. By the S. S. *Slavic Prince*, at New York.				
Boston Insulated Wire & Cable Co.	Singapore	Dorchester	13,600	
Balfour, Williamson & Co.	Singapore	New York	57,240	
Thos. A. Desmond & Co.	Singapore	New York	44,640	
Edward Maurier Co., Inc.	Singapore	New York	25,920	
Baird Rubber & Trading Co.	Singapore	New York	156,800	
L. Littlejohn & Co., Inc.	Singapore	New York	405,000	
Thornett & Fehr, Inc.	Singapore	New York	54,000	
William H. Stiles & Co.	Singapore	New York	130,000	
W. R. Grace & Co.	Singapore	New York	107,640	
Fred Stern & Co.	Singapore	New York	252,720	
Poel & Kelly	Singapore	New York	194,220	
Aldens' Successors, Inc.	Singapore	New York	81,180	
Chas. T. Wilson Co., Inc.	Singapore	New York	91,800	
W. G. Ryckman, Inc.	Singapore	New York	56,000	
Rubber Importers & Dealers' Co., Inc.	Singapore	New York	228,060	
F. R. Henderson & Co.	Singapore	New York	105,840	
Frank Waterhouse & Co.	Singapore	New York	43,200	
Rogers-Pyatt Shellac Co.	Singapore	New York	72,000	
General Rubber Co.	Singapore	New York	220,320	
Meyer & Brown, Inc.	Singapore	New York	246,400	
Hood Rubber Co.	Singapore	Watertown	179,200	
The B. F. Goodrich Co.	Singapore	Akron	96,300	
Whittall & Co., of Ceylon	Singapore	New York	16,200	
Various	Singapore	New York	1,012,140	
Joosten & Janssen (as agents)	Penang	New York	89,600	
The Goodyear Tire & Rubber Co.	Penang	Akron	74,600	
Various	Singapore	Toronto	88,920	4,142,540
September 26 By the S. S. *Rotterdam*, at New York.				
Meyer & Brown, Inc.	Rotterdam	New York	44,800	
L. Littlejohn & Co., Inc.	The East	New York	2,726	47,526
September 27. By the S. S. *Roseric*, at New York.				
Meyer & Brown, Inc.	Colombo	New York	44,800	
Chas. T. Wilson Co., Inc.	Colombo	New York	9,116	
L. Littlejohn & Co., Inc.	Colombo	New York	11,200	
Fred Stern & Co.	Colombo	New York	11,200	
Baird Rubber & Trading Co.	Singapore	New York	22,400	98,716
September 29. By the S. S. *Sommelsdijk*, at New York.				
Aldens' Successors, Inc.	Soerabaya	New York	126,720	
Meyer & Brown, Inc.	Far East	New York	10,080	
Manhattan Rubber Mfg. Co.	Batavia	New York	27,000	
Robertson, Cole & Co.	Batavia	New York	71,640	
Hagemeyer Trading Co.	Batavia	New York	18,000	
Chas. T. Wilson Co., Inc.	Batavia	New York	22,198	
L. Littlejohn & Co., Inc.	Batavia	New York	179,200	
Fred Stern & Co.	Batavia	New York	134,400	
Various	Belawan-Deli	New York	54,720	
Various	Soerabaya	New York	236,640	880,598
September 29. By the S. S. *Siletz*, at New York.				
Chas. T. Wilson Co., Inc.	Colombo	New York	29,480	
L. Littlejohn & Co., Inc.	Soerabaya	New York	819,848	
Poel & Kelly	Soerabaya	New York	21,240	
Various	Soerabaya	New York	362,620	
Hood Rubber Co.	Far East	Watertown	146,150	
J. Aron & Co.	Singapore	New York	5,040	
Aldens' Successors, Inc.	Singapore	New York	8,100	
Fred Stern & Co.	Singapore	New York	358,400	
Meyer & Brown, Inc.	Singapore	New York	67,200	
Baird Rubber & Trading Co.	Singapore	New York	11,200	
Winter, Ross & Co.	Batavia	New York	18,720	
Poel & Kelly	Batavia	New York	60,120	1,908,118
September 29. By the S. S. *Altai Maru*, at New York.				
Meyer & Brown, Inc.	Singapore	New York	22,400	
L. Littlejohn & Co., Inc.	Singapore	New York	293,307	
Thornett & Fehr, Inc.	Singapore	New York	46,220	
Pacific Trading Corp. of America	Singapore	New York	13,500	
Fred Stern & Co.	Singapore	New York	177,300	
Chas. T. Wilson Co., Inc.	Singapore	New York	134,500	
Hood Rubber Co.	Singapore	Watertown	280,980	
Falls Rubber Co.	Singapore	Cuy'oga Falls	53,280	
Various	Singapore	New York	69,460	1,090,947
October 1. By the S. S. *Arcturus*, at New York.				
Pell & Dumont, Inc.	Singapore	New York	50,400	
Meyer & Brown, Inc.	Singapore	New York	352,800	
W. R. Grace & Co.	Singapore	New York	217,980	
W. T. Sargent & Sons	Singapore	New York	20,520	
Rogers-Pyatt Shellac Co.	Singapore	New York	73,800	
Henderson, Forbes & Co.	Singapore	New York	196,700	
Pacific Trading Corp. of America	Singapore	New York	13,500	
A. C. Fox & Co.	Singapore	New York	10,080	
F. R. Henderson & Co.	Singapore	New York	185,580	
L. Littlejohn & Co., Inc.	Singapore	New York	89,800	
Chas. T. Wilson Co., Inc.	Singapore	New York	183,800	
Balfour, Williamson & Co.	Singapore	New York	20,160	
Various	Singapore	New York	429,440	
Fred Stern & Co.	Batavia	New York	100,800	
Pacific Trading Corp. of America	Penang	New York	6,300	
Henderson, Forbes & Co.	Penang	New York	77,760	
Hood Rubber Co.	Far East	Watertown	101,100	2,130,520
October 4. By the S. S. *Tregenna*, at New York.				
Thornett & Fehr, Inc.	Colombo	New York	28,800	
Aldens' Successors, Inc.	Colombo	New York	5,040	
Fred Stern & Co.	Colombo	New York	5,040	
Chas. T. Wilson Co., Inc.	Colombo	New York	103,500	
Thos. J. Lipton, Inc.	Colombo	New York	10,620	
L. Littlejohn & Co., Inc.	Colombo	New York	22,400	
Baird Rubber & Trading Co.	Colombo	New York	8,960	
Various	Colombo	New York	171,890	356,250
October 2. By the S. S. *Sommelsdijk*, at New York.				
The United Malaysian Rubber Co., Limited	Banjermassin	New York	1,106	1,106
October 4. By the S. S. *Lowther Castle*, at New York.				
Hood Rubber Co.	Singapore	Watertown	221,760	
F. R. Henderson & Co.	Singapore	New York	456,300	
W. R. Grace & Co.	Singapore	New York	163,080	
Edward Maurer Co., Inc.	Singapore	New York	258,120	
Thornett & Fehr., Inc.	Singapore	New York	130,500	
William H. Stiles & Co.	Singapore	New York	100,000	
Rubber Importers & Dealers Co., Inc.	Singapore	New York	98,280	
A. C. Fox & Co.	Singapore	New York	53,460	
The Fisk Rubber Co.	Singapore	Chicopee Falls	89,269	
Chas. T. Wilson Co., Inc.	Singapore	New York	152,950	
Aldens' Successors, Inc.	Singapore	New York	136,080	
L. Littlejohn & Co., Inc.	Singapore	New York	313,000	
Meyer & Brown, Inc.	Singapore	New York	56,000	
Fred Stern & Co.	Singapore	New York	11,200	
Various	Singapore	New York	519,660	2,759,659
October 4. By the S. S. *Bardic*, at New York.				
Various	London	New York	29,340	29,340
October 4. By the S. S. *West Point*, at New York.				
Various	Pasages	New York	41,085	41,085
October 5. By the S. S. *Eastern Merchant*, at New York.				
J. Aron & Co.	Colombo	New York	20,160	
Chas. T. Wilson Co., Inc.	Colombo	New York	11,400	
W. R. Grace & Co.	Colombo	New York	30,240	
Poel & Kelly	Colombo	New York	6,300	
L. Littlejohn & Co., Inc.	Colombo	New York	45,150	
Hood Rubber Co.	Ceylon	Watertown	6,800	120,050
October 11. By the S. S. *Amazon Maru*, at New York.				
Hood Robber Co.	Far East	Watertown	302,750	302,750
October 11. By the S. S. *City of Melbourne*, at New York.				
Thornett & Fehr, Inc.	Colombo	New York	72,000	72,000
October 11. By the S. S. *Karimoen*, at New York.				
Aldens' Successors, Inc.	Soerabaya	New York	67,137	
Various	Soerabaya	New York	28,969	
Chas. T. Wilson Co., Inc.	Batavia	New York	11,200	
Fred Stern & Co.	Batavia	New York	312,480	
Peninsular Trading Agency, Inc.	T'jong Priok	New York	19,611	
Aldens' Successors, Inc.	T'jong Priok	New York	476,903	
Various	T'jong Priok	New York	138,108	1,054,408
October 12. By the S. S. *Fushimi Maru*, at Seattle.				
Mitsui & Co., Limited	Singapore	Seattle	43,200	43,200
October 12. By the S. S. *Nieuw Amsterdam*, at New York.				
Meyer & Brown, Inc.	Rotterdam	New York	4,480	4,480
October 13. By the S. S. *Tokiwa Maru*, at New York.				
Mitsui & Co., Limited	Singapore	New York	161,280	
L. Littlejohn & Co., Inc.	Singapore	New York	131,640	
Poel & Kelly	Singapore	New York	112,680	
Fred Stern & Co.	Singapore	New York	33,600	
Various	Singapore	New York	28,740	467,940

PLANTATIONS—Continued

	Shipment from:	Shipped to:	Pounds	Totals
October 14. By the S. S. *City of Canton*, at New York and Boston.				
L. Littlejohn & Co., Inc.	Colombo	New York	112,000	
Meyer & Brown, Inc....	Colombo	New York	4,480	
Hood Rubber Co........	Ceylon	Watertown	19,380	
Chas. T. Wilson Co., Inc.	Colombo	New York	78,400	
Thornett & Fehr, Inc...	Colombo	New York	197,280	
Baring Bros.	Colombo	New York	40,320	
Poel & Kelly...........	Colombo	New York	51,660	
Baird Rubber & Trading Co.	Colombo	New York	102,180	
Various	Colombo	New Yrok	68,180	673,880
October 18. By the S. S. *Carmania*, at New York.				
Various	Liverpool	New York	1,800	1,800

CENTRALS

	Shipment from:	Shipped to:	Pounds	Totals
September 24. By the S. S. *Cristobal*, at New York.				
Chas. E. Griffin.........	Cristobal	New York	1,500	
Various	Cristobal	New York	600	2,100
September 27. By the S. S. *Helikon*, at New York.				
Various	Jamaica	New York	450	450
October 7. By the S. S. *Lake Copley*, at New York.				
Pablo Calvet & Co......	Cristobal	New York	2,000	2,000
October 8. By the S. S. *Maraval*, at New York.				
Southern Sales Corp....	Trinidad	New York	7,350	7,350
October 11. By the S. S. *Panama*, at New York.				
Ultramares Corp.	Cristobal	New York	750	
Various	Cristobal	New York	1,500	2,250
October 15. By the S. S. *Essequibo*, at New York.				
A. M. Capen's Sons, Inc.	Valparaiso	New York	1,950	1,950
October 15. By the S. S. *Philadelphia*, at New York.				
Scholz & Co............	Venezuelan Ports	New York	2,650	2,650
October 18. By the S. S. *Panuco*, at New York.				
The Steiger Trading Co.	Puerto Mexico	New York	6,300	
Various	Puerto Mexico	New York	1,200	7,500
October 20. By the S. S. *Gen. G. W. Goethals*, at New York.				
Mecke & Co............	Cristobal	New York	2,250	2,250
October 21. By the S. S. *Esperanza*, at New York.				
Coruba Plantation & Trading Co.	Cristobal	New York	1,650	1,650

PONTIANAK

	Shipment from:	Shipped to:	Pounds	Totals
September 25. By the S. S. *Slavic Prince*, at New York.				
Various	Singapore	New York	124,500	124,500
September 29. By the S. S. *Silitz*, at New York.				
Various	Soerabaya	New York	108,000	108,000
October 1. By the S. S. *Arcturus*, at New York.				
Various	Soerabaya	New York	180,000	180,000

AFRICANS

	Shipment from:	Shipped to:	Pounds	Totals
September 27. By the S. S. *Rotterdam*, at New York.				
Various	Rotterdam	New York	47,380	47,380
October 13. By the S. S. *Niew Amsterdam*, at New York.				
Various	Rotterdam	New York	2,645	2,645
October 17. By the S. S. *Carmania*, at New York.				
Meyer & Brown, Inc....	Liverpool	New York	11,200	11,200

GUTTA PERCHA

	Shipment from:	Shipped to:	Pounds	Totals
September 29. By the S. S. *Sommelsdijk*, at New York.				
Various	Belawan-Deli	New York	26,700	26,700
September 29. By the S. S. *Altai Maru*, at New York.				
Various	Batavia	New York	53,100	53,100
October 4. By the S. S. *Lowther Castle*, at New York.				
L. Littlejohn & Co., Inc.	Singapore	New York	189,600	
Various	Singapore	New York	63,000	252,600

GUTTAS

	Shipment from:	Shipped to:	Pounds	Totals
September 8. By the S. S. *Madioen*, at New York.				
The United Malaysian Rubber Co., Limited..	Banjermassin	New York	57,994	57,994
October 2. By the S. S. *Sommelsdijk*, at New York.				
The United Malaysian Rubber Co., Limited..	Banjermassin	New York	73,556	73,556

BALATA

	Shipment from:	Shipped to:	Pounds	Totals
September 24. By the S. S. *Zecapa*, at New York.				
G. Amsinck & Co., Inc..	Cartagena	New York	1,568	1,568
October 1. By the S. S. *Katahdin*, at New York.				
Middleton & Co., Limited	St. L. du Maroni	New York	17,185	
Antoine Chiris Co......	West Indies	New York	6,095	23,280
October 4. By the S. S. *Dutch Amor*, at New York.				
Middleton & Co., Limited	Port de Paix	New York	6,000	
Wm. Schall & Co.......	Dutch Guiana	New York	24,456	30,456
October 8. By the S. S. *Maraval*, at New York.				
South & Central Am. Comm. Co.	Trinidad	New York	5,850	
Southern Sales Corp....	Trinidad	New York	20,700	
G. Amsinck & Co., Inc..	Trinidad	New York	13,100	39,650
October 15. By the S. S. *Santa Marta*, at New York.				
Various	Cartagena	New York	2,400	2,400
October 15. By the S. S. *Essequibo*, at New York.				
J. S. Sembrada & Co....	Valparaiso	New York	2,811	2,811
October 18. By the S. S. *Guiana*, at New York.				
Middleton & Co., Limited		New York	14,190	14,190
October 20. By the S. S. *Gen. G. W. Goethals*, at New York.				
Various		New York	650	650

GUAYULE

	Shipment from:	Shipped to:	Pounds	Totals
October 1. By rail at Eagle Pass, Texas.				
Continental - Mexican Rubber Co...........	Mexico	New York	145,000	145,000
October 8. By rail at Eagle Pass, Texas.				
Continental - Mexican Rubber Co...........	Mexico	New York	70,000	70,000

ANTWERP RUBBER ARRIVALS

August 17. By the S. S. *Albertville*, from the Congo.

Societe Anonyme Bungé (Comptoir Colonial Belgika)..........	*kilos*	22,120
Societé Anonyme Bunge (Compagnie du Congo Belge)............		42,490
Societe Anonyme Bungé (Plantations Lacourt).................		1,450
Société Anonyme Bungé (Various)		7,726
Société Coloniale Anversoise (Intertropical)................		22,640
Societé Colonial Anversoise (S. A. B.)......................		3,100
Crédit Colonial & Commercial (Anc. L. & W. Van de Velde). (Compagnie de Kassai).........		53,675
Comfina		65,330
Various		31,139
Total		249,670

September 25. By the S. S. *Anversville*, from the Congo.

Société Anonyme Bungé...................................	*kilos*	23,890
Société Anonyme Bungé......................................		7,965
Société Anonyme Bungé......................................		1,800
Société Coloniale Anversoise (Compagnie du Kassai)..........		27,900
		61,555

September 28. By the S. S. *Matasi*, from the Congo.

Société Anonyme Bungé (Compagnie du Kassai).................	41,160
Sociéeé Anonyme Bungé (Compagnie du Kassai).................	2,117
Société Anonyme Bungé (Compagnie du Kassai).................	9,490
Société Anonyme Bungé.......................................	8,200
Crédit Colonial & Commercial (Anc. L. & W. Vande Velde)......	69,060
Société Coloniale Anversoise................................	20,570
	150,597

Compiled by Grisar & Co., Antwerp.

CUSTOM HOUSE STATISTICS

PORT OF NEW YORK

IMPORTS

	August			
	1919		1920	
Unmanufactured—*free*: Crude rubber:	Pounds	Value	Pounds	Value
From Belgium	....	....	21,243	$10,453
France	129,960	$32,268	....	....
Netherlands	....	....	122,932	50,526
Portugal	....	....	69,237	25,859
England	1,760,940	739,862	1,959,765	793,200
Costa Rica	5,808	3,147	1,623	325
Nicaragua	....	....	23,615	10,573
Trinidad	145,342	34,113	....	....
Honduras	1,379	450	....	....
Panama	1,200	690	1,530	918
Argentina	27,269	9,294	....	....
Mexico	5,466	1,576	19,133	4,649
Bolivia	36,553	12,745	15,000	5,643
Brazil	2,598,977	741,892	1,317,139	325,547
Colombia	410	167	242,994	67,624
Uruguay	....	....	10,911	3,409
Ecuador	....	....	10,900	2,420
Peru	244,438	104,489	114,405	25,095
Venezuela	83,976	36,917	....	....
British India	11,200	3,808	270,000	97,516
Dutch Guiana ...	31,306	23,626	....	....
Straits Settlements	10,375,023	4,437,138	26,191,776	12,322,176
British E. Indies.	2,192,867	898,694	4,052,341	1,787,894
Dutch E. Indies.	35,750	13,708	3,985,146	1,686,826
Hongkong	....	....	22,348	12,538
China	....	....	44,450	23,680
Japan	19,500	8,808	929,600	385,610
British Oceania..	....	....	959	367
Philippine Islands	....	....	15,540	5,400
British E. Africa	....	....	7,733	3,136
Totals	17,707,364	$7,103,392	39,450,320	$17,651,384
Jelutong (Pontianak):				
From Straits Settlements	798,999	$79,622	1,825,936	$396,120
Dutch E. Indies.	....	....	1,048,965	143,987
Totals	798,999	$79,622	2,874,901	$540,107
Gutta percha:				
From Straits Settlements	315,971	$65,601	1,109,613	$312,937
Dutch E. Indies.	....	....	301,178	56,511
Totals	315,971	$65,601	1,410,791	$369,448
Balata:				
From England	11,349	$11,723	....	....
Panama	17,712	8,124	455	$110
Colombia	25,147	11,762	3,960	1,774
British Guiana...	22,806	17,557	11,130	6,439
Dutch Guiana...	18,320	16,648	25,677	17,655
Venezuela	43,769	27,328	....	....
Totals	139,103	$93,142	41,222	$25,978
Reclaimed and scrap rubber	253,060	$30,058	391,133	$59,588
Totals, unmanufactured	19,214,497	$7,371,815	44,168,367	$18,646,505
Manufactures of rubber and gutta percha	....	$41,855	....	$130,068
Rubber substitutes.*dutiable*	18,816	3,127	....	....
Chicle ....*dutiable*	245,052	128,560	264,911	181,647
Totals	263,868	$173,542	264,911	$311,715

EXPORTS OF DOMESTIC MERCHANDISE

	August			
	1919		1920	
	Pounds	Value	Pounds	Value
Manufactured:				
Automobile tires	....	$1,959,258	....	$2,040,577
Inner tubes	....	....	....	211,916
Solid tires	....	....	....	166,232
All other tires..........	....	83,936	....	36,576
Belting	....	421,107	....	170,557
Hose	....	....	....	133,908
Packing	....	....	....	48,029
Rubber boots ......*pairs*	8,480	24,921	5,340	18,530
Rubber shoes ......*pairs*	280,445	218,529	364,860	351,208
Soles and heels	....	....	....	42,853
Druggists' sundries	....	65,384	....	94,928
Other mfrs. of rubber...	....	475,717	....	275,869
Totals, manufactured.	288,925	$3,248,852	370,200	$3,591,183
Insulated wire	....	637,346	....	261,911
Fountain pens....*number*	14,076	17,365	17,024	21,445
Suspenders and garters..	....	193,761	....	221,581
Chewing gum	....	188,848	....	109,592
Totals	14,076	$1,037,320	17,024	$614,529
Unmanufactured—*free:*				
Reclaimed and scrap rubber	546,925	$64,858	106,466	$12,515

FOREIGN EXPORTS

Crude rubber	16,870	$8,018	336,809	$137,257
Balata	5,900	2,065	99,778	50,640
Chicle	....	....	309	220
Rubber substitutes	305	155	....	....
Rubber scrap	....	....	224,300	44,831

PORT OF BOSTON

IMPORTS

Unmanufactured—*free.*				
Crude rubber:				
From Straits Settlements.....	......	......	7,000	$3,114
British East Indies....	......	......	93,311	21,562
Totals	......	......	100,311	$24,676
Gutta percha	......	......	......	......
Rubber scrap and reclaimed..	591	44	96,839	$6,413
Rubber manufactures...*dutiable*	......	......	......	90,184

EXPORTS

Manufactured:				
Automobile tires.............	......	$19,689	......	$6,910
Inner tubes	......	......	......	11,269
Other tires	......	......	......	506
Belting	......	4,603	......	3,007
Hose	......	......	......	1,291
Packing	......	......	......	184
Rubber boots ....*pairs*	19,122	43,860	3,786	11,526
Rubber shoes ....*pairs*	293,218	169,794	86,145	87,662
Soles and heels............	......	......	......	7,114
Druggists' sundries	......	3,621	......	3,980
Other rubber manufactures...	......	83,530	......	64,812
Totals	312,340	$325,097	89,931	$198,261
Insulated wire..............	......	$149	......	$15,820
Fountain pens	......	......	......	......
Suspenders and garters.......	......	29,702	......	22,914
Rubber scrap...............	80,477	7,977	1,571	550

PORT OF NEW ORLEANS

IMPORTS

Manufactured—*free:*				
Crude rubber:				
From Nicaragua	1,100	$281	1,464	$298
Honduras	....	....	670	154
Totals	1,100	$281	2,134	$452
Chicle	6,191	$3,567	....	....

EXPORTS

	August			
	1919		1920	
	Pounds	Value	Pounds	Value
Manufactured:				
Automobile tires	....	$8,287	....	$57,906
Inner tubes	....	....	....	7,292
Solid tires	....	....	....	248
All other tires...........	....	219	....	43
Belting	....	2,858	....	2,299
Hose	....	....	....	11,366
Packing	....	....	....	2,707
Rubber boots ......*pairs*	....	....	2	9
Rubber shoes ......*pairs*	8,826	9,169	13,557	15,805
Soles and heels	....	....	....	1,130
Druggists' sundries	....	256	....	11
Other rubber manufactures	....	1,960	....	2,393
Totals	....	$22,749	13,559	$101,209
Insulated wire	....	$1,344	....	$10,688
Fountain pens	85	142	....	....
Suspenders	....	2,703	....	4,649
Chewing gum	....	2,041	....	1,374
Scrap	276	60	....	....

PORT OF SEATTLE

IMPORTS

Unmanufactured—*free:*				
Crude rubber:				
From Canada	11,350	$405	....	....
Straits Settlements	825,294	324,991	223,000	$75,847
Dutch E. Indies.	9,100	3,185	....	....
Hongkong	160,200	80,100	....	....
Japan	....	....	89,760	32,328
Totals	1,005,944	$408,681	312,760	$108,175
Jelutong (Pontianak) ...	66,000	$6,600	....	....
Rubber manufactures ...	....	320	....	....

EXPORTS

Manufactured:				
Automobile tires	....	$41,737	....	$50,168
Inner tubes	....	....	....	6,036
Solid tires	....	....	....	1,203
All other tires..........	....	3,268	....	56
Belting	....	4,575	....	29,146
Hose	....	....	....	10,317
Packing	....	....	....	16,999
Rubber boots ......*pairs*	537	1,716	242	980
Rubber shoes ......*pairs*	3,586	5,522	2	2
Druggists' sundries	....	2,436	....	80
Other rubber manufactures	....	6,538	....	3,347
Totals	4,123	$65,792	244	$118,334
Insulated wire	....	$1,085	....	$119
Fountain pens ...*number*	156	83	60	45
Suspenders	....	1,517	....	1,288
Chewing gum	....	103	....	120
Reclaimed rubber	....	....	1,065	32

REEXPORTS

Crude rubber	....	....	1,000	376

PORT OF SAN FRANCISCO

IMPORTS

Unmanufactured—*free:*				
Crude rubber:				
From Straits Settlements	3,415,180	$1,138,702	....	....
Canada	971	413	1,033,170	$656,945
Totals	3,416,151	$1,139,115	1,033,170	$656,945
Jelutong (Fontianak) ...	20,235	$1,214	....	....
Rubber manufactures ...	....	1,017	....	$1,581

EXPORTS

Manufactured:				
Automobile tires	....	$120,384	....	$112,267
Inner tubes	....	....	....	8,897
Solid tires	....	....	....	14,494
All other tires..........	....	547	....	356
Belting	....	48,779	....	49,342
Hose	....	....	....	11,111
Packing	....	....	619	78
Rubber boots ......*pairs*	48	137	....	....
Rubber shoes ......*pairs*	4,674	3,805	1,944	2,213
Soles and heels.........	....	....	....	6,484
Druggists' sundries	....	2,977	....	4,743
Other rubber manufactures	....	37,564	....	18,012
Totals	4,722	$214,193	2,563	$227,997
Insulated wire..........	....	$71,382	....	$6,910
Fountain pens....*number*	3,188	3,011	1,364	3,0 0
Suspenders	....	3,733	....	6,728
Chewing gum	....	3,188	....	2,298
Unmanufactured—*free:*				
Reclaimed and scrap rubber	51,658	$2,066	....	....

EXPORTS OF INDIA RUBBER AND CAUCHO FROM MANAOS DURING AUGUST, 1920

	EUROPE					NEW YORK					
Exporters	Fine	Medium	Coarse	Caucho	Totals	Fine	Medium	Coarse	Caucho	Totals	Grand Totals
General Rubber Co. of Brazil.*kilos*	86,540	16,218	8,142	26,100	137,000	258,295	17,920	32,019	76,766	385,000	522,000
Tancredo, Porto & Co...........	116,964	9,893	622	86	127,565	55,137	6,647	26,606	17,287	105,677	233,242
Stowell & Co.	39,980	1,920	800	9,760	52,460	35,348	1,197	21,950	30,750	89,245	141,705
Semper & Co....................	24,148	835	8,856	7,931	41,770	....	....	....	....	....	41,770
Obliger & Co....................	9,036	778	7,943	7,060	24,817	5,425	....	....	....	5,425	30,242
Companhia Fluvial	21,925	....	....	....	21,925	....	....	....	....	....	21,925
Gomes & Co.....................	9,180	340	150	....	9,670	....	....	....	....	....	9,670
Pedro Manoel Fuentes...........	....	....	....	....	....	5,166	....	3,441	....	8,607	8,607
J. G. Araujo	....	....	....	1,120	1,120	....	....	....	....	....	1,120
Totals from Manáos......*kilos*	307,773	29,984	26,513	52,057	416,327	359,371	25,764	84,016	124,803	593,954	1,010,281
In transit from Iquitos..........	....	....	....	....	....	10,052	23,453	1,997	35,742	71,244	71,244
Totals ....*kilos*	307,773	29,984	26,513	52,057	416,327	369,423	49,217	86,013	160,545	665,198	1,081,525

Compiled by Stowell & Co., Manáos, Brazil.

EXPORTS OF INDIA RUBBER MANUFACTURES AND INSULATED WIRE AND CABLE FROM THE UNITED STATES BY COUNTRIES, DURING THE MONTH OF AUGUST, 1920

EXPORTED TO—	Belting Value	Hose Value	Packing Value	Boots		Shoes		Soles and Heels Value	Automobile Tires				Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
				Pairs	Value	Pairs	Value		Casings Value	Inner Tubes Value	Solid Tires Value	All Others Value				
Europe:																
Austria									$3,200	$100						$3,300
Belgium	$388		$1,680			9,288	$9,170		68,004	10,354			$1,090	$20		90,706
Denmark	828	$1,315	1,368	5	$22	11,160	8,649	$2,089	94,689	6,393	$1,398	$7,471	8,623	1,208	$9,531	143,584
Finland	1,357														75	1,432
France	658								19,683	84	20,987		1,158		14,474	57,044
Germany	525								30,189	10,016					800	41,530
Greece	3,534	903				75	62		13,545	4,708			1,040	162	765	24,719
Italy			482	48	140	20,676	17,907	3,670	45,804	6,435			1,320		8,501	84,259
Malta, Gozo, and Cyprus Is.									343	8					3	354
Netherlands		11,893				1,632	843		7,113	1,033			13,884	2,480	3,678	40,924
Norway	1,364	2,124	300			39,796	33,378		50,347	2,208	15,675		3,439		2,279	111,114
Portugal									38,719	2,290	150		6,256	361	253	48,029
Roumania	112	98							117,952	580			86			118,828
Spain	2,194	3,865	1,067			38,248	37,211	1,065	126,232	15,268	24,782	497	5,773	794	5,458	224,206
Sweden	4,118	6,425	13,803	33	136	1,522	1,949		167,746	25,880	12,365	2,397	6,742	4,007	7,947	253,515
Switzerland	90			420	1,094	42,008	38,796		37,127	6,017					3,273	86,397
Turkey in Europe		913				48,699	44,444		3,351	461					433	49,602
England	14,139	28,338	2,947	1,626	4,639	20,720	22,778	4,506	279,906	16,444	6,416	3,927	9,659	18,215	145,534	557,448
Scotland			1,696	300	595	7,716	6,731		5,356	191		597				15,166
Ireland	10,778															10,778
Yugoslavia, Albania, etc.									578	118						696
Totals, Europe	$40,085	$55,874	$23,343	2,432	$6,626	241,540	$221,918	$11,330	$1,109,884	$108,588	$81,773	$14,889	$59,070	$27,247	$203,004	$1,963,631
North America:																
Bermuda		$10				259	$391	$52					$1,999		$44	$2,496
British Honduras		52	$134	1	$3	1,963	2,731	105	$772	$256		$43	292	$9	110	4,507
Canada	$18,414	11,517	6,192	1,667	6,895	2,622	6,214	1,277	212,148	25,162	$17,259	5,983	42,819	21,834	212,279	587,993
Costa Rica	106	241	46	1	6	144	163	854	850	16			4,185	380	739	7,586
Guatemala		87							30		218		90	79	5	509
Honduras	629	3,468	349			236	332	78	864	24	593		804		279	7,420
Nicaragua	1,291	147	92			301	254	420	1,290	230			1,015	196	284	5,219
Panama	2,744	5,115	1,533	60	201	823	1,117	2,511	96,824	12,706	546	63	16,561	634	2,135	142,690
Salvador	430	261	75					918	283	66	484		736	78	24	3,355
Mexico	62,099	42,520	11,550	16	64	22,258	23,903	1,351	79,540	11,860	5,298	2,813	30,669	7,004	21,090	299,761
Miquelon, Langley, etc.				912	3,221											3,221
Newfoundland and Labrador	3,247	918	264	5,681	20,629	1,231	2,330	356	3,236	508	291	748	208	139	2,256	35,130
Barbados	1,270	285				462	823	190	138	8		136	300		278	3,428
Jamaica	13	703				354	641	107	2,463	59				112	1,056	5,154
Trinidad and Tobago	1,541	966	285			19,388	16,882	369	10,607	824		474	778	277	453	33,456
Other British West Indies	181	15				712	823	249	3,561	405	262	55	231	5	277	6,064
Cuba	7,783	26,347	18,435	565	2,884	89,866	88,229	12,250	270,073	24,007	41,259	1,305	58,673	7,514	16,340	575,099
Virgin Islands of U. S.		1,632				2,545	3,999	506	3,454	772		54	18		240	10,675
Dutch West Indies						250	312		2,579	3,413		67	21	25	77	6,494
French West Indies	18								1,120	50	1,030					2,218
Haiti	55	75				36	41	205	10,445	1,784		85	8,415	30	741	21,876
Dominican Republic	1,112	1,402	147			2,050	2,315	571	23,104	3,667	1,512	2,755	605	1,359	3,874	42,423
Totals, North America	$100,933	$95,761	$39,102	8,903	$33,903	145,500	$151,500	$22,369	$723,381	$85,817	$68,752	$14,581	$168,419	$39,675	$262,581	$1,806,774
Oceania:																
Australia	$11,891	$140	$499			8,795	$7,322	$400	$12,780	$3,211	$1,000		$3,856	$7,910	$4,221	$53,230
New Zealand	4,912	657				1,224	1,159		85,573	4,946	6,200	$3,169	255	1,006	3,163	111,040
French Oceania		18							96	18		70			28	230
Other Oceania															171	171
Philippine Islands	2,516	6,612	923	252	$362	13,282	19,260	10,103	80,146	4,933	13,028	1,410	26,348	2,693	20,521	188,855
Totals, Oceania	$19,319	$7,427	$1,422	252	$362	23,301	$27,741	$10,503	$178,595	$13,108	$20,228	$4,649	$30,459	$11,609	$28,104	$353,526
South America:																
Argentina	$45,896	$10,494	$1,390			11,299	$11,413	$177	$169,349	$26,354		$7,757	$9,808	$13,657	$16,438	$312,733
Bolivia		300						9	697	310			46	296		1,658
Brazil	10,182	5,522	2,028	62	$275	18,790	19,574	12,835	189,740	9,886	$29,955	56	54,705	8,465	46,254	389,477
Chile	1,003	2,378	1,220			480	545	780	8,589	1,828	6,152		2,853	1,295	3,636	30,279
Colombia	450	1,195	275			61	80	2,186	10,929	1,451		440	4,878	1,921	1,967	25,772
Ecuador	252					5,672	4,629		11,551	745				1,747	568	19,492
British Guiana			83			4,982	7,879		11,428	354	505		316	6	113	20,684
Dutch Guiana			5			148	186						35		212	438
Paraguay	680													45		725
Peru	1,843	566	245	108	918	480	818		14,060	1,923	1,470		3,251	1,145	2,278	28,517
Uruguay		3,044				516	482	3,478	22,888	5,378	700		1,012	1,643	4,504	43,129
Venezuela	365	454	102					519	24,344	2,817		504	183	3,672	2,016	34,976
Totals, South America	$60,671	$23,953	$5,348	170	$1,193	42,428	$45,606	$19,984	$463,575	$51,046	$38,782	$8,757	$77,087	$33,892	$77,986	$907,880

EXPORTED TO—	Belting Value	Hose Value	Packing Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Soles and Heels Value	Automobile Tires: Casings Value	Inner Tubes Value	Solid Tires Value	All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
ASIA:																
Aden	......	......	......	......	......	13	$21	......	$5,570	$931	......	......	......	......	......	$6,522
China	......	$153	......	......	......	842	909	......	3,039	366	......	$31	$52,240	$8,773	$5,394	70,905
Kwantung Leased Territory	......	234	......	......	......	......	......	......	......	......	......	......	......	......	......	234
Chosen	......	......	......	......	......	......	......	......	64	......	......	......	......	16	......	80
British India	$7,715	10,004	$2,987	......	......	608	664	......	82,117	6,889	$2,294	646	20,389	4,200	4,913	142,818
Straits Settlements	......	......	104	......	......	48	34	......	76,239	4,725	2,000	61	56	2,054	275	85,548
Other British East Indies	......	......	......	......	......	......	......	......	2,968	672	......	......	14	24	......	3,678
Dutch East Indies	......	100	......	......	......	168	176	......	78,128	8,421	45,402	2,170	3,707	731	3,300	142,135
French Indo China	......	......	......	......	......	......	......	......	......	......	638	......	......	......	66	704
Hongkong	......	717	......	......	......	72	111	......	2,900	......	......	......	4,876	......	195	8,799
Japan	35,387	11,760	18,455	2,366	$6,896	27,510	25,444	$23	50,971	6,742	3,985	8,103	3,505	38	4,025	175,334
Russia in Asia	......	......	......	......	......	......	......	......	......	449	......	......	......	......	......	449
Siam	......	......	......	......	......	239	321	......	......	......	......	30	......	125	10	486
Turkey in Asia	......	......	......	......	......	2,016	2,621	......	3,549	558	......	......	......	175	251	7,154
TOTALS, ASIA	$43,102	$22,968	$21,546	2,366	$6,896	31,516	$30,301	$23	$305,545	$29,753	$54,319	$11,041	$84,787	$16,136	$18,429	$644,846
AFRICA:																
British South Africa	$58,503	$45,824	$12,519	132	$416	4,161	$4,025	$1,755	$287,631	$29,681	$895	......	......	$592	$9,904	$451,745
British East Africa	......	......	......	......	......	......	......	......	13,657	2,202	......	......	$386	......	1	16,246
Canary Islands	......	......	......	......	......	......	......	......	707	35	800	......	......	......	......	1,542
Portuguese Africa	......	......	447	......	......	......	......	......	21,386	5,357	......	......	......	9	45	27,258
Egypt	......	......	......	......	......	192	369	......	17,169	1,422	......	$14	......	678	901	20,539
TOTALS, AFRICA	$58,503	$45,824	$12,966	132	$416	4,353	$4,394	$1,755	$340,550	$38,697	$1,695	$14	$386	$1,279	$10,851	$517,330
TOTALS	$322,613	$251,807	$103,727	14,255	$49,396	488,638	$481,460	$65,964	$3,121,530	$327,009	$265,549	$53,931	$420,208	$129,838	$600,955	$6,193,987

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORY OF THE UNITED STATES

	Belting, Hose and Packing Value	Boots and Shoes Pairs	Boots and Shoes Value	Tires: Automobile Value	Tires: All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All other Manufactures of Rubber Value	Totals Value
Hawaii	$13,254	......	......	$167,451	$3,834	......	......	$30,364	$214,903
Porto Rico	9,108	......	......	158,253	1,211	......	......	52,967	221,539
TOTALS	$22,362	......	......	$325,704	$5,045	......	......	$83,331	$436,442

Compiled by the Bureau of Foreign Commerce, Department of Commerce, Washington, D. C

OFFICIAL INDIA RUBBER STATISTICS FOR THE UNITED STATES

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	July 1919 Pounds	July 1919 Value	July 1920 Pounds	July 1920 Value
UNMANUFACTURED—*free*.				
India rubber:				
From France	......	......	197,165	$67,798
Netherlands	......	......	692,369	280,188
Portugal	......	......	509,146	169,974
United Kingdom	678,016	$310,552	3,397,894	1,481,125
Canada	174,362	80,194	340	133
Central America	27,956	9,265	33,989	9,243
Mexico	1,155	252	154,102	31,330
Brazil	2,055,583	579,257	3,529,968	920,488
Peru	......	......	635,093	220,873
Other South Am.	179,562	67,963	236,726	73,691
British E. Indies	40,109,576	16,390,865	24,711,293	11,622,235
Dutch E. Indies	8,707,707	3,602,738	11,018,052	4,974,481
Other countries	703,891	271,183	338,300	131,000
Totals	52,637,808	$21,312,269	45,454,437	$19,982,559
Balata	105,432	86,104	43,293	25,590
Guayule	285,548	67,453	......	......
Jelutong (Pontianak)	4,000,945	437,606	1,525,057	245,844
Gutta percha	1,264,364	200,032	844,952	190,108
Rubber scrap	1,014,464	71,799	1,349,283	120,092
Totals, manufactured	59,308,561	$22,175,263	49,217,022	$20,564,193
Chicle (dutiable)	795,190	$530,146	1,125,401	$777,897
MANUFACTURED—*dutiable*:				
India rubber and gutta percha	......	$52,776	......	$162,368
India rubber substitutes	16	6	20	61

EXPORTS OF DOMESTIC MERCHANDISE

	July 1919 Pounds	July 1919 Value	July 1920 Pounds	July 1920 Value
UNMANUFACTURED—				
India rubber:				
Scrap and old	752,599	$78,107	360,857	$27,585
Reclaimed	467,139	78,897	378,851	65,364
Belting[1]	......	400,377	......	308,588
Hose[1]	......		......	248,502
Packing[1]	......		......	140,965
Boots[1] ... *pairs*	20,396	59,409	18,289	64,592
Shoes[1] ... *pairs*	131,412	114,436	667,754	680,518
Soles and heels[1]	......	......	......	113,371
Tires:				
For automobiles[1]	......	1,569,967	......	......
Casings[1]	......		......	4,269,123
Inner tubes[1]	......		......	473,413
Solid tires[1]	......		......	265,745
All other tires[1]	......	38,816	......	151,160
Druggists' rubber sundries	......	74,733	......	188,921
Suspenders and garters	......	186,175	......	374,398
Other rubber manufactures[1]	......	481,692	......	755,487
Totals, manufactured	1,371,546	$3,082,609	1,425,751	$8,127,732
Fountain pens ... *number*	53,490	$51,542	33,011	$32,495
Insulated wire and cables[1]	......	659,893	......	558,791

EXPORTS OF FOREIGN MERCHANDISE

	July 1919 Pounds	July 1919 Value	July 1920 Pounds	July 1920 Value
UNMANUFACTURED—				
India rubber	437,414	$199,046	282,860	$97,544
Balata	44,657	20,599	27,700	15,675
Guayule	......	......	1,666	1,083
Jelutong (Pontianak)	23,280	3,492	56,000	6,020
Rubber scrap	......	......	1,875	169
Totals, unmanufactured	505,351	$223,137	370,101	$120,491
MANUFACTURED—				
Gutta percha	......	$3,550	......	$258
Totals, manufactured	......	$3,550	......	$258
India rubber substitutes	......	......	2,450	$1,052
Chicle	......	......	11,020	1,112

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES

	July 1919 Pounds	July 1919 Value	July 1920 Pounds	July 1920 Value
MANUFACTURED—				
To Alaska:				
Belting, hose and packing	......	$8,678	......	$10,648
Boots and shoes ... *pairs*	5,721	15,574	12,333	32,635
Other rubber goods	......	6,657	......	14,289
Totals	5,721	$30,909	12,333	$57,572
To Hawaii:				
Belting, hose and packing	......	$6,740	......	$14,641
Automobile tires	......	43,811	......	137,031
Other tires	......	1,841	......	2,563
Other rubber	......	11,333	......	14,733
Totals	......	$63,725	......	$168,969
To Porto Rico:				
Belting, hose and packing	......	$3,761	......	$9,447
Automobile tires	......	132,865	......	230,738
Other tires	......	1,348	......	24,187
Other rubber goods	......	21,754	......	55,583
Totals	......	$159,728	......	$319,955

To Philippine Islands treated as foreign commerce.

[1] Details of exports of domestic merchandise by countries during July, 1920, are given on pages 68-69 of October issue.

UNITED STATES CRUDE RUBBER IMPORTS FOR 1920 (BY MONTHS)

1920	Plantations	Parás	Africans	Centrals	Guayule	Manicoba and Matto Grosso	Balata	Miscellaneous Gum	Waste	Totals 1920	Totals 1919
January ....tons	17,799	2,620	821	111	....	....	....	....	....	21,351	7,235
February	29,681	2,456	558	265	34	....	....	....	....	32,994	17,456
March	28,533	2,463	514	23	114	3	113	983	1,252	33,998	28,223
April	21,036	1,893	628	29	79	10	22	812	448	24,957	28,146
May	24,443	2,025	662	95	113	....	45	1,059	224	28,666	16,348
June	12,911	1,352	427	27	164	....	7	552	164	15,604	16,319
July	14,695	1,115	34	40	....	....	8	1,283	312	17,487	17,965
August	12,730	590	13	75	156	....	67	1,135	300	15,066	11,067
September	10,974	459	99	8	74	22	44	516	218	12,414	14,036
Totals, 9 months, 1920	172,802	14,973	3,756	673	734	35	306	6,340	2,918	202,537	156,795
Totals, 9 months, 1919	131,853	20,060	2,036	1,136	1,453	257	....	....	....	....	156,795

Compiled by The Rubber Association of America, Inc.

Official India Rubber Statistics for the United States

CALENDAR YEAR 1919

INDIA RUBBER

IMPORTS OF CRUDE INDIA RUBBER BY COUNTRIES (FREE)

From—	Pounds	Value
Europe—		
Belgium	655,001	$272,499
France	2,410,319	752,579
Netherlands	2,637,665	1,276,060
Portugal	87,422	24,470
United Kingdom—		
England	60,159,954	28,657,525
Scotland	91,940	29,975
Totals, Europe	66,042,301	$31,013,108
North America—		
British Honduras	454	$113
Canada	5,320,540	2,530,295
Central American States—		
Costa Rica	35,332	14,337
Guatemala	12,289	3,336
Honduras	17,038	5,648
Nicaragua	267,378	78,482
Panama	89,127	33,884
Salvador	27,209	16,346
Mexico	963,242	306,307
West Indies—		
British—		
Trinidad and Tobago	161,925	41,400
Other British	1,235	375
Haiti	1,000	400
Totals, North America	6,896,769	$3,030,923
South America—		
Argentina	96,240	$44,616
Bolivia	268,253	110,931
Brazil	58,845,384	20,828,269
Chile	56,357	28,072
Colombia	699,790	273,975
Ecuador	476,225	139,265
Guiana—		
British	18,930	15,920
Dutch	31,306	28,626
Peru	4,567,002	1,501,854
Uruguay	230,076	140,364
Venezuela	521,573	219,193
Totals, South America	65,811,136	$23,331,085
Asia—		
China	296,172	$131,582
East Indies—		
British—		
India	4,896,061	2,077,192
Straits Settlem'ts	267,295,344	105,788,564
Other	57,432,831	23,786,387
Dutch	61,260,330	24,600,493
Hongkong	994,968	374,795
Japan	2,808,888	1,095,496
Totals, Asia	394,984,594	$157,854,509
Oceania—		
Philippine Islands	983,987	$394,507
Africa—		
Belgian Congo	67,020	$12,686
British West Africa	858,688	129,516
French Africa	295,926	53,779
Totals, Africa	1,221,634	$195,981
Calendar year, 1919	535,940,421	$215,820,113
Calendar year, 1918	325,959,308	146,378,313
Fiscal year, 1917-18	389,599,015	202,800,392
Fiscal year, 1916-17	333,373,711	189,328,674
Fiscal year, 1915-16	267,775,557	155,044,790
Fiscal year, 1914-15	172,068,428	$83,030,269
Fiscal year, 1913-14	131,995,742	71,219,851
Fiscal year, 1912-13	113,384,359	90,170,316
Fiscal year, 1911-12	110,210,173	93,013,255
Fiscal year, 1910-11	72,046,260	76,244,603
Fiscal year, 1909-10	101,044,681	101,078,825
Fiscal year, 1908-09	88,359,895	61,709,723
Fiscal year, 1907-08	62,233,160	36,613,185
Fiscal year, 1906-07	76,963,838	58,919,981
Fiscal year, 1905-06	57,844,345	45,114,450

IMPORTS OF CRUDE INDIA RUBBER BY CUSTOMS DISTRICTS (FREE)

At—	Pounds	Value
Massachusetts	3,097,900	$905,747
New York	368,146,386	150,168,723
New Orleans	130,693	40,715
Arizona	982	297
San Antonio	280,068	87,733
San Francisco	60,209,143	23,787,035
Southern California	12,908	4,293
Washington	64,556,132	26,027,058
Buffalo	1,674,851	815,505
Dakota	6,982,443	2,788,318
Michigan	3,053,100	977,903
Ohio	26,900,838	9,838,974
St. Lawrence	121,019	52,071
Vermont	640,793	275,681
Colorado	133,165	50,060
Calendar year, 1919	535,940,421	$215,820,113

IMPORTS OF MANUFACTURES OF INDIA RUBBER AND GUTTA PERCHA BY COUNTRIES (DUTIABLE)

[+ indicates increase; — indicates decrease, compared with the preceding year.]

From—	Value
Europe—	
Belgium	$214+
France	5,668+
Germany	43+
Gibraltar	1+
Italy	298—
United Kingdom—	
England	480,642+
Scotland	30,542+
Ireland	164—
Total, Europe	$517,572
North America—	
Canada	$406,947+
West Indies—	
British—	
Barbados	10+
Cuba	343+
Total, North America	$407,300
South America—	
Argentina	$337+
Brazil	71+
Venezuela	230+
Total, South America	$638
Asia—	
China	$2
Hongkong	9
Japan	30,550
Total, Asia	$30,561
Oceania	
Australia	$14+
Total, Calendar year, 1919	$956,085
Total, Calendar year, 1918	445,332

	Gutta Percha	India Rubber
Fiscal year, 1917-18	$16,978	$599,763
Fiscal year, 1916-17	173,975	608,954
Fiscal year, 1915-16	57,875	398,020
Fiscal year, 1914-15	10,841	791,281
Fiscal year, 1913-14	42,023	1,517,789
Fiscal year, 1912-13	77,300	1,217,236
Fiscal year, 1911-12	41,098	874,736
Fiscal year, 1910-11	61,283	875,125
Fiscal year, 1909-10	80,567	1,154,347
Fiscal year, 1902-09	71,819	1,391,770
Fiscal year, 1907-08	93,545	1,956,590

IMPORTS OF MANUFACTURES OF INDIA RUBBER AND GUTTA PERCHA BY CUSTOMS DISTRICTS (DUTIABLE)

At—	Value
Maine and New Hampshire	$965
Maryland	2,132
Massachusetts	39,442
New York	528,957
Philadelphia	1,269
Rhode Island	637
South Carolina	71
Florida	138
Mobile	10
New Orleans	111
Hawaii	3,238
Oregon	17
San Francisco	14,651
Southern California	164
Washington	1,165
Buffalo	245,428
Chicago	85,186
Dakota	295
Michigan	13,135
Montana and Idaho	205
Ohio	10,053
Rochester	43
St. Lawrence	2,520
Vermont	312
Wisconsin	921
Minnesota	5
Pittsburgh	4,854
St. Louis	161
Total	$956,085

REEXPORTS OF IMPORTED CRUDE INDIA RUBBER

To—	Pounds	Value
Austria	179,952	$77,992
Denmark	65,050	32,500
France	7,575	4,800
Germany	322,650	135,310
Norway	525	336
Spain	1,900	857
Sweden	150	280
Switzerland	357	209
United Kingdom—England	39,550	14,343
Canada	4,142,665	1,752,034
Mexico	146,567	67,700
Cuba	71,707	33,927
Chile	1.355	938
Japan	28.652	19,360
Australia	103,131	65,043
Calendar year, 1919	5,111,786	$2,205,629
Calendar year, 1918	6.150,755	3,133,622
Fiscal year, 1917-18	8,208,280	4,274,543
Fiscal year, 1916-17	12,355,898	7,304,820
Fiscal year, 1915-16	4,662,889	2,661,331
Fiscal year, 1914-15	6,383,145	3,361,107
Fiscal year, 1913-14	3,747,749	2,398,150
Fiscal year, 1912-13	5,272,387	4,476,379
Fiscal year, 1911-12	5,610,951	4,890,905
Fiscal year, 1910-11	5,267,588	5,439,282
Fiscal year, 1909-10	6,492,947	7,629,380
Fiscal year, 1908-09	3,791,971	2,964,496
Fiscal year, 1907-08	4,110.667	2,994,208
Fiscal year, 1906-07	4,215,350	3,593,912

REEXPORTS OF MANUFACTURES OF INDIA RUBBER AND GUTTA PERCHA

To—	Value
Denmark	$8,200
Sweden	5,538
United Kingdom—England	21,571
Canada	2,570
Mexico	40
Cuba	1,040
Chile	188
Venezuela	85
Japan	511
Calendar year, 1919	$39,743
Calendar year, 1918	40,101

	Gutta Percha	India Rubber
Fiscal year, 1917-18	$18,216	$13,563
Fiscal year, 1916-17	421	10,905
Fiscal year, 1915-16	537	38,649
Fiscal year, 1914-15	....	7,489
Fiscal year, 1913-14	....	7,638
Fiscal year, 1912-13	....	7,973
Fiscal year, 1911-12	65	6,681
Fiscal year, 1910-11	8,687	29,356
Fiscal year, 1909-10	....	13,568
Fiscal year, 1908-09	....	36,401
Fiscal year, 1907-08	....	176,129
Fiscal year, 1906-07	....	32,712

GUTTA PERCHA

IMPORTS OF CRUDE GUTTA PERCHA BY COUNTRIES (FREE)

From—	Pounds	Value
Europe—		
France	44,800	$9,311
United Kingdom—England	256,914	54,219
Totals, Europe	301,714	$63,530
North America—		
Canada	58,393	$17,580
Asia		
East Indies—British—Straits Settlem'nts	4,576,880	$764,907
Dutch	1,286,069	184,477
Japan	200	40
Totals, Asia	5,863,149	$949,424
Oceania—		
Philippine Islands	7,491	$1,750
Africa—		
British—West Africa	265,071	$36,414
Calendar year, 1919	6,495,818	$1,068,698
Calendar year, 1918	1,207,986	225,922
Fiscal year, 1917-18	1,151,312	147,323
Fiscal year, 1916-17	2,021,794	332,223
Fiscal year, 1915-16	3,188,449	342,226
Fiscal year, 1914-15	1,618,214	230,750
Fiscal year, 1913-14	1,846,109	323,567
Fiscal year, 1912-13	480,853	167,313
Fiscal year, 1911-12	1,204,406	225,797
Fiscal year, 1910-11	1,648,921	390,548
Fiscal year, 1909-10	784,501	167,873
Fiscal year, 1908-09	255,559	82,136
Fiscal year, 1907-08	188,610	100,305
Fiscal year, 1906-07	546,890	201,339
Fiscal year, 1905-06	500,770	188,161

IMPORTS OF CRUDE GUTTA PERCHA BY CUSTOMS DISTRICTS (FREE)

At—	Pounds	Value
New York	6,131,188	$988,971
San Francisco	195,833	48,867
Washington	168,193	30,663
Michigan	604	197
Calendar year, 1919	6,495,818	$1,068,698

REEXPORTS OF CRUDE GUTTA PERCHA

To—	Pounds	Value
Scotland	10,205	$2,179
Canada	2,450	1,432
Calendar year, 1919	12,655	$3,611
Calendar year, 1918	126,731	29,015
Fiscal year, 1917-18	202,646	47,211
Fiscal year, 1916-17	763	558
Fiscal year, 1915-16	60,023	11,446
Fiscal year, 1914-15	9,457	4,603
Fiscal year, 1913-14	14,649	5,255
Fiscal year, 1912-13	22,352	2,665
Fiscal year, 1911-12	1,011	945
Fiscal year, 1910-11	62,391	19,235
Fiscal year, 1909-10	74,137	13,886
Fiscal year, 1908-09	9,370	3,730
Fiscal year, 1907-08	....	....
Fiscal year, 1906-07	5,000	700

GUAYULE

IMPORTS OF GUAYULE BY COUNTRIES (FREE)

From—	Pounds	Value
North America—		
Mexico	3,204,224	$760,690
Calendar year, 1919	3,204,224	$760,690
Calendar year, 1918	1,376,085	413,484
Fiscal year, 1917-18	4,307,539	1,341,095
Fiscal year, 1916-17	2,854,372	764,484
Fiscal year, 1915-16	2,816,068	880,813
Fiscal year, 1914-15	5,111,849	1,441,367
Fiscal year, 1913-14	1,475,804	607,076
Fiscal year, 1912-13	10,218,191	4,345,088
Fiscal year, 1911-12	14,238,625	6,463,787
Fiscal year, 1910-11	19,749,522	10,443,157

IMPORTS OF GUAYULE BY CUSTOMS DISTRICTS (FREE)

At-	Pounds	Value
New York	140,043	$22,233
San Antonio	3,064,181	738,457
Calendar year, 1919	3,204,224	$760,690

REEXPORTS OF GUAYULE

To—	Pounds	Value
United Kingdom—England	2,206	$620
Canada	4	1
Calendar year, 1919	2,210	$621
Calendar year, 1918	9,778	2,936

JELUTONG (PONTIANAK)

IMPORTS OF JELUTONG BY COUNTRIES (FREE)

From—	Pounds	Value
Europe—		
England	164,523	$25,399
Totals, Europe	164,523	$25,399
North America—		
Canada	351,791	$114,824
Totals, North America	351,791	$114,824
South America—		
Brazil	52,381	$5,409
Totals, South America	52,381	$5,409
Asia—		
East India—British—Straits Settlem'nts	13,485,039	$1,590,215
Dutch	4,568,968	474,117
Japan	40,000	4,000
Totals, Asia	18,094,007	$2,068,332
Calendar year, 1919	18,662,702	$2,213,964
Calendar year, 1918	9,932,476	683,551
Fiscal year, 1917-18	7,481,292	474,366
Fiscal year, 1916-17	....	....
Fiscal year, 1915-16	27,858,335	1,322,262
Fiscal year, 1914-15	14,851,264	731,995
Fiscal year, 1913-14	24,926,571	1,155,402
Fiscal year, 1912-13	45,345,338	2,174,441
Fiscal year, 1911-12	48,795,268	2,255,050
Fiscal year, 1910-11	51,420,872	2,872,633
Fiscal year, 1909-10	52,392,444	2,419,223
Fiscal year, 1908-09	24,826,296	852,372
Fiscal year, 1907-08	22,803,303	1,039,776
Fiscal year, 1906-07	28,437,660	1,085,098

IMPORTS OF JELUTONG BY CUSTOMS DISTRICTS (FREE)

At—	Pounds	Value
New York	16,516,505	$2,019,121
San Francisco	508,812	37,972
Washington	1,637,385	156,871
Calendar year, 1919	18,662,702	$2,213,964

REEXPORTS OF JELUTONG

To—	Pounds	Value
Canada	163,034	$26,873

BALATA

IMPORTS OF BALATA BY COUNTRIES (FREE)

From—	Pounds	Value
Europe—		
United Kingdom—England	132,565	$122,563
Totals, Europe	132,565	$122,563
North America—		
Canada	5,900	$3,127
Central American States—Panama	250,433	102,794
West Indies—British—Trinidad and Tobago	187	112
Haiti	24,354	22,295
Totals, North America	280,874	$128,328
South America—		
Brazil	2,637	$1,960
Colombia	197,113	89,425
Ecuador	11,100	4,610
Guiana—British	136,910	106,711
Dutch	224,970	187,843
Peru	1,500	446
Venezuela	360,506	227,397
Totals, South America	934,736	$618,392
Asia—		
East Indies—British—Straits Settlem'nts	600	$240
Other British	279,359	67,515
Totals, Asia	279,959	$67,755
Calendar year, 1919	1,628,134	$937,038
Calendar year, 1918	1,547,338	836,383
Fiscal year, 1917-18	2,449,881	1,278,610
Fiscal year, 1916-17	3,287,445	1,649,452
Fiscal year, 1915-16	2,544,405	996,102
Fiscal year, 1914-15	2,472,224	963,384
Fiscal year, 1913-14	1,533,024	793,126
Fiscal year, 1912-13	1,318,598	766,772
Fiscal year, 1911-12	1,517,066	984,012
Fiscal year, 1910-11	878,305	624,702
Fiscal year, 1909-10	399,003	196,878
Fiscal year, 1908-09	1,157,018	522,872
Fiscal year, 1907-08	584,582	276,756
Fiscal year, 1906-07	799,029	305,041
Fiscal year, 1905-06	374,220	152,689

IMPORTS OF BALATA BY CUSTOMS DISTRICTS (FREE)

At—	Pounds	Value
New York	1,342,275	$866,156
Buffalo	6,900	3,127
Dakota	279,359	67,515
Vermont	600	240
Calendar year, 1919	1,629,134	$937,038

REEXPORTS OF BALATA

To—	Pounds	Value
Europe—		
Germany	11,000	$5,200
United Kingdom—England	278,222	158,021
Totals, Europe	289,222	$163,221
North America—		
Canada	13,774	$8,092
Miquelon, Langley, etc.	1,530	520
Totals, North America	15,304	$8,612
South America—		
Uruguay	551	$549
Asia—		
Japan	46,400	$33,736
Calendar year, 1919	351,477	$206,118
Calendar year, 1918	706,185	436,252
Fiscal year, 1917-18	473,915	303,338
Fiscal year, 1916-17	879,765	474,538
Fiscal year, 1915-16	667,168	245,329
Fiscal year, 1914-15	1,076,619	426,735
Fiscal year, 1913-14	223,983	127,139
Fiscal year, 1912-13	118,334	77,963
Fiscal year, 1911-12	62,529	38,423
Fiscal year, 1910-11	264,589	235,575
Fiscal year, 1909-10	....	42,750
Fiscal year, 1908-09	....	223,907
Fiscal year, 1907-08	....	18,741
Fiscal year, 1906-07	....	12,659

RECLAIMED RUBBER

EXPORTS OF RECLAIMED RUBBER BY COUNTRIES

To—	Pounds	Value
Europe—		
Belgium	13,468	$2,400
France	180,570	26,574
Italy	11,375	1,916
Netherlands	127,915	25,900
Sweden	143,858	23,837
United Kingdom—England	321,504	53,906
Scotland	448,000	73,297
Totals, Europe	1,246,690	$207,830
North America—		
Canada	3,750,138	$619,524
West Indies—Cuba	30	15
Totals, North America	3,750,168	$619,539
Asia—		
East Indies—British—Straits Settlem'nts	20,000	$3,575
Japan	46,574	7,397
Totals, Asia	66,574	$10,972
Africa—		
British—South Africa	7,200	$1,597
Calendar year, 1919	5,070,632	$839,938

Calendar year, 1918...	2,904,234	$502,176
Fiscal year, 1917-18...	3,284,958	567,278
Fiscal year, 1916-17...	4,938,991	814,199
Fiscal year, 1915-16...	6,406,946	871,262
Fiscal year, 1914-15...	5,970,380	822,561
Fiscal year, 1913-14...	5,583,860	834,440
Fiscal year, 1912-13...	5,413,247	932,904
Fiscal year, 1911-12...	5,397,806	875,501
Fiscal year, 1910-11...	4,994.527	781,650
Fiscal year, 1909-10...	3,622,556	535,795
Fiscal year, 1908-09...	3,196,551	414,861
Fiscal year, 1907-08...	2,947,974	418,738
Fiscal year, 1906-07...	4,550,788	665,109
Fiscal year, 1905-06...	4,084,696	511,843
Fiscal year, 1904-05...	*a*	522,902

(*a*) Not officially reported.

EXPORTS OF RECLAIMED RUBBER BY CUSTOMS DISTRICTS

At—	Pounds	Value
Massachusetts	2,817	$563
New York	1,115,990	186,773
Philadelphia	201,657	33,063
New Orleans	30	15
Buffalo	2,115,600	355,976
Michigan	352,259	57,963
St. Lawrence	395,041	65,876
Vermont	887,238	141,709
Calendar year, 1919...	5,070,632	$839,938

SUBSTITUTES, ELASTICON, ETC.

IMPORTS OF ELASTICON AND SIMILAR SUBSTITUTES FOR INDIA RUBBER BY COUNTRIES (DUTIABLE)

From—	Pounds	Value
EUROPE—		
France	110	$95
United Kingdom—		
England	166,040	12,816
Totals, Europe	166,150	$12,911
NORTH AMERICA—		
Canada	10	$39
ASIA—		
East Indies—		
British—		
Straits Settlem'nts	225,663	$34,987
Dutch	269	29
Totals, Asia	225,932	$35,016
Calendar year, 1919...	392,092	$47,966
Calendar year, 1918		383,497
Fiscal year, 1917-18		136,438
Fiscal year, 1916-17		39,815
Fiscal year, 1915-16		16,179
Fiscal year, 1914-15		30,349
Fiscal year, 1913-14		87,642
Fiscal year, 1912-13		97,452
Fiscal year, 1911-12		87,328
Fiscal year, 1910-11		115,601
Fiscal year, 1909-10		114,516
Fiscal year, 1908-09		60,625
Fiscal year, 1907-08		27,000

IMPORTS OF ELASTICON AND SIMILAR SUBSTITUTES OF INDIA RUBBER BY CUSTOMS DISTRICTS (DUTIABLE)

At—	Pounds	Value
Massachusetts	112,000	$4,015
New York	100,866	12,400
Porto Rico	16	6
San Francisco	179,200	31,506
Buffalo	10	39
Calendar year, 1919...	392,092	$47,966

REEXPORTS OF ELASTICON AND SIMILAR SUBSTITUTES OF INDIA RUBBER BY COUNTRIES

To—	Pounds	Value
Canada	70	$202
British South Africa	305	155
Calendar year, 1919...	375	$357
Calendar year, 1918...	....	65,765
Fiscal year, 1917-18...	....	11,098

SCRAP RUBBER

IMPORTS OF SCRAP RUBBER BY COUNTRIES (FREE)

From—	Pounds	Value
EUROPE—		
France	1,453,606	$134,663
Italy	366,852	102,483
United Kingdom—		
England	2,178,756	146,527
Totals, Europe	3,999,214	$383,673
NORTH AMERICA—		
British Honduras	226	$45
Canada	5,585,397	384,277
Central American States—		
Nicaragua	3,580	1,061
Panama	49,935	1,875
Mexico	6,222	341
Newfoundland and Labrador	96,350	5,918
West Indies—		
British—		
Jamaica	13,270	276
Trinidad and Tobago	3,336	48
Other British	2,270	78
Cuba	923.710	40.677
Dominican Republic...	8,671	510
Totals, North America	6,692,967	$435,076
SOUTH AMERICA—		
Guiana—		
British	60	$3
Venezuela	16,163	840
Totals, South America	16,223	843
ASIA—		
Other British East Indies	2,921	$1,168
OCEANIA—		
New Zealand	65,766	$4,849
Philippine Islands	134	10
Totals, Oceania	65,900	$4,859
Calendar year, 1919...	10,777,225	$825,619
Calendar year, 1918...	8,526,420	645,581
Fiscal year, 1917-18...	13,980,303	1,019,222
Fiscal year, 1916-17...	20,517,328	1,569,448
Fiscal year, 1915-16...	16,371,573	1,271,903
Fiscal year, 1914-15...	11,006,928	726,914
Fiscal year, 1913-14...	25,958,261	2,063,198
Fiscal year, 1912-13...	43,385,456	3,709,238
Fiscal year, 1911-12...	26,293,192	2,095,605
Fiscal year, 1910-11...	26,948,000	2,334,870
Fiscal year, 1909-10...	37,364,671	2,998,697
Fiscal year, 1908-09...	20,497,695	1,543,267
Fiscal year, 1907-08...	16,331,035	1,496,822
Fiscal year, 1906-07...	29,335,193	2,607,987

IMPORTS OF SCRAP RUBBER BY CUSTOMS DISTRICTS (FREE)

At—	Pounds	Value
Maine and New Hampshire	1,011,246	$74,740
Massachusetts	62,393	3 174
New York	4,957,746	426,986
Philadelphia	78.681	6,130
Florida	59,190	2,293
San Antonio	400	40
San Francisco	68,166	4,929
Washington	96,919	4,029
Buffalo	2,208,652	156,406
Chicago	107,672	6,545
Dakota	41,845	3,101
Duluth and Superior	54,200	556
Michigan	593,134	26,268
Ohio	134	10
St. Lawrence	1,057,268	80,787
Vermont	379,669	29,625
Calendar year, 1919...	10,777,225	$825,619

EXPORTS OF SCRAP RUBBER BY COUNTRIES

To—	Pounds	Value
EUROPE—		
Belgium	88,580	$13,130
Denmark	129,600	22,090
France	603,099	$100,015
Germany	201,000	29,204
Italy	22,400	3,136
Netherlands	1,283,640	127,062
Norway	40,000	2,500
Spain	27,202	3,220
Sweden	188,640	31,150
United Kingdom—		
England	1,488,874	189,422
Scotland	447,981	42,988
Totals, Europe	4,521,016	$563,917
NORTH AMERICA—		
Canada	2,316,488	$178,578
Central American States—		
Panama	321	71
Mexico	500	35
West Indies—		
Cuba	105	10
Virgin Islands of United States	112	12
Totals, North America	2,317,526	$178,706
ASIA—		
China	49	$14
Japan	1,453,462	66,356
Totals, Asia	1,453,511	$66,370
Calendar year, 1919...	8,292,053	$808,993
Calendar year, 1918...	2,931,929	287,883
Fiscal year, 1917-18...	2,117.257	235.811
Fiscal year, 1916-17...	3,696.661	415,526
Fiscal year, 1915-16...	3,904,715	400,148
Fiscal year, 1914-15...	2,422.091	291,421
Fiscal year, 1913-14...	6,207,672	598,287
Fiscal year, 1912-13...	7,269,465	880,442
Fiscal year, 1911-12...	7,336.984	780,188
Fiscal year, 1910-11...	7,049,729	723,664
Fiscal year, 1909-10...	6,143.610	578.944
Fiscal year, 1908-09...	4,071,795	402,897
Fiscal year, 1907-08...	4,255.789	449,727
Fiscal year, 1906-07...	4,756.621	548,695

EXPORTS OF SCRAP RUBBER BY CUSTOMS DISTRICTS

At—	Pounds	Value
Georgia	147	$42
Maine and New Hampshire	15,037	549
Massachusetts	331,565	33,741
New York	3,968.535	508,363
Philadelphia	255.311	23,716
New Orleans	321	71
Hawaii	155.143	4,277
San Francisco	359,087	15,815
Washington	1,005,918	46,093
Buffalo	737,430	72,036
Dakota	70	15
Michigan	492,950	31,812
Montana and Idaho	2,790	3,018
St Lawrence	556,219	34,337
Vermont	411,530	35,108
Calendar year, 1919...	8,292,053	$808,993

REEXPORTS OF SCRAP RUBBER

To—	Pounds	Value
Germany	900	$180
Canada	970	26
Calendar year, 1919...	1,870	206
Calendar year, 1918...	58.574	16,032
Fiscal year, 1917-18...	74 497	16,965
Fiscal year, 1916-17...	1 626	215
Fiscal year, 1915-16...	9.204	734
Fiscal year, 1914-15...	3 483	373
Fiscal year, 1913-14...	24.295	2,450
Fiscal year, 1912-13...	87.930	10.723
Fiscal year, 1911-12...	302,105	28.196
Fiscal year, 1910-11...	401.231	43,338
Fiscal year, 1909-10...	61,395	5,373
Fiscal year, 1908-09...	38,576	2,093
Fiscal year, 1907-08...	21.713	2,943
Fiscal year, 1906-07...	105.463	9,444

Note.—Details of exports of domestic merchandise by countries for the calendar year 1918, were given on pages 736, 737 of THE INDIA RUBBER WORLD, September 1, 1920.

EXPORTS OF UNITED STATES RUBBER GOODS, CALENDAR YEAR, 1919 (BY CUSTOMS DISTRICTS*)

From—	Belting, Hose, and Packing Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Druggists' Rubber Sundries Value	Tires Automobile Value	Tires All Other Value	All Other Manufactures of Rubber Value	Totals Value
Georgia	$3,52[illegible]	7	$28	....	....	....	$14,847	....	$2,779	$21,178
Maine and New Hampshire	28,817	27,128	82,374	8,426	$10,631	$10,593	109,541	$46,047	19,723	307,726
Maryland	128,766	....	....	....	....	....	92,260	7,333	4,279	232,638
Massachusetts	56,992	84,458	218,143	1,021,310	677,138	33,746	125,380	82	541,398	1,652,879
New York	3,963,008	91,298	230,126	4,200,476	3,324,573	813,376	22,056,081	1,249,204	5,326,516	36,962,884
Philadelphia	221,477	12	31	35,913	30,494	5,197	394,737	7	46,128	701,071
Porto Rico	3,424	12	30	114	142	98	22,299	1,845	4,737	32,575
Virginia	75	....	....	....	....	....	392	....	....	467
Rhode Island	....	36	150	....	....	....	....	....	14,976	15,126
Florida	14,919	11	47	409	401	322	858,596	28,997	43,133	946,415
Galveston	4,723	....	....	....	....	....	1,004	....	2,936	8,663
Mobile	2,455	....	....	21,131	19,469	41	8,431	666	1,409	32,471
New Orleans	52,428	557	1,674	72,414	67,655	9,602	92,715	8,115	21,118	253,307
Sabine	18,284	110	442	....	....	1,277	31,281	816	1,327	53,427
Arizona	101,065	116	544	3,564	3,927	3,556	98,564	3,770	14,873	226,299
El Paso	55,457	5	40	16,628	13,849	7,969	28,566	1,191	9,795	116,867
San Antonio	188,530	20	113	4,821	4,075	12,965	411,227	22,590	80,080	719,580
Alaska	1,125	420	2,317	560	1,890	15	687	....	364	6,398
Hawaii	....	....	....	....	....	14	840	....	1,800	2,654
Oregon	404	....	....	....	....	788	4,820	....	54	6,066
San Francisco	750,917	8,951	26,604	164,796	142,469	61,130	2,757,810	88,911	640,194	4,468,035
Southern California	5,353	52	291	1,435	1,336	4,992	26,479	5,075	11,174	54,700
Washington	75,328	12,757	42,917	51,365	58,117	15,766	463,173	22,105	85,662	763,068
Buffalo	133,128	1,650	4,808	19,218	19,153	61,814	328,627	20,718	865,828	1,434,076
Dakota	74,201	2,515	11,360	45,474	38,485	41,706	437,601	35,739	230,022	869,114
Duluth and Superior	25,004	82	233	1,405	3,493	3,961	4,133	384	8,875	46,083
Michigan	55,662	23,516	68,153	671	528	25,102	256,502	4,778	127,512	538,237
Montana and Idaho	1,202	174	234	1	4	194	14,326	234	4,117	20,311
Ohio	1,095	....	....	....	....	....	170	....	....	1,265
St. Lawrence	80,477	595	1,927	1,474	2,587	33,613	224,600	6,520	265,543	615,267
Vermont	49,620	6,628	22,127	122,883	130,970	122,669	58,970	2,100	721,421	1,107,877
Calendar year, 1919	$6,100,460	261,110	$714,713	5,794,488	$4,551,386	$1,270,506	$28,924,659	$1,557,227	$9,097,773	$52,216,724
‖Calendar year, 1918	4,525,243	772,586	2,799,116	1,285,110	1,584,747	772,539	14,511,621	755,888	5,762,079	30,711,233
Fiscal year, 1917-18	4,578,396	1,559,598	4,861,213	1,244,170	913,128	884,245§	13,977,671	1,130,623	6,194,816	32,540,092
Fiscal year, 1916-17	3,532,383	600,455	1,483,379	3,356,484	1,716,225	....	12,330,201	2,547,652	8,265,509	29,875,349
Fiscal year, 1915-16	2,986,953	720,130	1,619,260	1,976,896	1,046,102	....	17,936,227	3,003,077	7,290,345	33,881,964
Fiscal year, 1914-15	1,807,848	318,727	726,765	2,219,900	2,053,560	....	4,963,270	576,602	3,525,486	13,653,531
Fiscal year, 1913-14	2,372,887	101,361	279,206	1,634,258	834,289	....	3,505,267	563,372	3,453,472	11,008,493
Fiscal year, 1912-13	2,605,551	109,528	274,330	2,231,467	1,163,953	....	3,943,220	611,458	3,913,036	12,511,548
			Boots and Shoes† Pairs	Boots and Shoes† Value						
Fiscal year, 1911-12	$2,315,484	....	2,545,076	$1,502,890	....	....	$2,657,809	$546,833	$4,144,273	$11,167,289
Fiscal year, 1910-11	2,163,416	....	3,984,332	2,219,430	....	....	2,085,107‡	592,470	3,886,825	10,947,248
Fiscal year, 1909-10	1,960,825	....	3,791,084	1,984,739	....	....	....	....	5,115,331	9,060,895
Fiscal year, 1908-09	1,498,445	....	2,396,435	1,292,673	....	....	....	....	3,823,956	6,615,074
Fiscal year, 1907-08	1,347,775	....	3,080,253	1,614,290	....	....	....	....	3,743,040	6,705,105
Fiscal year, 1906-07	1,253,369	....	2,310,420	1,231,898	....	....	....	....	3,729,643	6,21[illegible],910
Fiscal year, 1905-06	1,221,159	....	2,693,690	1,505,082	....	....	....	....	2,966,144	5,692,385
Fiscal year, 1904-05	994,100	....	2,390,539	1,214,342	....	....	....	....	2,572,375	4,780,817
Fiscal year, 1903-04	880,010	....	2,310,420	1,231,898	....	....	....	....	3,729,643	6,214,910
Fiscal year, 1902-03	819,985	....	2,307,401	1,056,491	....	....	....	....	2,299,875	4,176,351
Fiscal year, 1901-02	634,146	....	2,594,708	1,046,315	....	....	....	....	1,781,941	3,462,402
Fiscal year, 1900-01	565,726	....	1,459,100	724,015	....	....	....	....	1,727,527	3,017,268

*Exports of United States rubber goods, calendar year 1919, by countries, were published in THE INDIA RUBBER WORLD, September 1, 1920, page 737.

†States separately after 1912. ‡Tires were not specifically reported before 1910-11. §Druggists' rubber sundries were not specifically reported before 1917-18. ‖These figures are given for the calendar year ended December 31, 1918.

RUBBER STATISTICS FOR THE DOMINION OF CANADA

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	June 1919 Pounds	June 1919 Value	June 1920 Pounds	June 1920 Value
Rubber, gutta percha, etc.:				
UNMANUFACTURED—*free:*				
From United Kingdom	140,165	$62,953	1,654,854	$960 073
United States	442,023	195,618	687,148	271,475
Belgian Congo	....	....	30,421	35,228
Brazil	....	....	156,863	75,258
British East Indies:				
Ceylon	45,472	42.630	112,000	64 819
Straits Settlements	398,561	188,034	1,398,718	735,409
Other countries	....	....	5,462	2,185
Totals	1,026,221	$489,235	4,045,466	$2.144.447
Rubber, recovered	211,019	$38,417	435,890	$80,950
Rubber, powdered, and rubber or gutta percha scrap	124,287	18,963	261,628	26,295
Rubber substitutes	100,228	6,984	76,243	9,181
Totals unmanufactured	1,461,755	$553,599	4,819,027	$2,260,873
PARTLY MANUFACTURED—				
Hard rubber sheets and rods	35,695	$6,674	8,134	$6,4[illegible]0
Hard rubber tubes	....	1,437	....	5.063
Rubber thread, not covered	1,001	1,474	5.321	7,485
Totals, partly manufactured	36.696	$9,585	13,455	$19,038
MANUFACTURED—				
Belting	....	$5,659	....	$21,978
Hose	....	8,584	....	11,281
Packing	....	9,211	....	14.225
Boots and shoes	....	16,770	....	19,376
Clothing, including waterproofed	....	20,624	....	22,993
Gloves	....	989	....	1,295
Hot water bottles	....	1.308	....	4,402
Tires, solid	....	23,392	....	17,694
Tires, pneumatic	....	106,938	....	116,913
Tires, inner tubes	....	10,076	....	12.863
Other manufactures	....	174,237	....	390,917
Totals, manufactured	....	$377,788	....	$633,937
Totals, rubber imports	....	$876,608	....	$2,797,422
Insulated wire and cables:				
Wire and cables covered with cotton, linen, silk, rubber, etc.	....	$22,810	....	$21,402
Copper wire and cables, covered as above	....	6,704	....	23,825
Chicle	183,032	137,202	23,645	14,470

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS

	June 1919 Produce of Canada Value	June 1919 Reexports of Foreign Goods Value	June 1920 Produce of Canada Value	June 1920 Reexports of Foreign Goods Value
UNMANUFACTURED—				
Crude and Waste rubber	$27,908	$6,835	$12,110	......
MANUFACTURED—				
Belting	$997	......	$9,738	......
Hose	1,695	......	13 674	......
Boots and shoes	45.846	$839	91,772	$906
Clothing, including waterproofed	10.570	......	7.315	......
Tires, pneumatic	365.876	......	850 820	......
Tires, other kinds	30,707	5,731	5.493	18,544
Other manufactures	15.720	2,657	73.552	1,900
Totals, manufactured	$471,411	$9,227	$1,052,364	$21,350
Totals, rubber exports	$499,319	$16,062	$1,064.474	$21,350
Chicle	$73,737	......	......	......

RUBBER STATISTICS FOR ITALY

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	Two Months Ended February			
	1919		1920	
Unmanufactured—	Quintals[1]	Lire[2]	Quintals	Lire
Crude rubber and gutta percha raw and reclaimed:				
From Great Britain	......	18,096,750	28	4,308,150
French Colonies in Asia	97		898	
British India and Ceylon	5,143		674	
Straits Settlements	6,455		923	
French African Colonies	754		381	
Belgian Congo	......		142	
Brazil	4,786		942	
Other countries	......		115	
Totals	17,235	18,096,750	4,103	4,308,150
Rubber scrap	......	......	11	1,980
Totals, unmanufactured	17,235	18,096,750	4,114	4,310,130
Manufactured				
India rubber and gutta percha				
Threads	80	208,000	17	44,200
Sheets, including hard rubber	75	120,000	10	15,100
Tubes	17	20,400	8	10,400
Belting	61	85,400	177	247,800
Rubber coated fabrics in pieces	51	81,500	49	76,900
Boots and shoes ... *pairs*	6,473	97,095	19,730	295,950
Elastic webbing	43	120,400	12	33,600
Clothing and articles for travel	......	......	25	80,000
Tires and tubes				
From France	969	2,328,000	50	2,474,400
Great Britain	......		633	
Other countries	1		348	
Other manufactures	4,100	6,253,600	1,179	1,842,400
Totals, manufactured	......	9,314,395	......	5,120,750
Total imports	......	27,411,145	......	9,430,880

EXPORTS OF CRUDE AND MANUFACTURED RUBBER

	Quintals (1919)	Lire (1919)	Quintals (1920)	Lire (1920)
Unmanufactured—				
India rubber and gutta percha—raw and reclaimed:				
To Austria	......	652,800	300	316,000
Spain	1,632		......	
United States	......		490	
Totals	1,632	652,800	790	316,000
Waste	......	......	655	78,600
Totals, unmanufactured	1,632	652,800	1,445	394,600
Manufactured—				
India rubber and gutta percha—				
Threads	50	135,000	76	205,200
Sheets, including hard rubber	21	47,400	59	78,900
Tubes	138	161,800	166	193,100
Belting	76	121,600	......	......
Rubber coated fabrics in pieces	1	1,200	27	32,400
Boots and shoes ... *pairs*	......	......	446	10,175
Elastic webbing	165	495,000	180	540,000
Clothing and articles for travel	......	......	63	302,400
Tires and tubes:				
To Austria	......	2,888,000	108	10,697,000
Belgium	462		110	
Czecho-Slovakia	......		278	
France	63		157	
Great Britain	121		1,616	
Spain	1		76	
Switzerland	1		116	
British India and Ceylon	......		689	
Dutch East Indies	......		447	
Straits Settlements	......		192	
Australia	241		170	
Argentina	274		428	
Brazil	286		445	
Other countries	71		798	
Totals, tires exported	1,520	2,888,000	5,630	10,697,000
Other rubber goods	217	308,000	1,529	2,202,600
Totals, manufactured	......	4,158,000	......	14,261,775
Total exports	......	4,810,800	......	14,656,375

[1] One quintal equals 220.46 pounds.
[2] One lira equals $0.193 (normal).

THE MARKET FOR RUBBER SCRAP

NEW YORK

Practically no business is being done in rubber scrap of any kind, due to general shutting down of reclaiming for lack of a market for their products. The abnormally low level for crude rubber is apparently not the primary factor producing this condition, if it is even a contributing one, since the demand for scrap and reclaims is absent in the principal lines where the latter does not replace crude.

Rubber scrap prices are nominal. Reclaimers regard boots and shoes that are held around 5 to 5½ cents with No. 1 auto peelings around 4 cents unwarrantably high.

QUOTATIONS FOR CARLOAD LOTS DELIVERED

Prices subject to change without notice

October 26, 1920

BOOTS AND SHOES:			
Arctic tops	*lb.*	*$0.075 @	
Boots and shoes	*lb.*	*.05½ @	.05¾
Trimmed arctics	*lb.*	*.05¼ @	.05¾
Untrimmed arctics	*lb.*	*.04¼ @	.04¾
HARD RUBBER:			
Battery jars, black compound	*lb.*	*.01 @	.01¼
No. 1, bright fracture	*lb.*	*.23 @	.24
INNER TUBES:			
No. 1	*lb.*	*.11½ @	.12
Compounded	*lb.*	*.06 @	.07
Red	*lb.*	*.05½ @	.06
MECHANICALS:			
Black scrap, mixed, No. 1	*lb.*	*.03½ @	.04
No. 2	*lb.*	*.02½ @	.02¾
Car springs	*lb.*	*.03½ @	.04
Heels	*lb.*	*.03 @	.03½
Horse-shoe pads	*lb.*	*.03 @	.03½
Hose, air brake	*lb.*	*.03½ @	.03¾
fire, cotton lined	*lb.*	*.01½ @	.01¾
garden	*lb.*	*.01½ @	.01¾
Insulated wire stripping, free from fiber	*lb.*	*.03½ @	.04
Matting	*lb.*	*.01¼ @	.01½
Red packing	*lb.*	*.05½ @	.06
Red scrap, No. 1	*lb.*	*.09 @	.10
No. 2	*lb.*	*.06¾ @	.07¼
White scrap, No. 2	*lb.*	*.08 @	.09
No. 1	*lb.*	*.10 @	.11
TIRES:			
Pneumatic—			
Auto peelings	*lb.*	*.03¾ @	.04¼
Bicycle	*lb.*	*.02¼ @	.02¾
Standard white auto	*lb.*	*.03 @	.03½
Mixed auto	*lb.*	*.01¾ @	.02¼
Stripped, unguaranteed	*lb.*	*.01 @	.02½
White, G. & G., M. & W., and U. S.	*lb.*	*.03½ @	.04
Solid—			
Carriage	*lb.*	*.03 @	.03¼
Irony	*lb.*	@	
Truck	*lb.*	*.02½ @	.02¾

*Nominal.

THE MARKET FOR COTTON AND OTHER FABRICS

NEW YORK

American Cotton has declined steadily during the past month due to lack of buying interest. On October 1, spot middling uplands was 25 cents compared with 31.2 cents last year. In the absence of mill buying the market continued weak throughout the month and on October 25 spot middling uplands was quoted 22.5 cents compared with 37.4 a year ago.

Cotton planters are refusing to sell at the present market and thousands of bales are going into storage until 30 cents will be realized.

Arizona Cotton is being offered at approximately 60 cents for the good grades. The staple this season is somewhat shorter than last, which should please the spinners who have been unable to take the very long cotton which was grown during the last two seasons.

Egyptian Cotton. The market during the past two or three days has reacted somewhat sharply and medium grade Sakel, which recently could have been bought for around 50 cents, is now 6 to 8 cents higher. Medium grade uppers were offered about

the middle of the month at 34 cents and this same cotton is now worth 40 cents. Crop reports are not so encouraging and in place of the early estimates of seven and a half million cantars we are today advised that the crop will probably not exceed six and a quarter million. High grades are exceedingly scarce and it now looks like a medium grade crop.

There is but little interest in Sea Islands; the average extra choice is quoted 70 to 75 cents. The supply will be exceedingly small.

Ducks, Drills and Osnaburgs. The demand has been limited and in consequence of the weakness in raw cotton prices have declined.

Raincoat Fabrics. Business in fabrics for the raincoat and proofing trades has felt the depression ruling in all cotton goods lines. Very little business is being booked and manufacturers are buying from hand to mouth. Through lack of supporting demand and a declining cotton market, prices have fallen.

Sheetings. There is little going on in this market. Mills that have not shut down are looking for business. There is quite a lot of goods being offered by second hands. The market is weak and prices lower.

Tire Fabrics. There is nothing being offered in tire fabrics other than surplus stocks in the hands of tire manufacturers. Practically all fabric mills have ceased manufacturing for the tire trade in order to avoid overloading the market. Mill quotations are unobtainable.

NEW YORK QUOTATIONS

October 26, 1920

Prices subject to change without notice

ASBESTOS CLOTH:				
Brake lining, 2½ lbs. sq. yd., brass or copper insertion	lb.		@	
2¼ lbs. sq. yd., brass or copper insertion	lb.		@	
BURLAPS:				
32—7-ounce	100 yards	*$7.25	@	
32—8-ounce			@	
40—7½-ounce		*8.25	@	
40—8-ounce		*7.00	@	
40—10-ounce		*10.50	@	
40—10½-ounce		*9.25	@	
45—7½-ounce		*10.00	@	
45—8-ounce		*10.25	@	
48—10-ounce		*15.00	@	
DRILLS:				
38-inch 2.00-yard	yard	*.26	@	
40-inch 2.47-yard		*.22⅜	@	
52-inch 1.90-yard		*.34¼	@	
52-inch 1.95-yard		*.33⅜	@	
60-inch 1.52-yard		*.39½	@	
DUCK:				
CARRIAGE CLOTH:				
38-inch 2.00 yard enameling duck	yard	*.29	@	
48-inch 1.74-yard		*.34	@	
72-inch 16.66-ounce		*.72¾	@	
72-inch 17.21-ounce		*.75½	@	
MECHANICAL:				
Hose	pound	*.55	@	
Belting		*.55	@	
HOLLANDS, 40-INCH:				
Acme	yard	*.27¾	@	
Endurance		*.26¼	@	
Penn		*.26⅞	@	
OSNABURGS:				
40-inch 2.35-yard	yard		@	
40-inch 2.48-yard			@	
37½-inch 2.42-yard			@	
RAINCOAT FABRICS:				
COTTON:				
Bombazine 64 x 60	yard	.20	@	
60 x 48		.18	@	
Cashmeres, cotton and wool, 36-inch, tan		.90	@	
Twills 64 x 72		.35	@	
64 x 102		.43	@	
Twill, mercerized, 36-inch, blue and black		.37½	@	
tan and olive		.35	@	
Tweed		$0.60	@	$1.00
printed		.22½	@	
Plaids 60 x 48		.19	@	
56 x 44		.18	@	
Repp		.30	@	.35
Prints 60 x 48		.20	@	
64 x 60		.22	@	
IMPORTED WOOLEN FABRICS SPECIALLY PREPARED FOR RUBBERIZING—PLAIN AND FANCIES:				
63-inch, 3¼ to 7½ ounces	yard	.90	@	2.25
36-inch, 2¾ to 5 ounces		.70	@	1.84
IMPORTED PLAID LINING (UNION AND COTTON):				
63-inch, 2 to 4 ounces	yard	.78	@	1.64
36-inch, 2 to 4 ounces		.40	@	.94
DOMESTIC WORSTED FABRICS:				
36-inch, 4½ to 8 ounces	yard	.70	@	1.54
DOMESTIC WOVEN AND PLAID LININGS (COTTON):				
36-inch, 3¾ to 5 ounces		.22	@	.28
SHEETINGS, 40-INCH:				
48 x 48, 2.35-yard	yard	.19½	@	
48 x 48, 2.50-yard		.18½	@	
48 x 48, 2.85-yard		.15	@	
64 x 68, 3.15-yard		.18¼	@	
56 x 60, 3.60-yard		.14¼	@	
48 x 44, 3.75-yard		.14	@	
SILKS:				
Canton, 38-inch	yard	.45	@	
Schappe, 36-inch		.65	@	
STOCKINETTES:				
SINGLE THREAD:				
3½ Peeler, carded	pound		@	
4½ Peeler, carded			@	
6½ Peeler, combed			@	

DOUBLE THREAD:			
Zero Peeler, carded	pound	@	
3½ Peeler, carded		@	
6½ Peeler, combed		@	
TIRE FABRICS:			
BUILDING:			
17¼-ounce Sakellarides, combed	pound	@	
17¼-ounce Egyptian, combed		@	
17¼-ounce Egyptian, carded		@	
17¼-ounce Peelers, combed		@	
17¼-ounce Peelers, carded		@	
CORD:			
15-ounce Egyptian	pound	@	
BICYCLE:			
8-ounce American	pound	@	
10-ounce American		@	
CHAFER:			
9¼-ounces Sea Island	pound	@	
9¼-ounce Egyptian, carded		@	
9¼-ounce Peeler, carded		@	

*Nominal.

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS

NEW YORK

OWING to the closing down of tire manufacturing companies to a fractional part of their capacity the demand for such compounding ingredients as zinc oxide, carbon black and lithopone has had a marked effect on the market for these items.

In the case of zinc oxide trade conditions have led to the severest reduction in output of zinc spelter in the history of the American industry. Over 90 per cent of the operators, 72 in number, have shut down for a period of two weeks. This will afford opportunity for the working up of 40,000 tons of purchased ore in the bins at the mines.

ALUMINUM HYDRATE. The demand has continued steady during the month at 25 cents per pound for the light grade.

ANILINE OIL. This material has moved very slowly, the demand not being equal to the supply. Spot stocks are quoted at 27 cents.

BARYTES. There is a scarcity of supply of spot goods. Prices rose early in the month and were nominal at the close with some export demand. The shortage of cars at the mines has lessened somewhat.

BLANC FIXE. The restricted supplies of crude barytes limit the output of blanc fixe badly. The market is bare of stock at the present time.

BENZOL. There has been a good export demand and firm domestic demand. Early in the month spot stocks of the 90 per cent grade were bringing 35 cents a gallon.

BLACKS. The demand by tire manufacturers continues light although fair in other lines. This has led producers to seek for new outlets for their surplus product.

CHINA CLAY. The market has been steady and the supply rather short.

CARBON BISULPHIDE. There has been fair demand for the rather limited supply.

CARBON TETRACHLORIDE. This material has remained firm at 13½ cents a pound.

DRY COLORS. There have been price reductions in some colors and a not particularly active demand.

LITHARGE. The supply has been equal to the continued active demand from trades other than rubber manufacturers.

LITHOPONE. The general demand has been very steady and prices have held from 8½ to 8¾ the entire month.

SUBLIMED LEAD. Prices and demand have each held steady.

SULPHUR. The market has continued quiet.

SOLVENT NAPHTHA. Routine demand with no marked changes in price.

WHITING. While there have been some importations of chalk, good demand continues to absorb it, leaving small stocks of spot whiting.

ZINC OXIDE. The demand is reported fair, prices firm, and stocks not excessive. These conditions are liable to change shortly due to the reduced production previously noted.

NEW YORK QUOTATIONS

OCTOBER 26, 1920

Prices subject to change without notice

ACCELERATORS, ORGANIC				
Accelerene (New York)	lb.	$4.75	@	
Accelemal	lb.	.60	@	.65
Aldehyde ammonia crystals	lb.	2.00	@	2.25
Aniline oil	lb.	.27½	@	
Excellerex	lb.	.65	@	.75
Hexamethylene tetramine (powdered)	lb.	2.00	@	2.25
N. C. C.	lb.	.50	@	
No. 999	lb.	.18	@	
Paraphenylenediamine	lb.	2.60	@	2.70
Thiocarbanilide	lb.	.60	@	.65
Velosan	lb.	3.70	@	
Vul-Ko-Cene	lb.	.35	@	
Virol	lb.	.80	@	
ACCELERATORS, INORGANIC				
Lead, dry red (bbls.)	lb.	.12¼	@	
sublimed blue (bbls.)	lb.	.10	@	
sublimed white (bbls.)	lb.	.10	@	
white, basic carbonate (bbls.)	lb.	.10½	@	
Lime, flour	lb.	.02½	@	.03
Litharge, domestic	lb.	.11¾	@	
imported	lb.	.17	@	
sublimed	lb.	.12	@	
Magnesium, carbonate, light	lb.	.10½	@	.15
calcined extra light	lb.	.60	@	
calcined light	lb.	.35	@	
calcined medium light	lb.	.30	@	
calcined heavy	lb.	.07	@	.07½
calcined commercial (magnesite)	lb.	.04	@	
oxide, extra light	lb.	.60	@	
light technical	lb.	.35	@	
light, imported	lb.	.55	@	
imported	lb.	.55	@	
ACIDS				
Acetic, 28 per cent	lb.	.10½	@	
glacial, 99 per cent	lb.	.22¾	@	
Aqua fortis	cwt.	7.40	@	
Cresylic (97% straw color) (bbl.)	gal.	1.20	@	1.30
(95% dark) (bbl.)	gal.	1.10	@	1.20
Muriatic, 20 degrees	lb.	.06	@	
Nitric, 36 degrees	cwt.	7.28	@	
Sulphuric, 66 degrees	lb.	.03½	@	
ALKALIES				
Caustic soda, 76 per cent (bbls.)	lb.	.04½	@	.05½
Soda ash (bbls.)	lb.	.05	@	
COLORS				
Black:				
Bone, powdered	lb.	.06	@	
granulated	lb.	.11	@	.15
Carbon black (sacks, factory)	lb.	.12	@	.20
pressed	lb.	.16	@	.20
Dipped goods	lb.	1.00	@	
Drop	lb.	.07½	@	.15
Ivory black	lb.	.18	@	.30
Lampblack	lb.	.18	@	.45
Rubber black	lb.	.08½	@	
Rubber makers' black	lb.	.15	@	.35
Blue:				
Cobalt	lb.	.3[illegible]	@	.40
Dipped goods	lb.	1.50	@	
Prussian	lb.	.90	@	1.[illegible]0
Ultramarine	lb.	.18	@	.50
Rubber makers' blue	lb.	3.50	@	
Brown:				
Iron oxide	lb.	.04¼	@	.06¾
Sienna, Italian, raw and burnt	lb.	.07	@	.15
Umber, Turkey, raw and burnt	lb.	.05½	@	.09
Vandyke	lb.	.08	@	.10
Maroon oxide	lb.	.14	@	.15
Green:				
Chrome, light	lb.	.60	@	
medium	lb.	.60	@	
dark	lb.	.60	@	
commercial	lb.	.22	@	
tile	lb.	.20	@	
Dipped goods	lb.	1.50	@	
Oxide I. R.	lb.	.85	@	1.05
Oxide of chromium (casks)	lb.	1.25	@	
Rubber makers' green	lb.	3.50	@	
Red:				
Antimony, crimson, sulphuret of (casks)	lb.	.40	@	
crimson, "Mephisto" (casks)	lb.	.60	@	
crimson, "R. M. P."	lb.	.58	@	
Antimony, golden sulphuret of (casks)	lb.	.30	@	
golden, "Mephisto" (casks)	lb.	.33	@	
golden, "R. M. P."	lb.	.30	@	
vermilion sulphuret	lb.	.55	@	
Arsenic, red sulphide	lb.	.16½	@	

Dipped goods, red	lb.	$1.75	@	
purple	lb	1.75	@	
Indian	lb.	.14	@	
Para toner	lb.	2.25	@	
Red excelsior	lb.	.19	@	.22
Tolnidine toner	lb.	4.25	@	
Iron oxide, reduced grades	lb.	.12	@	.14
pure bright	lb.	.16	@	.17
Spanish neutral	lb.	.05¾	@	
Venetian	lb.	.03	@	.08
Oximony	lb.	.18	@	
Vermilion, American	lb.	.25	@	.30
permanent	lb.	.37	@	
English quicksilver	lb.	1.70	@	1.75
Rubber makers' red	lb.	3.50	@	4.00
purple	lb.	3.50	@	
White:				
Albalith	lb.	.07¾	@	.08¼
Aluminum bronze, extra brilliant	lb.	.65	@	
extra fine	lb.	.75	@	
Lithopone, Beckton white	lb.	.08½	@	.08¾
Lithopone	lb.	.08	@	.08¼
Ponolith (carloads, factory)	lb.		@	
Rubber-makers' white	lb.		@	
Zinc oxide. American (factory):		C. L.		L. C. L.
Special	lb.	.10¼	@	.11
XX red	lb.	.10¼	@	.10½
French process (factory):				
White seal	lb.	.13½	@	.13¾
Green seal	lb.	.12½	@	.12¾
Red seal	lb.	.11½	@	.11¾
Azo factory:				
ZZZ (lead free)	lb.		@	
ZZ (under 5% leaded)	lb.		@	
Z (8-10% leaded)	lb.		@	
Yellow:				
Cadmium, sulphide, yellow, ligbt, orange	lb.	2.10	@	
red	lb.	2.10	@	
Chrome, light and medium	lb.	.35	@	.38
Dipped goods	lb.	1.75	@	
Ocbre, domestic	lb.	.02½	@	.05½
imported	lb.	.04¾	@	.08
Rubber makers' yellow	lb.	2.50	@	
Zinc chromate	lb.	.50	@	

COMPOUNDING INGREDIENTS

Aluminum flake (carload)	ton	33.00	@	
hydrate	lb.	.25	@	
silicate	ton	30.00	@	40.00
Ammonium carbonate (powdered)	lb.	.17¾	@	
Asbestine (carloads)	ton	35.00	@	40.00
Barium, carbonate, precipitated	ton	100.00	@	110.0
dust	ton	130.00	@	
Barytes, pure white (f. o. b. works)	ton	28.00	@	
off color	ton	20.00	@	
uniform floated	ton	28.00	@	
Basofor	lb.	.06½	@	
Blanc fixe (dry, bbls.)	lb.	.06½	@	
Bone ash	lb.	.12	@	
Carrara filler	lb.	.02	@	
Chalk, precipitated, extra light	lb.	.05	@	.05½
heavy	lb.	.04	@	.04½
China clay, Dixie	ton	22.00	@	
Blue Ridge	ton	22.00	@	
domestic	ton	10.00	@	20.00
imported	ton	19.00	@	25 00
Cotton linters, clean mill run, f. o. b. factory	lb.	.02½	@	.03½
Fossil flour (powdered)	ton	60.00	@	
(bolted)	ton	65.00	@	
Diatomite	lb.	.03	@	.04
Glue, bigh grade	lb.	.35	@	.45
medium	lb.	.30	@	.35
low grade	lb.	.20	@	.25
Graphite, flake (400-pound bbl.)	lb.	.10	@	.25
amorphous	lb.	.04	@	.08
Ground glass FF. (bbls.)	lb.	.05	@	
Infusorial earth (powdered)	ton	60.00	@	
(bolted)	ton	65.00	@	
Liquid rubber	lb.	.18	@	
Mica, powdered	lb.	.15	@	
Pumice stone, powdered (bbl.)	lb.	.05	@	
Rotten stone, powdered	lb.	.02½	@	.04½
Rubber paste	lb.	.19	@	.22
Silica, gold bond	ton	40.00	@	
silver bond	ton	28.00	@	
Soapstone, powdered gray (carload)	ton	12.00	@	
Starch, powdered corn	cwt.	3.48	@	4.06
Talc, powdered soapstone	ton	18.00	@	20.00
Terra blancbe	ton	22.00	@	32.00
Tripoli earth, air-floated, cream or rose (factory)	ton	50.00	@	
white (factory)	ton	52.50	@	
Tyre-lith	ton	110.00	@	
Whiting, Alba (carloads)	cwt.	.80	@	.90
Columbia	cwt.	.95	@	
commercial	cwt.	1.40	@	
Danish	ton	24.00	@	
English cliffstone	cwt.	2.00	@	
gilders	cwt.	1.60	@	
Paris, white, American	cwt.	1.75	@	
Quaker	ton	16.00	@	
Super	ton	30.00	@	32.50
Wood pulp, imported	lb.	.03¾	@	
XXX	ton	75.00	@	
X	ton	60.00	@	
Wood flour, American	ton	50.00	@	

MINERAL RUBBER

Elateron (c. l. factory)	ton	60.00	@	
(l. c. l. factory)	ton	63.00	@	
Gilsonite	ton	75.00	@	
Genasco (c. l. factory)	ton	69.00	@	
(l. c. l. factory)	ton	71.00	@	
Hard hydrocarbon	ton	42.00	@	
Soft hydrocarbon	ton	$40.00	@	
K-X	ton		@	
K. M. R	ton		@	
M. R. X	ton		@	
Pioneer (c. l. factory)	ton	60.00	@	
(l. c. l. factory)	ton	65.00	@	
Raven M. R	ton	60.00	@	65.00
Refined Elaterite	ton		@	
Richmond	ton		@	
No. 64	ton		@	
318/320 M. P. hydrocarbon (c. l. factory)	ton	60.00	@	
(l. c. l. factory)	ton	62.50	@	
300/310 M. P. hydrocarbon (c. l. factory)	ton	45.00	@	
(l. c. l. factory)	ton	47.50	@	
Robertson, M. R. pulverized (c. l. factory)	ton	95.00	@	
M. R. pulverized (l. c. l. factory)	ton	97.50	@	
M. R. (c. l. factory)	ton	72.50	@	
M. R. (l. c. l. factory)	ton	75.00	@	
Rubrax (factory)	ton	50.00	@	
Synpro, granulated	ton	97.50	@	
Walpole rubber flux (factory)	lb.		@	

OILS

Avoilas compound	lb.	.17	@	.19
Castor, No. 1, U. S. P.	lb.	.18	@	
No. 3, U. S. P.	lb.	.17	@	
Corn	lb.	.16	@	
Corn, refined Argo	cwt.	*17.25	@	
Cotton	lb.	.15	@	
Glycerine (98 per cent)	lb.	.31	@	
Linseed, raw (carloads)	gal.	1.02	@	1.04
Linseed compound	gal.		@	
Palmoline	lb.	.15	@	.17
Palm niger	lb.	.09	@	
Palm "Lagos"	lb.	.09½	@	
Palm special	lb.	.16½	@	
Peanut	lb.	.16	@	
Petrolatum	lb.	.08	@	.11
Petrolatum, sticky	lb.	.10	@	.14
Petroleum grease	lb.	.07½	@	.09
Pine, steam distilled	gal.	1.65	@	2.00
Rapeseed, refined	lb.	1.30	@	
blown	lb.	1.45	@	
Rosin	gal.	.60	@	.95
Synpro	gal.	.70	@	1.00
Soya bean	lb.	.14	@	
Tar	gal.	36	@	.41

RESINS AND PITCHES

Balsam, fir	gal.	2.00	@	
Cantella gum	lb.	.50	@	
Cumar resin, hard	lb.	.12	@	.16
soft	lb.	.09	@	.13
Tar, retort	bbl.	16.00	@	16.75
kiln	bbl.	15.00	@	15.75
Pitch, Burgundy	lb.	.08	@	
coal tar	lb.	.01½	@	
pine tar	lb.	.04	@	
ponto	lb.	.14	@	
Rosin, K	bbl.	14.00	@	
strained	bbl.	12.90	@	
Shellac, fine orange	lb.	1.50	@	

SOLVENTS

Acetone (98.99 per cent drums)	lb.	.25	@	
methyl (drums)	gal.	1.50	@	
Benzol (water white, 90%)	gal.	.33	@	.47
Beta-naphthol	lb.	.52	@	
Carbon bisulphide (drums)	lb.	.08½	@	.09
tetrachloride (drums)	lb.	.13½	@	.14
Naphtha, motor gasoline (steel bbls.)	gal.	.31	@	
73 @ 76 degrees (steel bbls.)	gal.	.41	@	
70@ 72 (steel bbls.)	gal.	.39	@	
68 @ 70 degrees (steel bbls.)	gal.	.38	@	
V. M. & P. (steel bbls.)	gal.	.30	@	
solvent	gal.	.42	@	
Toluol, pure	gal.	.35	@	.40½
Turpentine, spirits	gal.	1.28	@	
wood	gal.	1.18	@	
Osmaco reducer	gal.	.65	@	
Xylol, pure	gal.	.45	@	.50½
commercial	gal.	.30	@	.35½

SUBSTITUTES

Black	lb.	.10	@	.19
White	lb.	.11	@	.22
Brown	lb.	.15	@	.20½
Brown factice	lb.	.09	@	.17
White factice	lb.	.11	@	.19
Paragol, soft and medium (carloads)	cwt.	15.81	@	
hard	cwt.	15.81	@	

VULCANIZING INGREDIENTS

Lead, black byposulphite (Black Hypo)	lb.		@	
Orange mineral, domestic	lb.	.15¼	@	
Sulphur chloride (jugs)	lb.	.20	@	
(drums)	lb.	.08	@	
Sulphur, flour, Brooklyn brand (carloads)	cwt.	3.40	@	
Bergenport, soft (c. l. factory)	cwt.	3.80	@	
Bergenport, soft (l. c. l. factory)	cwt.	4.15	@	
superfine (carloads, factory)	cwt.		@	

(See also Colors—Antimony.)

WAXES

Wax, beeswax, wbite	lb.	67	@	
ceresin, white	lb.	.16	@	
carnauba	lb.	.35	@	
ozokerite, black	lb.	.65	@	
green	lb.	.65	@	
Montan	lb.	.20	@	
paraffine, 115° m. p.	lb.	.12½	@	
120° m. p.	lb.	.12¾	@	
125° m. p.	lb.	.13½	@	
130° m. p.	lb.	.14½	@	
Sweet wax	lb.	.15	@	

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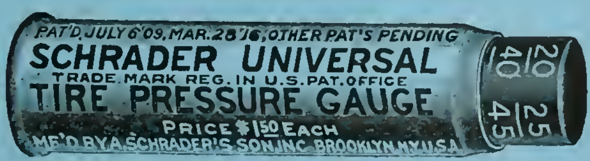

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AN INTERNATIONAL RUBBER ASSOCIATION

The suggestion is not new but suggestions of any sort rarely are new. That it comes now when almost everything in the line of reconstruction that can be put in effect is being tried or at least considered, is significant. The machinery for such an association lies in the great rubber manufacturing and planting associations that are already in existence here and abroad. The ease with which delegates could assemble at the next rubber exhibition and make a beginning is most evident. As a stabilizer, an educator and perhaps a money saver, it could be made exceedingly valuable. In one particular it might do a great good, and that is by stopping piracy of names, trade marks and patents.

Of course when one ponders the subject, it takes on qualities that suggest a League of Nations and the inevitable "14 points" obtrude themselves. Nevertheless, Article X might be omitted and serenity assured. The association might be a great help to the trade. Its rulings and laws would possess only a moral force. It would be a minor Hague tribunal without teeth, but with wise men at its head and a policy of fair dealing, together with statistical and newspaper sense, much good could be accomplished.

WHEN RUBBER GROWS OLD

A remark often heard among the uninformed is that the general average of quality in rubber goods is lower than formerly. Mr. Average Buyer, who is often unwilling to buy high-grade rubber goods, generally gets a second rate, poorly compounded article, takes no care of it, when he does not actually abuse it, and when it gives out sooner than he expected, scores the whole industry with the remark that "they are not making rubber goods as good as they used to." Mr. A. B. forgets the fact that rubber, like human beings, grows old. It has its stages of infancy, middle age, and decrepitude. Soft, pliant, elastic in youth, its tissue in old age takes on a change not unlike that of the arteries in senility, becoming hard, stiff and brittle. Negligent owners of automobiles are surprised at the appearance of minute fissures in the side walls of their tires and the manufacturers are scored for the supposed defect, when it is usually a fact that the tire owners have failed to conserve the strength of the tires with proper inflation and to guard against excessive light, heat, abrasion, etc.; and the tire grows old, like many humans, long before its time. Users of many other rubber articles often leave them lying about carelessly or exposed to strong alkaline or other harmful solutions, and then wonder why rubber goods deteriorate and become irreparable. Even the most expert retreader cannot galvanize new life into a tire that has not been given reasonable care and moderate exercise to keep it "fit."

ARE WE OVERINDUSTRIALIZED?

With the urban share of the population, once but a third, but now approaching two-thirds of the total, the query put by former Secretary of the Interior Lane, "Are we becoming overindustrialized?" has given many cause for serious reflection, and in most instances the essayists are disposed to answer the question in the affirmative. Even conceding that industrialism, i. e., manufacturing, is keeping well in advance of agriculture, there is no occasion yet for any anxiety. While the small farmers have become relatively fewer, the number of great stock-raising and agricultural concerns has increased and with modern methods and machinery, improved roads, motor trucks, etc., the output of the farms is larger than ever.

In a measure offsetting the tendency toward overindustrialism some far-sighted manufacturers, rubber mill owners being foremost among them, have made extensive plans for providing semi-rural homes with small truck gardens for their employes, and the workers show their appreciation of such interest in their welfare outside the mills. It is all in harmony with the modern idea of har-

monizing industry, and if such work be extended by other manufacturers, we will soon have less labor unrest and healthier, happier, and more efficient workers.

COLLECTIVE RESPONSIBILITY

In the opinion of the unpractical sentimentalist, the steel strike, which collapsed a few months ago, was waged wholly in the cause of hours, wages and the control of jobs. To the experienced industrial manager it was simply one of a series of disturbances deliberately planned to wrest the control of industry from its owners and to place it under the domination of the most radical element of organized labor.

This is the view of Charles Piez, president of the Link-Belt Company, of Chicago, who has had exceptional opportunity to study situations of this kind. In a current magazine article he declares that the real purpose of the strike was best reflected in the character of the two men who assumed leadership. One was an avowed syndicalist who continually denounced the wage system as "a brazen, gigantic robbery"; and the other was an adroit labor politician, without knowledge of the problems of industry, and who fought all workmen's compensation legislation and the fairest measures of compromise.

Mr. Piez scores one big point with which all fair-minded people are in accord, and that is, if labor insists upon collective bargaining it must also be made to realize that the people will just as strictly insist upon collective responsibility on the part of labor.

HIGH WAGE PROPAGANDA

Apprehensive of a possible revision in the present high wage scale in the mills making cotton and other fabrics, leaders among the United Textile Workers of America have been urging the establishment of a million-dollar fund for combating any attempt to lower wages in the textile industry in the United States and Canada. It is not stated just how such a "war chest" would be disbursed, but a fair inference would seem to be that it would be used largely to promote and maintain strikes. The leaders do not seem to worry over the fact that, although they personally may be spared hardship, tens of thousands of operatives and their dependents may suffer severely if a strike be called. Employers cannot do the impossible. In the face of an insistent public demand for lower prices and often keen competition they cannot guarantee that the war-time wage scale will be maintained, much less promise a considerable and immediate reduction in working time.

In the event of labor assuming an unreasonable attitude, the mill owners might adopt the one recourse left to them, to close down until the strikers on sober, second thought came to realize that there are two sides to the employment question, and that no manufacturer can operate a mill under intolerable and unprofitable conditions. If great factories are to be idle for a long period, no million dollar defense fund would adequately reimburse the workers for their loss, much less compensate a big community disorganized by such industrial paralysis.

THE BRITISH RUBBER INDUSTRY

The wisdom of raising an ample amount of raw material within a nation's boundaries or possessions and maintaining even an overabundant reserve as a precaution against possibly adverse conditions is strikingly illustrated in an article by B. D. Porritt in the British *Journal of the Society of Chemical Industries,* on "The Rubber Industry and the War."

He shows that out of the world's supply of 120,000 tons of crude rubber in 1914, 71,000 tons were produced within the empire, although the annual consumption then by British rubber manufacturers was but 18,000 tons. So, too, he states that even though the British manufacturers were put at a great disadvantage during the war by being obliged to use their factories almost entirely for making military and naval supplies, they readily shared their stock of raw rubber with American competitors who enjoyed considerable and profitable commerce at home and with Allied and neutral countries. Peculiarly interesting is the author's recital of the novel, numerous, and ingenious uses to which British manufacturers applied rubber for war needs, how they overcame the shortage in chemical supplies, and how the industry gave itself wholeheartedly to the Allied cause and proved a powerful factor in winning the war.

Touching upon "The Position and Prospects of the Rubber Industry" in Great Britain, in the same journal, W. A. Williams takes a very optimistic view. While conceding some actual and possible drawbacks to which the industry is or may be subjected, such as the higher cost of labor, the insufficient rail transportation, the none too plentiful supplies of chemicals, the restricted cultivation of Egyptian cotton, and the rising tide of tire production in the United States, for protection against which government aid may be sought, the writer is confident that the British rubber industry will nevertheless hold its own. Favorable factors are: great supplies of raw material, radically improved methods in quantity and quality output, and constant modernization of plants.

An apt phrase often does more to impress than reams of argument and exposition. "Growing pains" was what J. Newton Gunn termed the spasms of fear induced by the recent slackening in the tire business. Not only apt but prophetically true.

California experts after exhaustive tests give rubber jar rings a clean bill of health as regards poison olives. The poison did not come from the rubber but was due to faulty treatment of the fruit before canning.

Cost Accounting in the Rubber Industry

By Ferd G. Kirby[1]

Cost accounting for the rubber industry can very easily be allowed to become so detailed that the cost of maintenance of the system becomes greater than its utility warrants. Inasmuch as the material, largely rubber, is a more or less variable quantity, and of necessity introduces the use of certain factors and prorations, in addition to the usual estimations encountered in cost finding, any method of accounting which endeavors to subdivide the various items too closely is of doubtful utility, owing to the fact that since many basic figures are themselves the result of estimate and proration, any method which carries its calculations and deductions to extremes is a fallacy.

Rubber manufacturers in general recognize the vital importance of a knowledge of the cost of their product, yet but few of them have a cost system on which they are willing to rely under all conditions.

While it is possible to get quite accurately the amount of material and labor used directly in the production of an article, and several systems have been devised which accomplish this result, there does not seem to be in general use any system of distributing that portion of the expense known variously as indirect expense, burden, or overhead, in such a manner as to make sure that it has been done properly. There are in common use several methods of distributing this expense. One is to distribute to the product the total indirect expense including interest, taxes, insurance, etc., according to the direct labor. Another is to distribute a portion of this expense according to direct labor, and a portion to machine hours. Other methods distribute a certain amount of this expense on the materials used, etc. Most of these methods contemplate the distribution of all of the indirect expense of the manufacturing plant, however much it may be, on the output produced, no matter how small it is.

If the factory is running at its full, or normal capacity, this item of indirect expense per unit of product is usually small. If the factory is running at only a fraction of its capacity, say one-half, and turning out only one-half of its normal product, there is but little change in the total amount of this indirect expense, all of which must now be distributed over half as much product as previously, each unit of product thereby being obliged to bear approximately twice as much expense as previously.

When times are good, and there is plenty of business, this method of accounting indicates that the costs are low; but when times become bad and business is slack, it indicates high costs due to increased proportion of burden each unit has to bear. During good times, when there is a demand for all the product that can be made, it is usually sold at a high price and the element of cost is not such an important factor. When business is dull, however, manufacturers cannot get such a high price

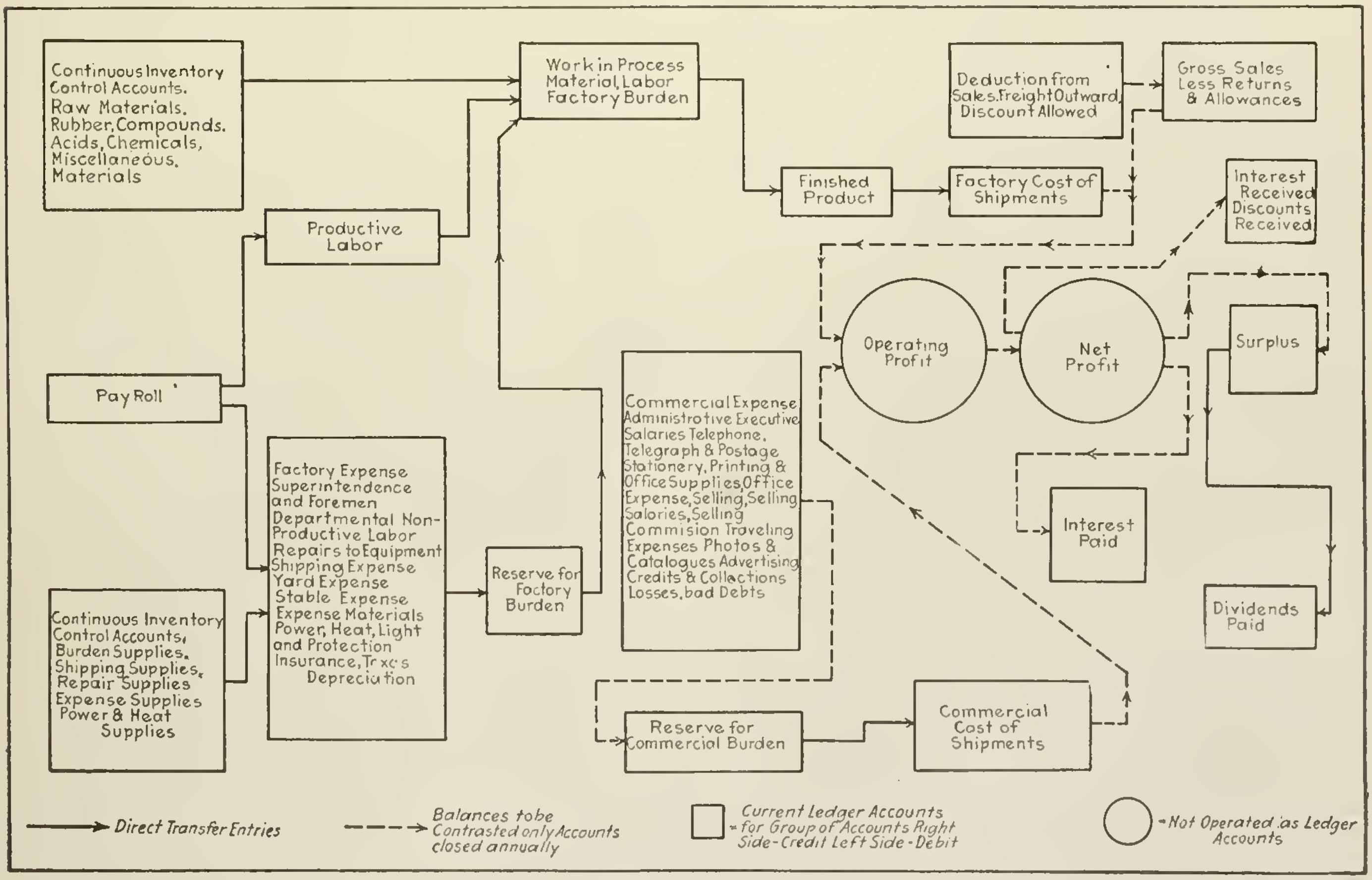


Fig. 1. Organization and Relation of Accounts in General Plan of Cost Control in the Rubber Industry

[1] Accountant, R. T. Lyman & Co., Inc.

for their products, and the question of at how low a price can they afford to sell the product is of vital importance. Rubber manufacturing cost systems, as generally operated at present, show under such conditions that costs are high and, if business is very bad, they usually show a cost far greater than the amount obtained for the goods. In other words, the present systems of cost accounting go to pieces when they are most needed. This being the case, many have felt for a long time that there was something radically wrong with the present theories on the subject.

As an illustration, the writer will cite a case which recently came to his attention. A manufacturer found that his cost on a certain article was forty cents. When he found he could buy it for thirty-four cents, he stopped manufacturing and bought it, saying that he did not understand how his competitor could sell at such a low price. He seemed to realize that there was a flaw somewhere but he could not locate it. When he was asked of what his expense consisted, his reply was: labor fifteen cents, material nine cents, and overhead sixteen cents. He was then asked if he was running his factory at full capacity, and the writer was informed that he was running it at less than half its capacity, possibly a little over one-third. The next question was: What would be the overhead on this article if the factory were running full? The reply was that it would be about eight cents. The writer suggested then in such a case the cost would be only thirty-two cents. The possibility that his competitor was running his factory full suggested itself at once as an explanation.

The next question that suggested itself was how the sixteen cents overhead, which was charged to this article, would be paid if the article was bought. The obvious answer was that it would have to be distributed over the product still being made and would thereby increase its cost. In such a case it would probably be found that some other article was costing more than it could be bought for; and if the same policy was pursued, the second article should be bought, which would cause the remaining product to bear a still higher expense rate. If this policy were carried to its logical conclusion, the manufacturer would be buying everything before long, and be obliged to give up manufacturing entirely.

The illustration which is cited above is not an isolated case but is representative of the problems before a large class of rubber manufacturers, who believe that all the expense, however large, must be carried by the output produced, however small. This theory of expense distribution indicates a policy which in dull times would, if followed logically, put many manufacturers out of business. In fact the writer knows of a plant which was recently put out of business by just this kind of logic.

Fortunately for the country, the American people as a whole will finally discard theories which conflict with common sense; and, when their cost figures indicate an absurd conclusion, most of them will repudiate the figures. A cost system, however, which fails when needed most, is of but very little value and it is imperative to devise a theory of costs that will not fail.

Most of the cost systems in use, and the theories on which they are based, have been devised by accountants for the benefit of financiers, whose aim has been to criticize the factory and to make it responsible for all shortcomings of the business. In this the financiers have succeeded admirably, largely because the methods used are not so devised as to enable the agent or superintendent to present his side of the case.

One of the prime functions of cost-keeping is to enable the agent or superintendent to know whether or not he is doing the work he is responsible for as economically as possible, a function which is ignored in the majority of cost systems now in general use. Many accountants who make an attempt to show it, are so long in getting their figures in shape that they are practically worthless for the purpose intended, the possibility of using them having passed.

THE GENERAL PLAN

The general plan of cost accounting for a rubber plant followed by the writer is illustrated by Fig. 1. In applying costs for the rubber industry, the plan outlined is covered by the following formula, which includes and illustrates the successive stages of cost accumulation from gross sales to final net profit.

Gross sales, less returns and allowances		G.S.
Less:		
Freight—outward	F	
Commissions	C	
Discounts	D	
Total deductions from sales		T.D.
Net sales		N.S.
Less:		
Factory cost of shipments		
Materials consumed	M	
Direct labor employed	L	
Factory burden or indirect cost	B	
Total factory cost of shipments		F.C.
Gross manufacturing profit		G.P.
Less:		
Commercial cost of shipments		
Administrative expense	A	
Selling expense	S	
Total commercial cost of shipments		C.C.
Operating profit		O.P.
Other income:		
Interest and discount received		I.R.
Total		S.P.
Other charges:		
Interest expense		I.E.
Net profit		**N.P.**

Some accountants and executives, will, of course, differ regarding this method of handling interest, but in connection with the rubber industry the writer's experience has demonstrated that this method is the more feasible. The plan outlined above embraces the establishment of continuous inventory control accounts for raw materials and burden supplies. Records of raw materials and supplies consumed each month are obtained and the value transferred to an account which represents the value of work in process. The productive labor employed each month is analyzed and also transferred to the account representing the value of the work in process.

Various accounts are maintained representing the factory burden or indirect cost of operation. The relation of the costs of factory burden and the cost of productive labor is determined and ratios of burden expense developed. Each month, in proportion to the productive labor employed, a charge is made to the account representing value of work in process for the proportionate share of burden applicable to work in process. The amounts so applied are credited to a reserve account, the object of which is to indicate how closely the charges to work in process for factory burden, compare with the actual cost of factory burden as shown by the aggregate of balances in the various factory expense accounts.

Records of product finished are obtained which are calculated at cost values, the aggregate being credited to the account representing the value of work in process and charged to an account representing the value of the finished product. At this particular point in the plan of accounting, the plan must be varied according to the individual needs of a manufacturer. In some cases, instead of one account representing the value of work in process, several accounts will be necessary, representing the value of work in process at successive stages of manufacture.

Having accumulated the cost of all goods entering into the finished product account, the cost of all shipments is calculated and the aggregate is credited to the account representing the value of finished product and charged to the account representing factory cost of shipment.

Various accounts are maintained representing the details of administrative and selling expenses, and in order to be assured that the ratios of administrative and selling expenses to the total factory cost are correctly employed in cost calculations there is provided an account representing the commercial cost of shipments, to which is charged an amount representing the estimated value of administrative and selling expenses based upon the factory cost of goods shipped. The amounts so charged to the commercial cost of shipments are credited to a reserve for a commercial burden. The balances in the latter account represent the aggregate of amounts applied to the commercial cost of shipments for commercial burden, and should be in substantial agreement with the accounts representing the details of administive and selling expenses.

Separate accounts are maintained representing the cost of freight outward, commission and discounts allowed, which are considered as deductions from gross sales. All returns and allowances are charged against gross sales.

To determine the operating profit, therefore, in the manner indicated in the formula outlined in the foregoing, the amount of sales after the deductions have been made will be contrasted with the factory cost of shipments, plus the commercial cost of shipments, with the object of showing the operating profit.

Interest transactions will be considered after the determination of the operating profit and will be considered as direct additions thereto, or deductions therefrom, to arrive at the net profit. The transactions briefly described in the foregoing are to be recorded by months, with the very important object of obtaining a statement of monthly earnings.

ESTABLISHING BURDEN RATES

One of the first steps in establishing costs is to work out the ratio of burden to the direct labor charges for the various departments of the business. This is to provide the mechanism for making a charge each month to the account representing work in process, to cover the burden applicable to the cost of the product, in proportion to the amount of direct labor incurred during the month. It is preferable to make these charges at percentage rates according to the individual departments; that is, the ratio which the expense in a department bears to productive labor in that department is determined; and for all productive labor charged to work in process there is a further charge made to that account, based upon the departmental percentage rate, to cover the burden applicable to the cost of the product. These amounts are credited to the reserve for factory burden account, which represents at all times the accumulation of amounts applied to the costs to cover the burden charges. The principal advantages of the use of departmental expense rates in the calculation of burden charges are as follows:

(a) Closer values may be obtained for determining the selling price of partly finished product.

(b) Closer values may be obtained for use in pricing the inventory, which would, of necessity, be found in all stages of process.

The aggregate of the general accounts representing the burden of indirect costs of manufacture will be in substantial agreement with the aggregate amounts of burden applied to the cost of production, as shown by the balance in the reserve account, if the production be upon a normal basis and the ratios of burden costs correctly compiled. Should the aggregate of the balances in the expense accounts be greater than the aggregate of burden applied, it would indicate that an increase should be made in the ratios used in applying the burden; but, on the other hand, should the aggregate of the balances in the expense accounts be less than the aggregate of burden applied, a decrease should be made in the expense rates. Should such variations occur as the result of abnormal operating conditions it is recommended that no radical changes in the expense rates be made, but rather that the variations should be considered as a separate charge to the operating profits of the year. It is inadvisable, for comparative purposes, to absorb in individual costs extraordinary expenses due to abnormal conditions.

The method of working up the percentages of burden in relation to direct labor varies with local conditions and at individual plants. Certain items, such as supervision, are distributed over the various departments in ratio to the direct labor itself, while others, such as heat and light, are apportioned according to floor area. The local conditions must be carefully examined to determine the proper basis for each case.

INTERLOCKING FACTORY COSTS INTO FINANCIAL ACCOUNTING

An essential feature of any cost plan is to absorb and check the actual accumulated cost figures by financial accounting that the total of all individual cost figures will be reflected and proved into monthly balance sheets. This is provided for by the establishment of a private ledger and a works ledger which must balance each other through controlling accounts. The accumulated cost figures are absorbed by the works ledger and the accumulated financial figures by the private ledger, thus assuring that each balances the other and that all transactions are absorbed by the one or the other.

ESTABLISHMENT OF PRIVATE AND WORKS LEDGER

To establish the cost plan correctly and the proof of the works ledger it is necessary to provide two controlling accounts which will represent the total investment in the form of raw materials, parts and product in process, finished product and factory expenses.

One of these accounts is carried upon the private ledger and is known as the works ledger controlling account symbol B. The other controlling account is known as the private ledger controlling account and is carried upon the works ledger, having the same symbol B. These two accounts act as controlling accounts to each other, and at the end of each month their balances should be in agreement.

At the beginning of the year the works ledger controlling account, symbol B, in the private ledger is charged with the total amount of the inventory. Through the year this account is charged with the total cost of all purchases of material, payroll and factory expenses. It is credited with the cost of all goods shipped and charged with the cost of any goods returned. The balance of this account will, therefore, at all times represent the total of raw material, work in process and finished stock inventories.

The foregoing describes in general the methods to be used in order to establish the accounts necessary for a monthly loss and gain statement supported by cost records as carried in the works ledger and controlled by the general books. The control of costs is thus obtained through proof of the balance in the various accounts in the works ledger in the following manner:

(a) When the balance of the various inventory accounts agrees with the physical inventory accounts, a proof is furnished that the value of materials consumed is substantially in agreement with the cost of the material.

(b) When the aggregate of the various factory overhead expense accounts, as a total, is in substantial agreement with the credits written off to the work in process burden, a proof is established that a proper percentage of burden expense has been used.

Considering the foregoing, it should be held in mind that the works ledger will give proof of the accuracy of the cost records and through these the loss and gain statement. Should there arise any question as to the amounts shown in the cost records, an analysis may be quickly made and traced through either the material, labor or expense accounts. The entire plan is subjected to direct proof when physical inventories are taken at different periods of the year.

(To be continued)

The Rubber Surplus and Its Relation to Future Tire Production

By Richard Hoadley Tingley

In arriving at the world's position with respect to crude rubber —and more particularly with respect to the United States, there are many factors to be taken into account. As every rubber man knows, there is a large surplus stock in the world's market, a very large portion of which is in this country. The exact amount of the surplus and where held is a matter about which there is no very definite knowledge. Each American importer and manufacturer seems to take the ground that the amount of his own personal holdings is a private matter to be kept as one of his trade secrets. Although almost anyone of them is willing to hazard a guess at the total surplus—world and United States, none will go much farther and the true amount is shrouded in more or less mystery.

On October 25, 1920, the *Trade News Service* of New York published a statement bearing on this matter which is reproduced as follows:

"In connection with views recently published as to the production and consumption of crude rubber a number of opinions have been given by factors in the New York market. While these are for the most part of a bearish nature, there are but few conflicting opinions since most of the statements are based on imports and consumption for a known period, namely, the past nine months of this year.

"According to the statements of dealers there were 65,000 tons of rubber in store in the United States on January 1, 1920, and arrivals for the nine months ended September 30, 1920, amounted to 192,000 tons, bringing into this market for the entire period a total of 257,000 tons of crude rubber.

"Consumption for the same period amounted to 165,000 tons, estimating 15,000 tons for January up to 30,000 tons for May when manufacturing was at its peak, and receding from that time.

"If this estimate is to be accepted, a surplus would be shown as of October 1, 1920, of 92,000 tons, and on the present limited scale of manufacture, even with decreaased imports, there would be an accumulation of rubber in this country at the end of the present year in excess of 100,000 tons.

"These figures represent not only stocks held in warehouses but also those in the hands of manufacturers. It is estimated that 30,000 tons are actually on spot at the present time in New York, but of this amount considerable has already been sold and it is difficult to estimate the amount actually available.

"In arriving at the world's present supply the American trade adds to the above amounts those quoted by the Rubber Growers' Association of London, August 31, 1920, of 33,000 tons held in London, which is expected to reach 50,000 tons by the end of the year. This, with the surplus stocks held in Singapore, Colombo, Java, and in the Brazilian markets, gives a total world's surplus of upwards of 200,000 tons."

It is the purpose of this article to analyze this statement and to ascertain how nearly it is correct; to see where, how, and when this surplus was rolled up, and to forecast, as well as maybe, under what conditions and how long a time it ought to take for the market to absorb it—for it is perfectly evident that, until it has been in a measure used up, the rubber market will continue to be in a more or less unsettled and dangerous condition.

In 1917, J. S. M. Rennie, as quoted in *London Times Trade Supplement*, foresaw an overproduction of rubber when he said:

"If some definite, strong action be not taken on behalf of this industry, and native Asiatic residents, plantation companies, and the powerful well-controlled American and British rubber goods manufacturers are allowed to continue planting ad lib., it is not difficult to foresee disastrous results to the industry, and the ultimate result may easily be that in, say, ten years' time, we may find ourselves with a planted area of 4,200,000 acres which, at 375 pounds per acre per annum, would give a total crop of 700,000 tons, and if the effective consumption at that time is less than that quantity by so much as a hair-breadth, so to speak,

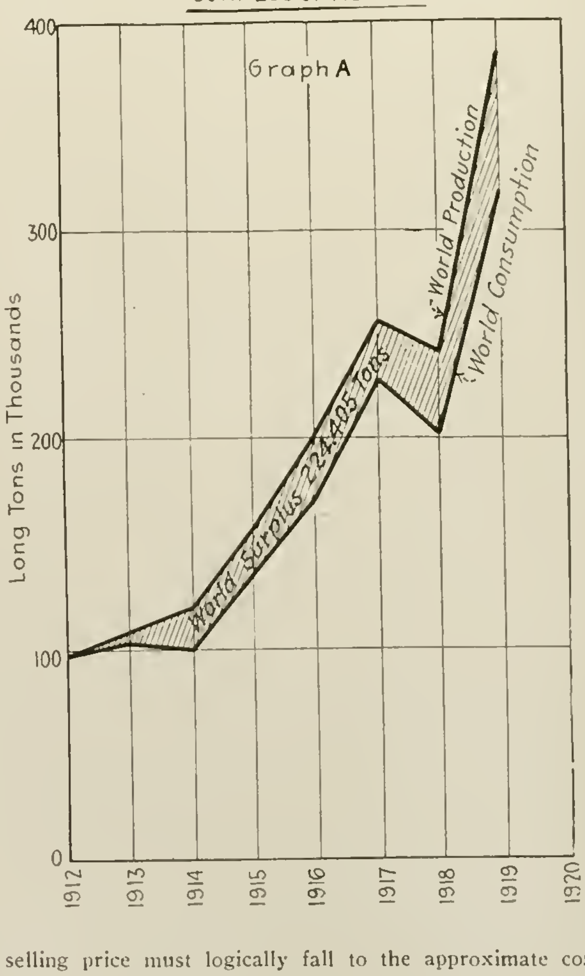
Table I

World Production, Consumption and Surplus of Rubber
(In long tons)
(Reference to Graph A)

	Production (a)	Consumption (b)	Surplus
1912	98,928	95,863	3,035
1913	108,440	102,455	5,985
1914	120,380	99,800	20,580
1915	158,702	135,214	23,588
1916	201,598	169,474	32,124
1917	265,698	229,017	26,681
1918	241,579	201,620	39,959
1919	381,860	219,497	62,453
Accumulated surplus			224,405

(a and b) Production figures for 1912-1917, inclusive, are taken from "The Rubber Industry," prepared by the War Service Committee of the Rubber Industry of the United States. Amounts quoted for 1918 and 1919 are from The India Rubber World.

WORLD PRODUCTION, CONSUMPTION AND SURPLUS OF RUBBER



the selling price must logically fall to the approximate cost of production."

What Mr. Rennie foresaw in 1917 as a possibility in ten years from that time became an actuality, so far as price is concerned,

within a year—accentuated each year that has followed, with prices dangerously near the cost of production; indeed, the surplus was, at that very time, being accumulated, as will be seen by reference to Table I and Graph A herewith, of the world production, consumption and surplus of rubber from 1912 to 1919, inclusive.

The preceding table and graph clearly show that the educated "estimate" or "guess" of manufacturers and dealers is substantiated, at least, so far as the world's position is concerned. If the figures quoted are correct—and they come from the best of authority—each year, from 1912 to and including 1919, has produced more rubber than that particular year has consumed, the surplus or "carry-over" from year to year accumulated at the end of 1919 being apparently 224,405 tons.

Applying a similar analysis upon the importations to, and the consumption of rubber in the United States, further confirmation is had of the "views" and "estimates" made by dealers and manufacturers, as will be seen by reference to Table II and Graph B. Here it will be seen that a surplus has been gradually accumulating, year by year, since 1912, and that it amounted to 83,350 tons at the end of 1919.

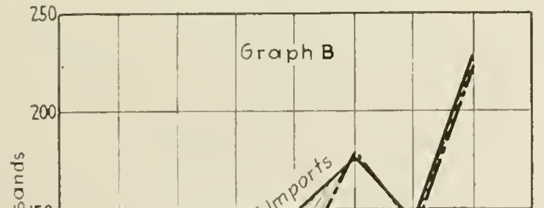
Table II

United States Imports, Consumption, and Surplus Stocks of Rubber
(In long tons)
(Reference to Graph B)

	Imports (a)	Consumption (b)	Surplus	Deficit
1913	58,927	52,179	6,748	.....
1914	76,817	61,251	15,566	.....
1915	123,560	96,792	26,768	.....
1916	148,827	116,477	32,360	.....
1917	173,928	177,088	.....	3,160
1918	145,517	142,722	2,795	.....
1919	239,260	236,977	2,283	.....
Totals			86,510	3,160
Accumulated surplus			83,350	.....

(a) United States imports are taken from The India Rubber World, November 1, 1920, page 144.
(b) United States consumption; from "The Rubber Industry," prepared by the War Service Committee of the Rubber Industry of the United States.

UNITED STATES IMPORTS CONSUMPTION AND SURPLUS OF RUBBER



Further analyzing the position of the United States with respect to the present year, 1920, it will be seen from Table III, and Graph C that imports of rubber in 1920, although in total amount falling but slightly below 1919 quantities, have, since September, declined greatly from the amounts imported in the latter part of 1919. In October, 1919, these imports totaled 28,888 tons, dropping to 10,693 tons in the same month of 1920, the lowest record for any single month for the past two years. The amounts given for November and December, 1920, are estimated by taking the best consensus of opinion of the trade.

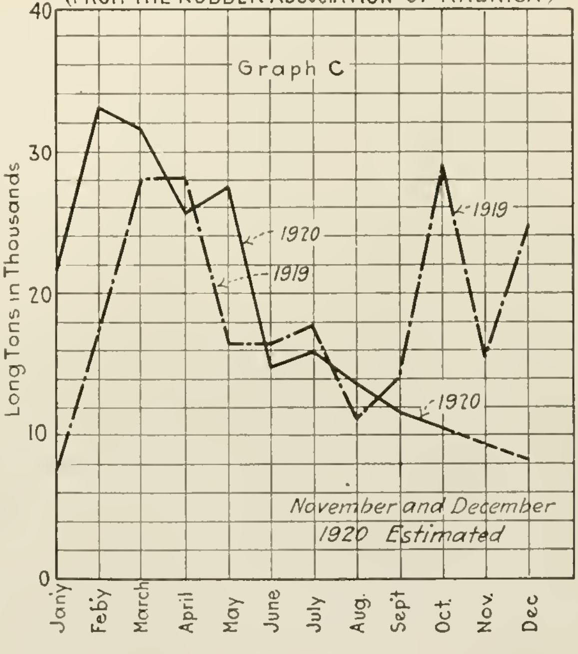
Table III

United States Imports of Crude Rubber
(From The Rubber Association of America)
(In long tons)
(Reference to Graph C)

	1920	1919
January	21,351	7,235
February	32,994	17,456
March	31,650	28,223
April	23,675	28,146
May	27,338	16,348
June	14,881	16,319
July	15,884	17,965
August	13,564	11,067
September	11,636	14,036
October	10,639	28,888
November	9,600[a]	15,674
December	8,400[a]	24,675
Totals	221,612	226,032

[a]Estimated.

UNITED STATES IMPORTS OF CRUDE RUBBER
(FROM THE RUBBER ASSOCIATION OF AMERICA)



The Rubber Association of America, through a series of questionnaires addressed to rubber manufacturers, made an endeavor to ascertain the amounts of crude rubber used in the years 1917, 1918 and 1919 in the various departments of manufacture. Its

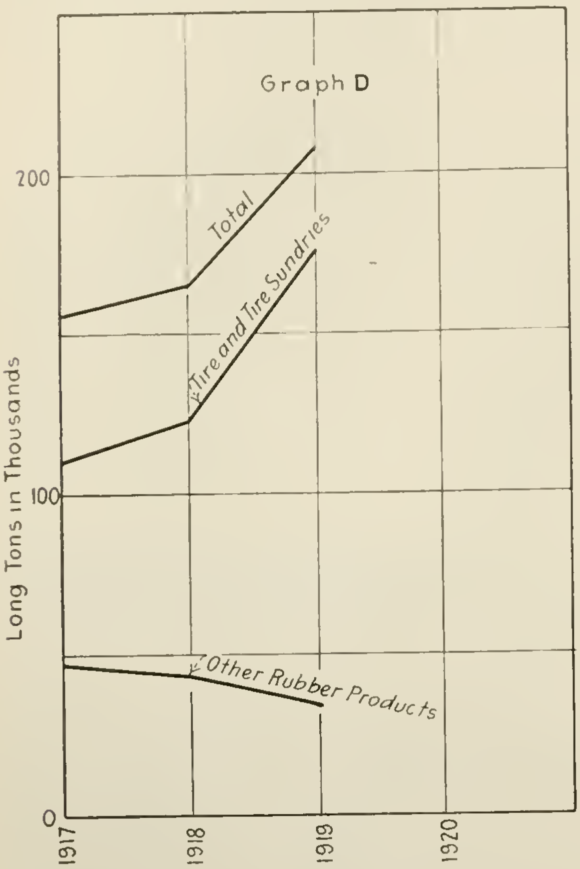
Table IV

United States Crude Rubber Consumption in the Divisions of Manufacture
(In millions of pounds; 000's omitted)
(In thousands of long tons; 000's omitted)
(Reference to Graph D)

	1917		1918		1919	
	Pounds	Tons	Pounds	Tons	Pounds	Tons
Tire and tire sundries	247,021	110	272,607	121	389,104	174
Other rubber products	105,654	47	98,405	44	77,830	35
Totals	352,675	157	371,012	165	466,934	209

Note: The above figures for 1917 are taken from reports compiled by the United States Government during the war. See The India Rubber World, May 1, 1918. These are taken as correct. Since, however, the reports issued by The Rubber Association of America of a limited number of replies to their questionnaire for similar data covering the same period indicate but 87 per cent of the government totals, the returns of the association for the years 1918 and 1919, also covering a limited number of replies to their questionnaire, have been taken as 87 per cent correct, and the figures in the above table adjusted accordingly.

UNITED STATES CRUDE RUBBER CONSUMPTION IN THE DIVISIONS OF MANUFACTURE



questionnaire divided the industry into two heads—"Tires and Tire Sundries" and "Other Rubber Products." Although nearly every rubber manufacturer was thus addressed, replies were received from by no means all and therefore the results did not disclose the entire story. In 1917, during the war, the United States Government made a very complete canvass of the situation, covering practically the same ground. At that time nearly every manufacturer replied to the questionnaire and the result shows that, assuming the United States figures to be correct, the amounts quoted by The Rubber Association as a result of its limited canvass are but 87 per cent of the truth. I assume for the purposes of estimation, also from the limited number of replies received by the association, that its figures for 1918 and 1919 are but 87 per cent of the total, and produce Table IV, and Graph D.

On June 24, 1920, Zorn and Leigh-Hunt of London made an analysis of the world's rubber position which they called "The Coming Rubber Shortage." In this they exhibit the following table of producing rubber acreages:

Table V

Acreages Under Cultivation

In bearing before	1915	900,000	....
Increase in	1915	280,000	31%
"	1916	420,000	35%
"	1917	340,000	21%
"	1918	220,000	11%
"	1919	170,000	8%
"	1920	120,000	5%
Total now in bearing		2,450,000	....
Increase in	1921	180,000	7%
"	1922	160,000	6%
"	1923	160,000	6%
"	1924	200,000	7%
Total planted		3,150,000	....

Having in view the fact of the proposed curtailment in production advocated by the Rubber Growers' Association of London, in which they advise a 25 per cent cut in production until present surplus stocks have been absorbed—a measure already in partial operation, I introduce Table VI and Graph E, which take into account the Zorn acreages with the 25 per cent reduction applied. In the last column I have made a forecast of America's imports, placing them on an average at 65 per cent of the production as modified by the curtailment figures.

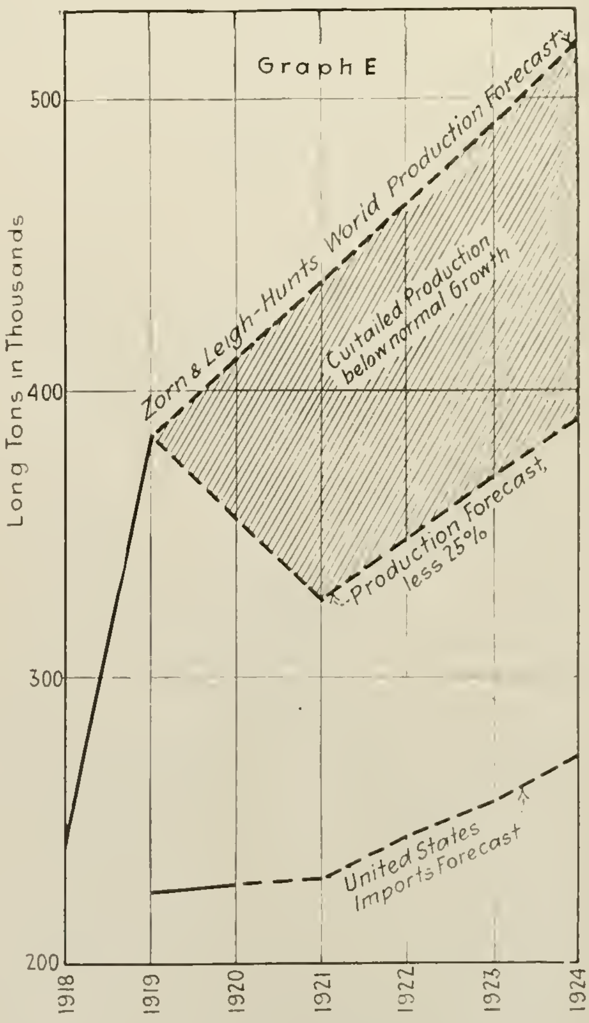
Table VI

Forecast of Production and American Imports
(Pounds in millions; 000's omitted)

	Zorn Acres (a)	Total Acreage (a)	Production Pounds (c)	Production Tons	Production Less 25%	American Imports (d)
1919	2,450,000	2,450,000	855,366	381,860	286,390	226,032
	(b)					
1920	180,000	2,360,000	920,500	410.940	256,000	231,000
1921	160,000	2,790,000	976,500	436,000	327,000	229,000
1922	160,000	2,950,000	1,032,500	461,000	345,000	242.000
1923	200,000	3,150,000	1,102,500	492,000	369,000	258,000
1924	200,000	3,350,000	1,162,500	519,000	390,000	273,000

(a) Acres in bearing at years given.
(b) Increases in acreages.
(c) Basis of 350 pounds per acre.
(d) Based on America taking 65 per cent of production.

PRODUCTION AND IMPORT FORECAST



Raw Materials, in its September, 1920, issue, gives an interesting and instructive review of the rubber situation, more especially with respect to its bearing upon automobiles and tires. On page 117 it produces a table that is applicable to the study in question and I therefore reproduce it in part:

Table VII

Rubber Requirements in the Automobile Industry

	1	2	3	4
	Pounds of Rubber Consumed in Tires	Number of Cars Registered in U. S. A.	Increased Rubber Consumed in Tires Over Previous Years	Pounds of Rubber in Tires Per Car Registered
1913	65,880,000	1,254,971	....	..
1914	89,830,000	1,711,339	23,942,000	52
1915	128,400,000	2,445,664	38,750,000	52
1916	185,650,000	3,512,996	57,250,000	52
1917	233,387,000	4,983,340	47,737,000	46
1918	248,000,000	6,146,617	14,613,000	43
1919	325,000,000	7,565,446	77,000,000	43

From an inspection of this table it will be seen that there is consumed in every car registered an average of about 43 pounds of rubber in tires. Applying this rate to the 70 per cent of our imports that go into tires, and to be distributed in the surplus, it will appear by reference to Table VIII, column 5, that, in 1921, there must be a registration of approximately 10,000,000 cars in order to use up this amount of rubber; increasing as imports increase up to 1924, when a registration of nearly 12,000,000 cars (11,800,000) must be had in order to use up the accumulated surplus and current imports.

Table VIII

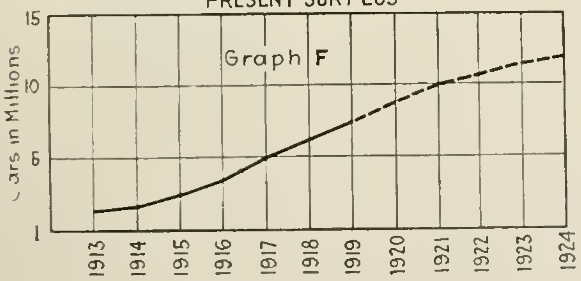
Forecast of Car Registration in Order to Absorb Rubber Imports Shown in Table VI, Plus the Existing Surplus Distributed Over the Years to and Including 1924.

(Reference to Graph F)

	1	2	3	4	5	6	7
1919	...	...	...	...	...	7,600,000	...
1920	...	...	...	...	...	8,800,000	...
1921	229	513	359	80	439	10,000,000	...
1922	242	542	379	80	459	10,700,000	...
1923	258	578	404	80	484	11,200,000	...
1924	273	612	428	80	508	11,800,000	...
Total increase, 1919-1920						4,200,000	...
Yearly increase, average						....	11%

Note:
Column 1. Forecast of imports in thousands of tons.
Column 2. Same in millions of pounds.
Column 3. Seventy per cent of imports used in tires, millions of pounds.
Column 4. Seventy per cent of world's surplus of 200,000 tons distributed over four years—1921 to 1924, inclusive, in millions of pounds.
Column 5. Total rubber that must be absorbed, each year, in tires and tire sundries to take care of the imports and present surplus as distributed, in millions of pounds.
Column 6. Cars that must be registered to use up imports and the surplus.
Column 7. Per cent of increase in cars registered each year.

CURVE OF CAR REGISTRATION WITH 1924 FORECAST NECESSARY TO ABSORD FUTURE IMPORTS AND PRESENT SURPLUS



The question arises, then, is the above too much of an increase in cars to expect under the conditions that now exist and that are likely to prevail during the next four years? Let us see.

From an inspection of Table VII it will be seen from column 2 that the average increase in car registration has been as follows:

1913 to 1914	36%	1916 to 1917	42%
1914 to 1915	43%	1917 to 1918	23%
1915 to 1916	44%	1918 to 1919	23%

In order to use up the imports and the surplus I have shown that a certain number of cars must be registered each year. See Table VIII. The rate of increase indicated is but an average of 11 per cent a year. This, compared with increases of anywhere from 23 to 44 per cent, should demonstrate that, with the curtailment of rubber production and importation I have mentioned and which seems likely to occur—indeed, it is now occurring, there need be no fear for the future of rubber surplus provided these restrictive measures are observed.

It does not seem to be apparent, as Zorn and Leigh-Hunt would have us believe, that there is any danger of a rubber shortage. The prediction of Mr. Rennie, of 1917, however, seems to have been amply verified, at least so far as prices are concerned. Now that steps have been taken to remedy the situation, this prediction—though at the time it was made it was thought to be entirely overdrawn, seems to have worked for good all around.

I do not think that any of the facts disclosed in this analysis need disturb the general feeling of optimism that exists in the trade, notwithstanding the fact of present depression. I have proved the fact of the rubber surplus statistically, demonstrating that, even with our lack of really reliable data of amounts of individual holdings, the "estimates" made by the trade are approximately correct.

No one who has closely followed the development of the automobile tire industry in this country doubts that it will continue to expand—perhaps not as rapidly as during the past few years, but in a normal healthy way that will easily take care of its share of the present rubber surplus and natural imports for the next few years.

A GROWING TIRE REPAIR SCHOOL

The tire repair school operated by The Miller Rubber Co., Akron, has been increased fifty per cent in space and equipment because of the growing demand for the course. An average of fifty students for the past few months has taxed the school to capacity, and the increased space will enable the company to handle 75 to 100 students at a time. New sectional and retread molds for heavy-duty tires have been added and a competent instructor employed to handle this phase of the work. Students of the Miller Tire Repair School are now divided into classes, including beginners, intermediate, senior repair men and special truck tire men. The course of four weeks' practical shop work is supplemented by a series of 24 lectures. Students are graded on each repair made, as a ticket is attached to each tire listing materials used, time of repair and the uame of the student making repair. At the completion of the course both work and results of examinations are taken into consideration, and if a student passes favorably he is given a diploma certifying him an expert repair man. If his grade is only fair, he is advised to stay and master the work, but if he fails or does not show good work he is advised to stay out of the repair business. Main repairs are taken up in the following order: inside section, inside patch, quarter section and bead repair, half section, full section, tread patch, reliner and retread.

THE STANDARD GOLF BALL

Because it affects both players of golf and makers of golf balls, the most important of the several regulations adopted at the Anglo-American golf conference was that applying to the limitation of golf balls and their standardization. The rules committee and the American delegates decided to recommend that golf balls for official tournament play shall not measure less than 1.62 inches in diameter, nor weigh more than 1.62 ounces avoirdupois. Although this compromise decision is disappointing to many American players and discommoding to manufacturers, it is being accepted in a sporting spirit and is believed by leading American experts to have prevented the game from turning backward The English wanted a standardized ball of the large "floater" type that would clip yards off the stroke of the best players. The Americans made a stand for the "Thirty" ball, the smallest and heaviest ball which comes within the new ruling and will maintain the present standard of the game, although it means the abandonment in international contests of the "Fifty" ball, which has won the most important tournaments of the past year.

Fluid Heat Transmission

By Alexander B. McKechnie[1]

The advantages of transmitting heat by means of a high boiling point fluid have been known for many years and several independent systems have been built and operated with more or less success. These systems consisted merely of a pipe coil or similar heater, a pump and some kind of a fluid. High flash point oil being easily obtainable was naturally the fluid chosen. These early systems operated for a short time, but soon commenced to give trouble and those that were used for the high temperature field were particularly short-lived, due principally to the carbonization of the circulating oil.

Heat transmission by hot oil embodies the desirable features and eliminates the objections of other methods for obtaining high temperatures. The quantity of heat delivered is under control at all times, and temperatures up to 550 degrees F. are reached without difficulty.

The pressure on the entire system is practically negligible, thus making it particularly adaptable to vessels with cast integral jackets usually built to withstand pressures of about 100 pounds and to the jackets of glass enamelled steel tanks designed only for pressures up to 75 pounds. This point is readily appreciated when we consider that the temperature of 100 pounds of steam represents only 338 degrees F. The distribution of heat is uniform over the entire surface of the vessel and its contents are treated instantly and uniformly without damaging the product.

The temperature can be controlled within close limits, either manually or by thermostatic devices. This is of vital importance in reactions where temperature variations in the heating medium are not permissible. Charts from recording thermometers show a temperature difference of from about 3 degrees F. to 7 degrees F. in the circulating oil when it is thermostatically controlled. The fire hazard is entirely removed, as there is no flame in contact with the vessels. The absorber furnace, the only place where flame exists, is isolated from the manufacturing equipment, and should conditions make it necessary the entire heating plant can be installed in a separate building.

DESIGN OF SYSTEM

There are five main factors in a system of this kind. They are as follows: Design of heater or absorber; type of circulating pump; type of system; quality of circulating oil; construction of pipe lines.

HEATER OR ABSORBER

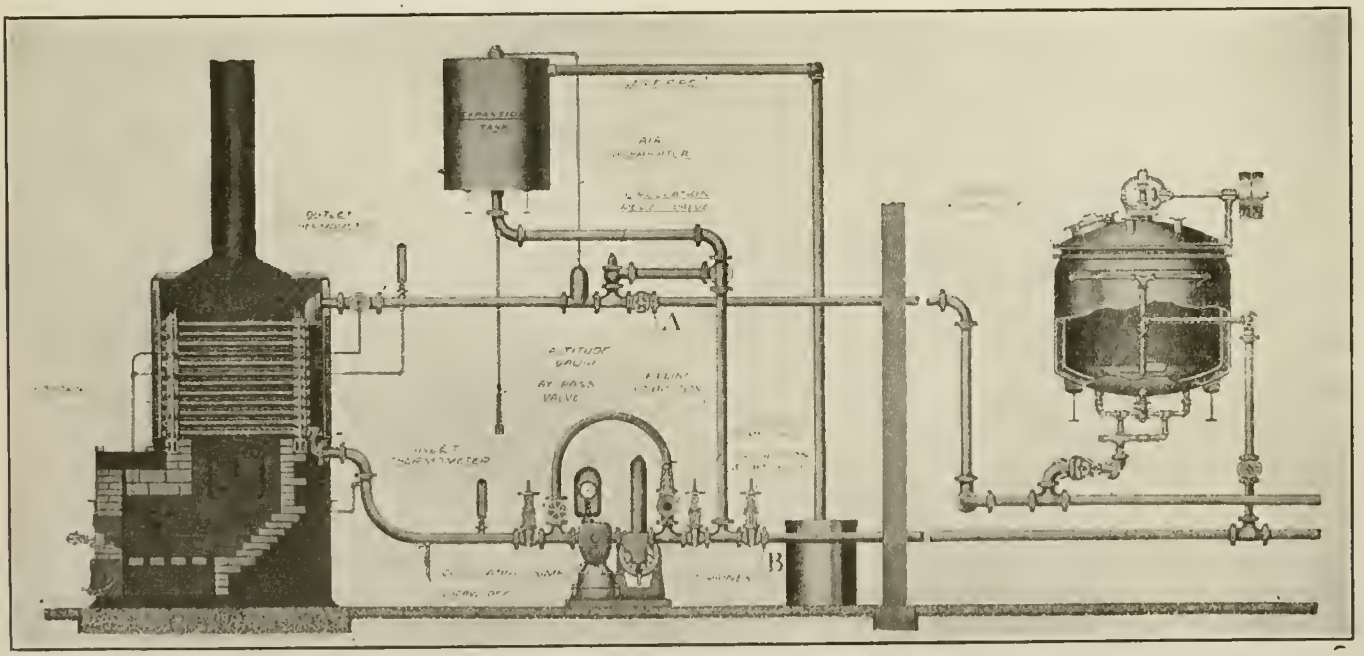
The absorber, like any other heat exchanger, must be designed for maximum efficiency, consistent with long life and freedom from trouble. It must be readily accessible for inspection or repair. The furnace must be built to withstand the high temperatures met in work of this kind and be thoroughly insulated to prevent undue radiation losses. Such points as the length and size of tubes, the velocity of the circulating oil and proximity of the fire to the tubes, all require careful study.

CIRCULATING PUMP

The circulating pump should be of the positive displacement rotary type to insure known and non-pulsating flow. The necessity for these features is apparent, because the temperature drop in the circulating oil is inversely proportional to the flow and a varying discharge pressure, particularly when starting a cold system, would produce excessive vibration.

TYPE OF SYSTEM

Experience has taught the superiority of the closed system shown in the illustration. By a closed system is meant one in which the hot oil does not come in contact with the atmosphere. This point is vital, as the oil would rapidly oxidize and soon become too viscous to pump freely, resulting in a decreased flow and the absorber tubes burning out, due to carbon deposit. Provision must be made, however, for expansion of the oil. The circulating oils generally used have a coefficient of expansion of about .000486, which means approximately a 25 per cent volumetric increase in 500 degrees F. rise. An expansion tank is placed



Parks-Cramer Co.

Typical Merrill Process System

Shown Connected to a Large Jacketed Kettle, Absorber, and Furnace in Cross Section

[1]Engineer, Parks-Cramer Co., Boston, Massachusetts.

on the end of a dead or stagnant line attached at the proper point in the system which takes care of this point very satisfactorily. It also serves as a liquid seal and insures the exclusion of air. The expansion tank being vented to the atmosphere does not permit the building up of high pressure. A number of tests have shown the oil in the expansion tank to be about 300 degrees lower than the oil in circulation.

CIRCULATION OIL

It is very important that the circulating oil used should be carefully selected. It must have a high flash point and be free from all impurities. Viscosity and specific heat are also of importance. A number of tests show the specific heat increases with temperature on a straight line, its value being .62 at 550 degrees F.

CONSTRUCTION OF PIPE LINES

The transmitting lines for the circulating fluid are one of the most difficult and expensive features in a system of this kind. Ample provision must be made at all points for the expansion produced, which amounts approximately to 1/32-inch per linear foot. As hot oil of this nature is an exceedingly fugitive material, all castings and pipe joints must be so designed that there is no possibility of leakage. A pipe line constructed in the same manner as for steam would be merely a source of expense and trouble. It is practically impossible to use threaded joints above two inches, and sheet packings thus far have proved to be useless for the flanges. As the pressure is comparatively small, namely from 10 to 20 pounds per square inch, standard weight steel piping is satisfactory. There is no corrosion as the oil actually preserves the pipe. Steel flanges, screwed and welded to the pipe, prevent leakage at that point, and special design metal gaskets take care of the flanges. It is advisable to avoid joints as much as possible, so pipe bends and offsets are substituted for fittings. These parts in addition reduce friction, and vibration caused by column inertia.

FUEL

Compounds requiring temperatures that make it necessary to use an oil circulating system generally require also a uniform temperature in the heat applied. For this reason fluid types of fuel are used, and the most satisfactory results are obtained with either oil or gas.

It is probable, however, in the absence of either of these kinds of fuel that the absorber could be coal fired, and with proper attention make possible the maintenance of reasonably close temperature regulation.

APPLICATIONS

Installations for fluid heat transmission have been found useful in rubber factories in a variety of lines. Some twenty years ago the India Rubber, Gutta Percha & Telegraph Works at Silvertown, England, installed a complete rubber drying plant, using oil heat. The saving in time over air drying or even steam heated rooms was very great. The only criticism offered by rubber men was that the intense heat softened the rubber too much. As the finished goods did not suffer, this point was ignored.

Following the Silvertown lead, oil heating plants were established in France, Germany and Russia for drying rubber. One was also planned for an American factory. Just at this juncture came the vacuum dryer which in compactness, ease of installation and quick results fairly outclassed the oil dryer and handicapped it in what would have been a very general adoption by rubber manufacturers.

Nevertheless, the system has a fairly wide use in heating compounds for electric tape, and "dope" for insulated wire, and indeed for a variety of heating in special lines.

USED IN "RUBBER ROOFING"

Here the saturant is maintained as high as 425 degrees F., which is sometimes required. This temperature is easily obtainable. Due to the uniform temperature the machines can be operated at constant speed, and because of the high saturant temperatures that can be carried the felt can run through the saturant at maximum speed, thus increasing the hourly production and insuring a product of the highest quality and uniformity.

The hot circulating oil at approximately 475 degrees to 500 degrees F. can be passed through pipe coils set inside the tanks, which is the general practice in the asphalt field, or through jacketed tanks if necessary.

After the felt is saturated, it is allowed to cool and then passed on to the coating machine. The coating is a bitumastic material that flows on the saturated felt at a lower temperature and forms a protective coating, in reality hermetically sealing the prepared felt from the weather. The coating tank temperature ranges from 250 degrees to 350 degrees F.

Both saturating and coating tanks operate from one oil heating system and the temperatures of each are independently controllable by special oil by-pass valves installed at each piece of apparatus.

The study of the transfer of heat is also very interesting here. The conductance of the film between the pipe coil and the liquid asphalt is about ten B.t.u. per square foot per hour, per degree F. difference and because the conductances of the pipe and the film on the oil side is so high compared to this value, the overall coefficient is practically ten.

MANUFACTURE OF MINERAL RUBBER

In the manufacture of mineral rubber an uncarbonized blend of asphalt heavy oil residue is desired that shall be intimately mixed and of definite melting point. No better system of heating such ingredients has been devised than fluid heat transmission by circulation of the oil in the jacket of a double-walled kettle.

INSULATION

A plant manufacturing rubber-covered electric wire formerly operated on steam and could not maintain above 280 degrees F. in eleven dipping and polishing kettles. They were using 125 pounds steam pressure. Today the oil system operates at 14 pounds pressure and the required temperature of 325 degrees F. in tanks is uniformly maintained. Production has increased about 50 per cent and the quality has been vastly improved.

POOLING WAGES FOR VOLUME PRODUCTION

When it became necessary, a few months ago, to reduce tire production temporarily, owing to the slump in the automobile industry, The B. F. Goodrich Co., Akron, Ohio, laid off about 4,000 of the 29,000 operatives employed earlier in the year and began running three-hour shifts five days a week. In an effort to retain as many men as possible, the company decided to adopt a plan which had been used in a small way in one of the mechanical goods departments, with the result that the new system has increased output per man and is more satisfactory to both employes and the company.

The plan provides for "pooled" operations by various departments and payment is made on the basis of a certain volume of production, shared proportionately by the various members of each department. For example, the compounding department is told to deliver a specified amount of various compounds. The department is paid a fixed sum for each ton of compound delivered and the operatives of the department share proportionately in this payment. In other words, the men are not paid by the hour or day, nor do they operate on a piece-work basis. It is more or less a matter of volume. If eighty men in one group can deliver as much compound as one hundred men in another group, the members of the first group will receive individually more money than those of the second. This increases personal efficiency, for the men themselves see to it that no one shirks. At the same time, the company can regulate production in a more satisfactory manner than heretofore.

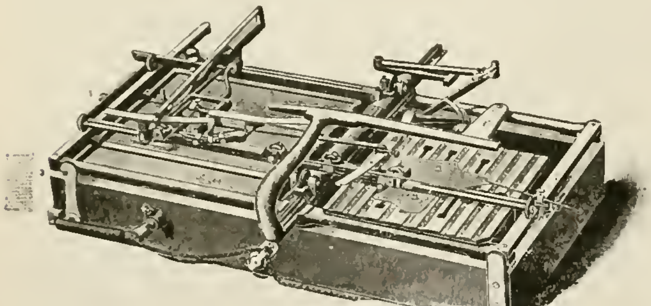
For the first seven months of the calendar year 1920 Belgian exports of rubber to the United States were 432 tons, valued $333,300.

Rubber Shoe Designing and Pattern Making

By Robert C. Kelley, A. B.

Within this generation, when a person asked for a pair of rubbers at a shoe store, the clerk went to the back of the store, pulled open a drawer containing a heterogeneous assortment tied together with red strings and sold him a pair which would stretch over the shoe. The question of fit was never considered, for the chances were that the dealer carried but a few ill-designed lasts.

Today the same store carries as many as a dozen lasts or styles of men's and women's light rubbers. The red string has gone. The clumsy, ill-fitting gum shoe has been replaced by its stylish, modern successor, wrapped in tissue and packed in a neatly labeled carton which reposes on the shelf along with the leather shoe.



Hartford Brothers

Combination Sole and Upper Grading Machine

The significance of this development in the rubber shoe industry is not to be underestimated. With it has come a chain of workers who bond together the leather and the rubber shoe industries and who have placed the craft of the rubber shoe designer on the same plane with the tire engineer and the originators of all modern utilities from women's corsets to men's collars. For the rubber shoe must now have style, fit and durability.

It is true that the styles in rubber shoes must follow those of leather shoes. But this is only a starting point. If the rubber footwear manufacturer attempted to get out a rubber to fit every last carried by the shoe dealers, he would soon find his outlay for lasts and patterns absorbing all the profits. Here is where the shoe designer finds his utility. He gets his ideas from his own sales force and the leather shoe trade. He attends every shoe style show, gathering information and watching the trend of styles. Of course, all shoe styles are modifications of previous models and in an established concern, part of the designing is, in reality, remodeling. But let us take, as an illustration, the case of a manufacturer who is just starting in the rubber footwear business. Before he can throw a batch of compound on the mill, he must design his lasts. The designer obtains samples of an assortment of leather shoes from the territories in which he expects to market his product. If they are women's shoes, he will have a varied line of high heels of the Louis type, of medium or Cuban heels, semi-high heels, low heels, long vamps, short vamps, high insteps and low, with a multitude of variations. He must analyze trade conditions to determine what kinds are the most popular and which ones are most likely to stay in vogue the longest. In many ways it a gamble, steadied by his judgment and knowledge of conditions.

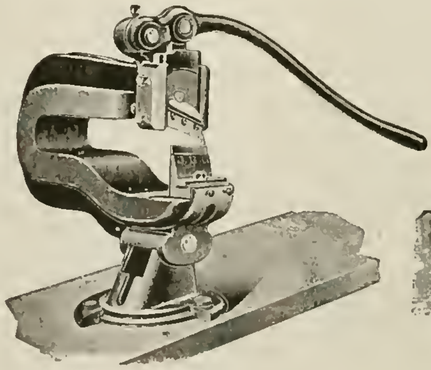
The next step is a grouping of the styles according to points of similarity. He simmers the groups down to individual shoes which possess the most points in common. The shoe of each group that comes the nearest to the specifications of all of them is sent to the last maker, who reproduces a model of it in wood. It will be noted that the last over which the leather shoe was made will not answer the purpose, as the rubber is to be fitted over the leather shoe. This model brings him a step farther in the process. He may add to it, take off a little here and there, change the balance between heel and toe, as he compares it with the other models of the group, always keeping in mind the most popular and enduring styles.

When the model is finished, as far as he can tell from the evidence at hand, it passes to another worker in the chain, who fits up the last. This work requires an eye for artistic details and a thorough knowledge of rubber shoe construction. The fitter measures the height and depth of the last, and sets the gage line of the upper for a storm, half storm, or croquet, as the case may be. He traces the exact outline of the bottom of the last for what is known as the "bottom pattern."

After these measurements are taken, he must have samples of the stocks to be used on the inside work of the shoe to determine the percentage of stretch to the material, such as the net lining, made of cotton stockinette coated on one side. The parts of a woman's light rubber, exclusive of the gum outsole and upper, are: lining; rag heel or junior for stiffening the back, made of rag stock; the cloth heel made of light sheeting frictioned both sides; the insole, made of light sheeting coated one side with rag; the heel lift of friction to reinforce the heel; filler and toe cap, also of friction; and the joining friction strip which binds the seams. The lining must come up above the upper line on the instep and pull down smooth and tight when it is lasted over. This surplus stock is trimmed off after vulcanization.

The line of the upper is used to design the engraved roll for imprinting the bind, and margin enough is left to enable the gum to be pulled over the bottom of the shoe and lap in the back for seaming or stitching.

The insole, outsole and filler are all graded from the bottom pattern. The lines of the heel pieces (rag and cloth heel) are determined, first by the height, and then drawn with the aid of a French curve down the sides of the shoe. These first patterns are cut from light cardboard and can be used to cut the parts for the model shoe. It is very rare that the parts fit perfectly after the first trial, and the fitter must go through the same process of experimentation that the designer did in modeling his last.



Hartford Brothers

Pattern Shears Corner Cutting Machine

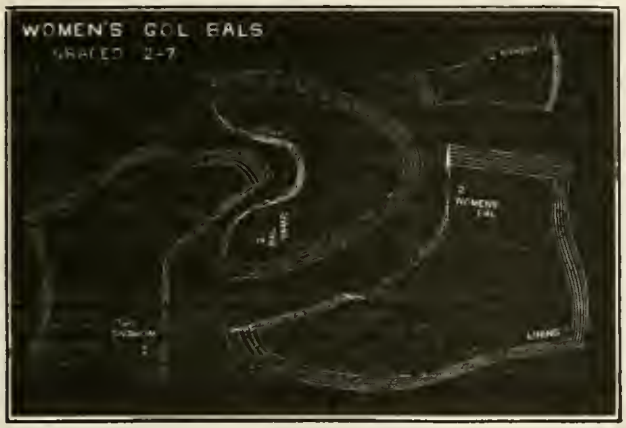
After the model rubber is made and cured, it is tried on the different shoes which it is made to fit, and any defects remedied. The salesmen are often consulted, and the shoe passed around for criticisms and comments. When its final form is settled

upon, the paper patterns are turned over to the patternmaker to be gotten out, and a set of lasts ordered from the last factory.

The making of patterns has been greatly simplified by the use of a grading machine such as shown in the illustration. Rubber shoe patterns for hand cutting are cut out of tin or planished iron from the cardboard originals and perforated with two holes, so that they can be fastened to the grading machine.

The pattern, which is usually a model size, such as 8 on the men's, and 5 on the women's, etc., is set in the machine, and the length and width measured on the indicators. A sheet of cardboard is then inserted in the lower bed of the machine and held in place by a clamp, operated by a foot lever. The movable carriage traverses the edge of the tin model, while at the same time a knife cuts its exact counterpart from the cardboard. The indicator is then reset for the other sizes in turn, which are cut in the same manner. This set of cardboard patterns, when stacked together, will be a run of sizes of the same model, as shown in the accompanying illustration of sole patterns after grading.

The patterns for cutting are made from these. In the rubber industry they are cut from tin or planished iron on a pattern



Hartford Brothers

Brass and Steel-Bound Patterns

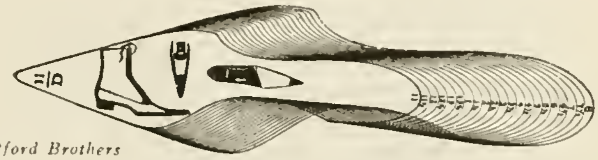
shears, the edges ground smooth, and the pattern flattened out with a few taps of the hammer on a metal plate so that it will lie evenly on the stock for cutting. The sizes, widths, name of the part, last and date are stamped on the pattern for purposes of identification. In the leather industry, patterns are usually made of heavy cardboard, and edged with brass binding. For this work the pattern binding and corner cutting machines are employed.

The outsole pattern is of a different type from the others, in that an indentation must be made along the line that separates the shank and heel, and a hole cut out so that the trade mark or manufacturer's brand can be centered by the cutter. Wellman outsole machine patterns are made of thick composition metal with a beveled edge, so that the knife may traverse the edge and give a proper skive to the sole.

On all shoes that have steady and large sales, the parts, such as linings, insoles, fillers, etc., are cut by dies on clicking machines or beam presses. These dies are made by the diemaker from the paper patterns furnished by the patternmaker.

It will thus be seen that the shoe designing and pattern departments of a rubber shoe factory, large or small, are increasing in their importance and usefulness. And it is not to their discredit to have a new last go out to the trade, be welcomed as a perfect fit and design, only to have it discarded a few months later and have the manufacturer's supply of dies, lasts and patterns sent to the salvage department to be sold for firewood and old metal. Styles are fickle things, and often are beyond human power to predict.

There are countless other features of rubber footwear designing which change from time to time, but fortunately do not always involve a change of lasts or patterns. Among some of the improvements brought out in late years may be mentioned extension toes and heels, self-acting features, suction non-skid soles on athletic footwear, various color combinations on uppers, soles and trade marks. All of these have been developed by rubber shoe designers for the expansion of business through



Hartford Brothers

Samples of Graded Soles

increased utility of the finished product. In this field the rubber chemists, production, sales and technical men work closely together, that all factors may be considered.

The introduction of machine-made gaiters and arctics has brought new fitting problems into rubber footwear, and with it has come a closer relation between rubber and leather shoemaking, the machines for the most part being adapted from the leather shoe field. How far this relation will be carried will be answered by the measure of success attained by machines in displacing hand labor, which has stood the test so many years in rubber footwear manufacturing.

INDUSTRIAL ENGINEERING IN RUBBER FACTORIES

By Malcolm C. W. Tomlinson[1]

The mechanical and electrical equipment of any factory represents a very large percentage of the capital invested. Unless such expenditures are analyzed carefully the net returns will fail to pay the interest on investment after operating expenses are met. Furthermore, analysis will often save a manager from tying up money in side issues such as power plants. But it must be borne in mind that analysis of technical questions is impossible without costs based on solid ground and also without technical aid. As the purchase and operation of equipment is seldom the result of intensive study, remarkable savings are often possible where such methods are put in practice. A number of cases will serve to illustrate the point. In two factories the bill for drinking water ran over $2,200 per year and averaged from $3 to $5 per employe. The installation of refrigerating systems cut down the water bill to less than $1 per person and paid out in two years' time. A boiler room was able to dispense with five boilers and three firemen as a result of a daily log and thus saved $9,000 yearly without the expenditure of one cent. In another plant a fortune was spent on grease and oil for lubrication but no attempt was made to recover one drop by filtration or separation when a saving of from 15 to 25 per cent was easily possible. A power plant which contained a low pressure turbine was producing electricity for 5 cents a k.-w.-hour with coal costing $3.50 per ton and a much smaller plant with poorer equipment located in the same town sold power at a slight profit for 2 cents. Similar examples of waste are occurring every day in most of our rubber factories and the facts usually remain hidden until the proper investigations are undertaken because these items can not be analyzed by cost departments.

The average executive will frankly admit that his costs are only worked out to the tenth or hundredth of a cent but will insist that they are accurate to that point. His accountants know better but believe that the expense of obtaining accuracy is ex-

[1]The author, a prominent consulting engineer, writes from a wealth of knowledge gained by his connection with such firms as the Baldwin Locomotive Works, the National Tube Co., the laboratories of the National Board of Fire Underwriters, The B. F. Goodrich Co., The McGraw Tire & Rubber Co., etc.

cessive. The fact remains that cost data on the production and departmental usage of water, steam, electric power, electric light, gas and air can only be obtained by the aid of technical engineers versed in making tests and investigations, that most of the plants in the larger industries have been obtaining this information for the past ten years, that the expense is very modest for smaller sized plants and that competition can be met by such methods.

INDUSTRIAL ENGINEERING'S FIELD

Certainly industrial engineering covers a broader field than that indicated. With the aid of the accountant it will cut out wastage in every department of our modern factory. Emphasis has been laid especially on analysis of equipment needs and on securing true cost data because therein lies a great opportunity for economy which is sadly neglected, for, though most industrial engineering firms are prepared to systematize factories and correct production errors by time and motion study, very few are equipped to make the necessary tests and investigations into the usage of those fundamental elements of manufacturing mentioned before: water, steam, electric power, electric light, gas and air. But there are many reasons why factories should do this work themselves when possible and thus reduce the expense. In such cases it might only be necessary to employ competent engineers to make the fundamental tests and investigations, to lay out a method of procedure and to supervise the installation of the system.

That engineering is a broad subject is seldom appreciated by factory managers. The civil, electrical, mechanical, industrial, chemical and mining divisions have subdivisions such as structural, sewage, electro-chemical, etc. It is, therefore, unfair to expect one engineer to have adequate training and experience over the whole field. Furthermore many mechanical, industrial or electrical engineers in factory work have had little or no practical experience in tests, investigations and research work. For this reason they are not competent to pass on many problems that arise and, in such cases, an engineer familiar with the problem should be employed.

THE MANAGER AND THE ENGINEER

Before we proceed it is best to point out that the factory manager and the technical engineer must each view industrial engineering in a broader light. The executive must realize that price alone ought not govern the purchase of equipment but that quality, delivery and maintenance cost should be considered; that there is as vast a difference between operating engineers, draftsmen and technical engineers as between surgeons and practicing physicians and that the safe harbor between low and high priced labor or equipment, while indefinite, can be found only by means of technical aid and analysis. The engineer must understand money values; have a wide experience with machinery and equipment; reject as unworthy of consideration propositions which will not secure prompt returns in profits; comprehend the ratio between income and investment and remember that his special value to industry is in his ability to analyze, to systematize and to effect economies.

The regulative principles of industrial management are as follows:

(a) The systematic use of experience.
(b) The economic control of effort.
(c) The promotion of personal effectiveness.

The author would broaden the third principle to include machinery and equipment. Industrial engineering must be employed to give business the full benefit of the principles enunciated, as the engineer's experience covers a field unknown to those who have not had such training; the control of effort, or time and motion study, has been developed by the engineering profession and the effective use of the human being as well as of the machine requires the aid of engineers.

ADVANTAGES OF ENGINEERING

Some of the advantages of engineering which can be had by various departments of a rubber factory are:

Management and General Office: (a) Reports, estimates and analysis of conditions and equipment set forth in simple language and illustrated with curves and graphic charts.

Cost Department: (a) Aid in obtaining true costs on production and distribution of electric power, light, air, water, steam and gas by means of tests and investigations. (b) advisory capacity on special costs; (c) rate fixing and bonus setting advice; (d) critical analysis, from an engineering viewpoint, of cost reports; (e) time study; (f) motion study; (g) systematic methods of recording data.

Purchasing Department: (a) Technical advice as to relative merits of various classes and makes of machinery and equipment; (b) tests and inspections of new and second hand machinery before purchasing; (c) analysis of bids or proposals on equipment.

Stores Department: (a) Modification of the perpetual inventory to meet local needs; (b) systematizing records and methods.

Shipping and Receiving Departments: (a) Systematic records and methods.

Production Department: (a) Reduction of machine-hour losses by better maintenance; (b) elimination of losses due to grounds, improper maintenance, imperfect alinement, excessive friction and poor lubrication; (c) proper routing; (d) unit systems of control and inspection; (e) air conditioning and humidity control to increase efficiency of employees and to reduce power required for milling; (f) light distribution to increase production.

Mechanical Department: (a) Estimates for building and equipment repairs or replacements; (b) establishment of daily log in power plant and monthly report on same; (c) tests and investigations of all kinds; (d) research work; (e) analysis of factory conditions for the management; (f) systematic supervision of maintenance work and power plant operations; (g) fire prevention, sanitation and safety engineering; (h) analysis of daily reports on percentage of "seconds" with a view to improvement of core and mold equipment or methods of production; (i) design of special machinery and equipment for production to reduce labor costs. This includes such items as special gearing to reduce power costs in milling; (j) building and equipment inspection; (k) improved methods of tempering and grinding tools; (l) design of special jigs and fixtures.

COST OF INDUSTRIAL ENGINEERING

The increased overhead burden of installing an adequate engineering department or of hiring an outside engineer will be offset by the economics effected. Just how much the return may be depends on the ability of the engineers entrusted with the work, the condition of the plant, and the willingness of the management to make expenditures. When such work has been neglected for years it ought not to be surprising if the expense of rectifying mistakes should be large. One cannot remove from a business profits which should have been used for improvements and then expect to have results. Where such conditions exist it is very often possible to institute great savings on slight expenditures. In one case of this kind an investment of $9,000 for equipment represented a saving of $75,000 yearly; but this can be considered as an exceptional case and part of these savings were made with little or no expense whatsoever.

Exports of automobile tires from the United States to Holland during the first six months of 1920 were valued at $760,000 as against $59,600 for the corresponding period of 1919. Imports of crude rubber from Holland to the United States during the first half of the current year amounted to $1,807,200.

Dry Heat Varnishes and Their Manufacture

The manufacture of varnish for dry heat goods, such as footwear and surface clothing, is really an oil-boiling proposition, and does not call for the huge chimneys nor the retorts of the old-time gum varnish maker. In boiling linseed oil, large kettles are used, the cold oil occupying one-third of the interior, and even then it sometimes boils over. The varnish house with its inflammable contents is as carefully segregated from other buildings as is a cement and naphtha house.

In preparing the oil varnish, the principal point is getting the fluid up to about 300 degrees F. and as quickly as possible and holding it there for several hours. The final stage is an increase of heat that causes frothing or boiling. This is continued until the liquid becomes viscid.

Back in the beginning of rubber shoe manufacture, what was known as the original Goodyear varnish was used. The ingredients were:

Linseed oil, boiled thick	10 gallons
Sulphur	10 pounds
Pulverized rosin	45 ounces
Camphene	10 gallons
Naphtha	15 gallons

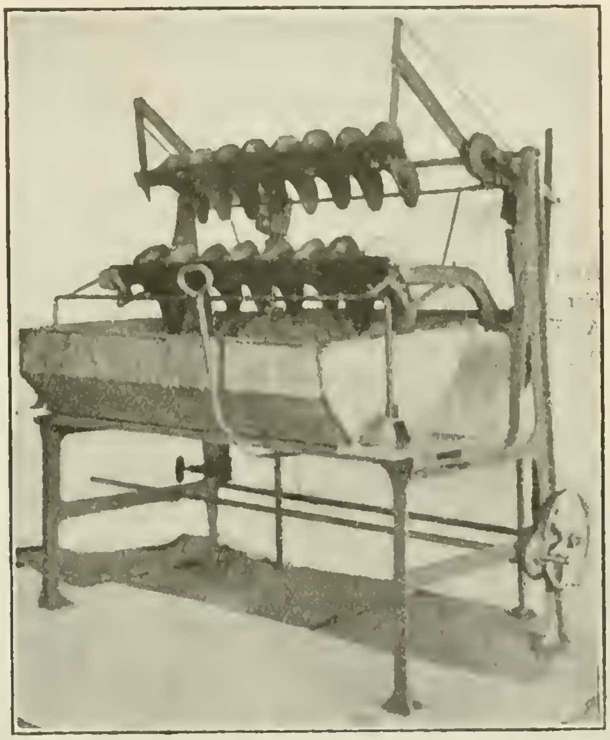
The oil and rosin were first mixed together cold and heated up to 290 degrees F. The sulphur was then added and allowed to stand 40 minutes. Next, the heat was run down to 215 or 220 degrees F. and the camphene added. Then the heat was run down to 150 degrees, the naphtha added and let stand until cold. Lastly, enough naphtha was added to bring it down to 50 gravity.

Erickson's Shoe Varnishing Machine

A more modern formula is:

Best raw linseed oil	32 gallons
White sugar of lead	1½ pounds

Boil these ingredients together until the oil is thick and viscid, and let it stand until cold. Then take 12 gallons of the above and heat it up to 290 degrees and add 7½ pounds of sulphur. Keep stirring and let the heat run up to 360 degrees. Then let it stand for 30 minutes. Then run the heat down to 150 degrees. Add 12 gallons of naphtha, and keep stirring until it gets cool.



Wall's Shoe Varnishing Machine—In Position for Dipping

A rubber shoe varnish used in Norwegian mills is made as follows: 8 kilograms of linseed oil, to which are added 1,170 grams of sulphur. Mix 8 grams of rosin with 40 grams of magnesia or 50 grams of lime, and add to the first mixture.

A very cheap shoe varnish is:

Well boiled linseed oil	10 gallons
Sulphur	10 pounds
Naphtha, 62 gravity	34 gallons

Primarily, rubber boots and shoes on lasts or trees were given the varnish coat by a broad brush in the hands of a skilled varnisher. Later, a dipping trough was used, in which each shoe was carefully immersed, slowly drawn out and drained before placing on the heater car. This, in turn, was displaced in 1906 by the Erickson varnishing machine. This in brief was a varnish tank fitted with an agitator to keep the varnish in homogeneous solution. A rack of ten shoes placed in the upper part of the tank was slowly revolved, dipping all of the shoes at once and giving each an even coating of varnish. With this machine four men could do the work of ten by the hand dipping process.

Two years later the Wall machine appeared. This needed but two men to operate it. In operation a stick of eight shoes is clamped over the varnish tank, a lever pulled, and the shoes descend into the varnish, are raised up by counter-weights and automatically transferred to a draining rack. Operated by one man, 500 pairs of shoes an hour are varnished. Two men, however, can handle 1,200 pairs, so it is naturally a two-man machine.

CARRIAGE CLOTH, AUTO TOP, AND SURFACE CLOTHING VARNISHES

Rubber automobile top cloth and carriage cloth are given a coating of vulcanizing varnish, often containing a pigment, which

is applied in a coating machine after the rubbered cloth has received an impressed representation of the grain of leather by means of an embossing machine. The rubber and varnish vulcanize in one operation. The time of cure is generally 2½ to 3½ hours at 250 degrees F., or 3½ to 4½ hours at 250 to 260 degrees F., depending upon the grade of goods. These varnishes are made in a dull, semi-bright, and gloss finish:

A good formula for this varnish consists of:

Linseed oil	1 gallon
Sulphur	1 pound
Naphtha	2½ gallons
Morrison's dryer	1 gallon

Varnishes for surface clothing are usually known as water varnishes. A good luster formula is:

Water	6 gallons
Shellac	3 pounds
Neutral chromate potash	1 pound
Borax	18 ounces

Heat until dissolved.

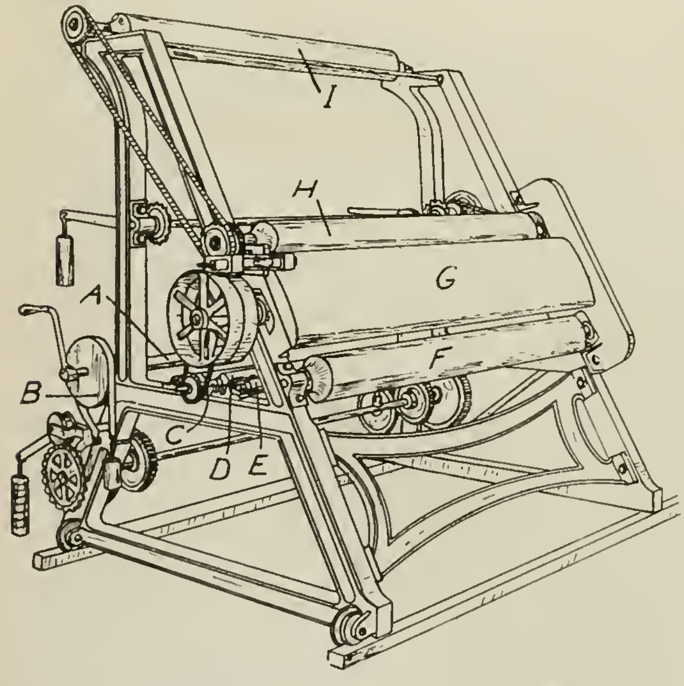
For a dull finish, add aniline to the above.

An English formula for water varnish is made as follows:

Boil a quantity of borax in water for 20 minutes. Decant the clear liquid from the undissolved borax and let cool. Add its own bulk of water; bring to a boil and digest therein for 20 minutes thin shavings of Ceara or Madagascar rubber.

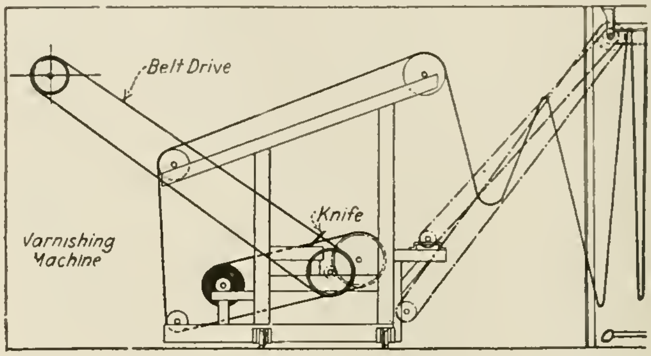
A very curious formula is found in *Elmer's Clothing Varnish.* This was designed particularly for an elastic varnish for fabrics that had already been coated with his "Elastic Selinide of Caoutchouc." It consists of a paste made of one part of alumina to two parts of ichthyocolla, the solvent being a mixture of one part oil of birch to thirty parts of naphtha. After application, the surface is partially dried and then subjected to a strong solution of tannic acid for 6 to 12 hours. It is then subjected to steam for 30 minutes.

Varnish was applied to carriage cloth by brushes when the business was young. Later several machines, all excellent, were



Birmingham Carriage Cloth Varnishing Machine

evolved. They are a trifle more complicated than other varnish applying mechanisms and are best shown in outline. The illustration shows the Birmingham machine for varnishing carriage cloth and delivering the cloth to the drying room. The rubber coated cloth is hung in bearings at the back of the machine on a square bar *A*, which is provided for a friction device *B* to regulate the tension. The cloth is then passed under an idler roller *C*, over the varnish roller *D*, under another idler *E*, and



Single Texture Fabric Varnishing and Festooning Machine

then to the front of the machine. The varnish roller revolves against the coated side of the goods, applying the varnish which it has picked up from the tank in which it runs. After being varnished the cloth passes under a roller *F* and over a zinc-covered table *G*. Here it is smoothed out and the wide surface gives an opportunity to inspect the varnished cloth and to retouch any knots or defects. A knife is provided immediately behind the varnish roller to scrape off the surplus varnish. From the inspection table the cloth passes over a roller *H* and over a roller *I* at the top of the frame, and then to the festooning apparatus which picks up the cloth and drapes it in festoons which are carried into the curing room.

These heaters are usually made 50 feet long and about 12 feet high. The machine is mounted on rollers so that when one heater is full it is run to the next heater. It is so geared that all parts are driven from one belt.

MOTOR CAR PRODUCTION FOR 1921 TO EXCEED ALL RECORDS

As forecasting what may be expected in the tire industry, the price reductions in the automobile industry have proved effective in stimulating the sale of cars. Alfred Reeves, general manager of The National Automobile Chamber of Commerce, reports that after two months of depression there has been an upward turn in the sale of both passenger cars and trucks. Present production is not averaging more than 50 per cent, except in the case of three or four factories, but the full year, he asserts, will exceed all records, approaching 1,900,000 cars and 340,000 trucks. Car renewals are at the rate of about 1,000,000 cars a year. It is logical and healthful, he believes, that an industry which increased 350 per cent in five years should undergo re-adjustment along with other industries. The 1920 Ford production alone is estimated at about 900,000 cars, and Mr. Ford has been quoted as saying that the 1921 output would be at least 1,250,000 cars. The major part of the tires fitted to Ford cars at Detroit before shipment come from Akron and are largely Firestone.

"PEERLESS" TIRE PAINT

The perfectly turned-out car does not of necessity depend upon the shop for its good looks, thanks to paints specially prepared for the car owner's use. Peerless Tire Paint is one of the latest additions to the Peerless line of automobile finishes. It is a durable protective coating and adds much to the appearance of spare tires as well as tires on the car. Peerless Tire Paint is made in three colors—black, white and gray.—The Columbus Varnish Co., Columbus, Ohio.

The Viscosity of Rubber

By A. M. Munro[1]

In order, on the one hand, to secure adequate control over the compounding and vulcanizing of manufactured rubbers, and on the other, to be in a better position to trace to their origin obscure differences in the physical and mechanical properties of finished goods, suitable methods are urgently needed for the evaluation of raw rubber, as it enters the factory.

At the present time the "variation" of raw rubber is one of the most perplexing problems faced by the manufacturer and the chemist. The problem is acknowledged to be, in the main, a physico-chemical one, complicated by the existence in a sample of raw rubber of an unknown number of colloidal aggregates of widely different physical properties and subject to variation in quality according to the amount of mechanical "breaking down" or other treatment which they may have received. Again many factories have not yet standardized their buying of crude rubber, with the result that the manufacturer is compelled to work in ignorance of the history of any particular consignment of rubber; age of the trees, seasonal variations, quality of the soil, method of coagulation, degree of milling and washing, length of storage before shipment, and a number of other factors being unknown or, at least, uncertain quantities.

However, in the face of these many and obvious difficulties it appears to the writer that the desired goal of rubber evaluation and standardization will eventually be reached along the lines of physical and physico-chemical measurement, and with this in view he has commenced a series of researches on the viscosity of rubber.

In this paper, which is of a preliminary nature, he ventures to put forward a few of the results which have been obtained up to the present date, together with a description of the experimental methods employed.

HISTORICAL

Axelrod, to whom the idea of studying the viscosity of rubber first occurred, worked with benzene solutions and observed the time taken by 100 cc. to run through a capillary from a containing vessel. The ratio of this figure to 4.5, he called the viscosity of the solution. He proposed at this time (1906) to apply the method to the evaluation of rubbers.

Schidrowitz, and later Frank, took up this question again, and the latter put before the International Testing Committee a new viscometer. Frank employed xylene as a solvent and his solutions contained 3 per cent of rubber. The apparatus was standardized with pure glycerine. Schidrowitz and Goldsborough in 1909 attempted to establish a relation between the "nerve" of a rubber and the viscosity of its solutions. Their experiments showed that a relationship does appear to exist but that it is not direct, "nerve" being determined by two different factors, one of a mechanical nature and the other chemical (polymerization). Schidrowitz used the Ostwald type of viscometer, employing 1 per cent benzene solutions and calculating the viscosity in terms of the solvent as unity. The rubber content of the solution was determined by evaporation of the solvent at the end of the experiment. For the sake of comparison he made mechanical tests and found that the indications of the viscometer were of a comparative value from the point of view of the determination of elasticity.

It will be noticed in the above work that little has been done to compare the suitability of the many rubber solvents for the measurement of viscosity, to investigate the influence of varying temperature, or to correlate the viscosity value with the other chemical and physical constants of the sample. Most important of all, none of the results has been expressed in absolute units.

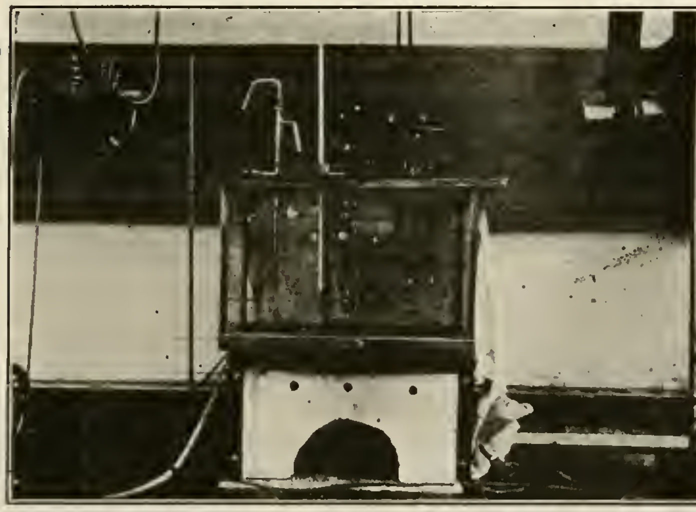


Fig. 1. Thermostat for Viscosity Work

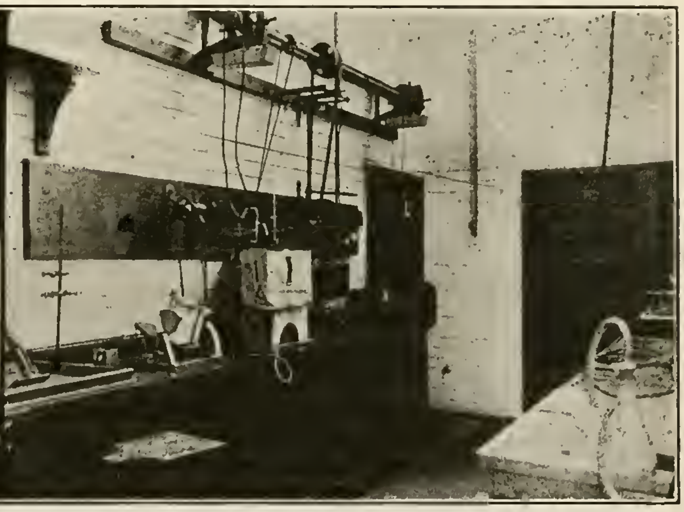


Fig. 2. Research Bench, Showing Thermostat and Power-Driven Shaking Machine

APPARATUS

In order to carry out an accurate series of measurements of viscosity, the writer has set up the apparatus shown in Figs. 1 and 2. The thermostat employed for securing constant temperatures consists of a glass tank, measuring 18 inches in length by 9 inches in width, by 13 inches in depth. The framework and bottom of this tank are of sheet copper. The water contained in this tank is stirred by a good sized propeller, driven from overhead shafting, which power supplied by a ¼-h.-p. electric motor; while heating is effected by a gas burner placed below the tank, which is itself supported on an iron stand.

The gas supply is regulated by a toluene-filled Ostwald thermoregulator placed in the water. Temperatures are read by means of a standard Centigrade thermometer, graduated in tenths of a degree. In order to minimize loss of heat by radiation and irregular cooling, the tank and stand are both covered with asbestos cloth, holes being provided for observation of the

[1] Chief chemist, Dunlop Rubber Co. of Australasia Ltd., Montague, Australia.

viscometer. The tank is also fitted with a movable wooden lid. while an electric lamp placed at the back insures sufficient illumination.

So far, viscometers of the Ostwald type have been employed, the bore of the capillary being chosen to suit the thickness of the particular solution in use. The viscometers are supported in the water in a vertical position in a wooden stand designed for the purpose.

It has been found that the temperature of this thermostat can be regulated to within one-tenth of a degree without any difficulty, and can be maintained constant for long periods.

UNITS OF MEASUREMENT

Instead of comparing the viscosity of the rubber solutions with some arbitrary liquid such as glycerine or with the pure solvent itself, as has been previously done by all investigators of the subject, the measurements have been calculated to an absolute value. In the Report of the Chemical Society, of London, on the Progress of Chemistry it is strongly advised that in future all viscosity measurements should be expressed in absolute values. In this way numbers can be obtained which will be entirely independent of the type of apparatus used and of the conditions of the experiment and which can be repeated by others.

For purposes of calculation the viscosity of a liquid may be defined as the force which will move a unit area of plane surface with unit speed relative to another parallel plane surface, from which it is separated by a layer of the liquid of unit thickness. This force, measured in dynes per square centimeter, is called a "poise" and a hundredth part of this unit is termed a "centipoise." The centipoise has been adopted as the unit for all the viscosity measurements described below.

In the Bulletin of the American Bureau of Standards for 1917, tables are published giving the viscosity of solutions of pure sucrose (cane sugar) and of mixtures of ethyl alcohol and water, expressed in centipoises, for different concentrations and temperatures. These values have been made use of in standardizing the viscometers employed.

EXPERIMENTAL

The first series of measurements described in this paper deals with the viscosity of different kinds of plantation rubber dissolved in chloroform. The solutions all have a concentration of 1 per cent and are made up by shaking the weighed amount of finely divided rubber with known volume of pure chloroform in a power-driven shaking machine.

In Table I are to be found the chemical constants which were first of all determined for the rubber samples.

Table I

Pale and Light Amber Crêpes from Different Estates. First Grade Rubbers from First Latex.

Serial No. for Reference	Caoutchouc by Difference, Including Proteids Per Cent	Resin Per Cent	Moisture Per Cent	Mineral Matter Per Cent
1	96.93	2,62	0.28	0.17
2	96.77	2.65	0.30	0.28
3	97.01	2.40	0.30	0.29
4	97.15	2.38	0.22	0.25
5	97.13	2.30	0.30	0.27

The viscosity values were as follows:

Serial No.	Viscosity at 25 Degrees C. in Centipoises
4	41.6
3	37.5
1	34.6
5	27.3
2	22.5

Examination of these values will show that, generally speaking, a high viscosity is associated with a low resin and high caoutchouc content, while a low viscosity corresponds to a high percentage of resin and a lower caoutchouc content.

In Table II are drawn up the results obtained on a number of high grade smoked plantation sheets from different estates.

Table II

Serial No. for Reference	Caoutchouc by Difference, Including Proteids Per Cent	Resin Per Cent	Moisture Per Cent	Mineral Matter Per Cent
8	96.81	2.61	0.34	0.24
9	95.81	3.38	0.47	0.34
10	96.27	3.05	0.40	0.28
11	96.29	2.92	0.58	0.21
12	96.75	2.52	0.48	0.25
13	96.15	2.89	0.50	0.40
14	95.95	3.23	0.42	0.40
15	95.87	3.25	0.60	0.28
16	96.41	2.56	0.64	0.36
17	96.87	2.47	0.48	0.18
18	96.84	2.60	0.40	0.16
19	96.67	2.50	0.34	0.23

Serial No	Viscosity at 25 Degrees C. in Centipoises
15	26.6
13	25.9
17	25.2
19	25.2
18	23.9
11	23.8
14	23.8
8	21.8
12	21.8
16	21.8
10	19.1
9	16.3

Examination of these values will show, that with one or two notable exceptions, including No. 15, there is again a tendency for low resin content to correspond with high viscosity and vice versa. Moreover, on the average the resin contents are higher than those of the pale crêpes and the viscosities correspondingly lower.

Samples Nos. 6 and 7 which are not included above were two lower grade compound crêpes and their viscosities were 17 and 19.8, respectively.

A certain number of determinations were carried out of the tensile strengths of a trial compound made from different samples of rubber. The breaking strain of rings cut from the compounds was measured on the Schopper machine and the result calculated from the dimensions of the rings to pounds per square inch. The results were as follows:

Viscosity values were as follows:

Serial No.	Tensile Strength in lbs. per sq. in.	Viscosity
13	1,923	25.9
11	1,689	23.8
12	1,662	21.8
17	1,615	25.2
16	1,502	21.8
18	1,479	23.9
15	1,343	26.6

These preliminary experiments support Schidrowitz's view that the relation between viscosity and tensile strength of the rubber is not direct. Further work on this point is required and the writer hopes to undertake it shortly.

The only conclusion which may be of some value which can be drawn from these early experiments seem to be that the viscosity of rubber solutions in chloroform is modified in the case of high grade plantation rubbers by their resin content in the way described above.

RUBBER FILLER

Ground tufa rock of specific gravity 2.25 is being advocated as a filling ingredient for general rubber compounding. Its composition is given as chiefly silica and alumina with small percentages of lime, magnesia, oxide of iron and compound of sodium and potassium. It shows loss of 6.5 per cent on ignition.

The Miller Rubber Co. has been highly complimented on the striking window display which it is offering to dealers in its products. It consists of reproductions in eight colors of original pantings by means of the Tullograph oil color reproduction process, in which no ink is used, but only oil and paint, so that the colors will stand up under sun and rain and can be cleaned with a damp cloth. This makes the display adaptable for out of doors if desired.

What the Rubber Chemists Are Doing

The "Slope" or "Type" of the Rubber Stress-Strain Curve[1]

By Dr. O. De Vries

In a recent paper[2] Schidrowitz, Goldsborough and Hatschek have discussed the nature of the stress-strain curves of vulcanized rubber-sulphur mixtures, and especially the mathematical solution of these curves as belonging to the conchoid family. The figure for "slope" or "type" plays a prominent rôle in these calculations.

Doubtless the slope of the stress-strain curve is an important figure, representing as it does the increase in load necessary to produce a certain elongation. The fact that the stress-strain curve at high elongations (at least for rubber-sulphur mixtures, with which this paper deals exclusively) ends in a straight line, so that the slope of this part of the curve is a constant, gives a special importance to this figure, which represents the resistance to stretching, or the distensibility, at high elongations. The higher the figure for slope of this part of the stress-strain curve, the more easily the vulcanized product already stretched to ten or more times its original length, yields to a further increase of load, and the weaker it is.

SLOPE OR TYPE

Schidrowitz and his coworkers have called this property "type." It shows markedly the differences between higher and lower grades of rubber, and is a better index of the properties of the lower grades than the tensile strength, the figure for which, in such cases, is often uncertain because of the presence of particles of dirt, etc. The different grades of plantation-rubber, in our testing work, gave the following figures for "slope" or "type," determined by the method of Schidrowitz:

	Average	Normal Figures	Limits
First quality crêpe	35.8	34—38	33 —39
Smoked sheet	36.7	35—39	33 —40
Crêpe from lump	37.3	35—38½	33½—40
Crêpe from tree scrap	38.8	37—41	35½—44½
Crêpe from bark rubber	42.9	40—43	38 —47½
Crêpe from earth rubber	37.6	36—39	34 —40
Crêpe from washings	39.1	37—41	35½—46

The highest figure was 53[3], found in a sample of very inferior crêpe from washings; the lowest figure, 32, is sometimes met with in crêpe from matured rubber.

Especially when figures of 40 or higher are found for slope, the sample may be expected to be inferior, and the higher figures generally indicate a rubber which on keeping is liable to become tacky. Whether in the first grades a difference in slope between 35 and 38 has any practical importance, remains to be seen. Though, theoretically, a rubber with a slope of only 34 to 35 is stronger and therefore preferable, it is not yet clear whether the difference is sufficiently great to affect the manufacture.

DETERMINATION OF "SLOPE"

The determination of "slope" is easy and necessitates no additional testing, as the stress-strain curve obtained in the determination of tensile strength may serve to read the slope also; and as slope represent a separate property, independent of tensile strength of rate of cure, it certainly deserves more attention than has hitherto been given to it. The more dependent properties one takes into consideration, the better a substance with properties so complicated as rubber can be judged.

It has been shown[4] that a close relationship exists between the slope and the permanent set, when both are determined for mixtures of 92½ rubber and 7½ sulphur, vulcanized to our standard state of cure (length of 990 per cent at a load of 1.30 kilograms; coefficient of vulcanization approximately 5). The closer nature of this relationship has not yet been worked out, but there appears to be no doubt that this relationship is founded on the intrinsic properties of the vulcanizate, and that there is one factor—be it structure, composition, or some other—which causes a certain rubber to stretch easily at high elongations, and that at the same time, after releasing, show large deformation.

CHARACTERISTICS OF "SLOPE"

It is not yet clear which intrinsic property of the rubber is responsible for the slope, and which factors in preparation have an influence on it. From our investigations the following facts are brought out:

(1) The slope becomes greater (the rubber less resistant to stretching) by prolonged and heavy tapping.

(2) The slope decreases by maturation[4] (decomposition on keeping the still wet coagulum, giving a quick-curing rubber); it also decreases by the use of sulphite and bisulphite in the latex, which prevent surface-oxidation and discoloration of the coagulum.

(3) The slope increases by coagulation with alcohol[5], by the action of lower organisms causing spots on crêpe, and by traces of copper salts, causing tackiness; also by strong heating of fresh, wet coagulum.

It would seem that the slope is smaller (the rubber better), the purer the rubber is, and greater, the more decomposition-products are present. The exact nature of these changes is, however, far from clear. Addition of foreign substances (such as gypsum or talc) to the rubber-sulphur mixture does not alter the slope, which also remains the same for mixtures with different contents of sulphur.[6]

"SLOPE" AND INCREASING TIMES OF CURE

One of the chief points which Schidrowitz and his coworkers bring forward is that the upper ends of the stress-strain curves for different states of cure run parallel, and that the slope, determined by their method, is a constant, not changing with increasing times of cure.

This is certainly not correct for curves obtained by our method of testing. We have on several occasions[7] reproduced sets of stress-strain curves which show clearly that the slope of the upper straight part is greater for less cured samples, and becomes smaller and smaller the further the sample is cured. This was regularly found to be the case in our testing of thousands of samples. Table I gives some figures representing this decrease in slope with increasing time of cure.

The same difference may be noted in the sets of curves published by B. J. Eaton and his coworkers for mixtures of 90 parts of rubber and 10 of sulphur; though no figures are given, and the slope of the curve, in whichever form, is not determined in their testing work, the reproductions often[8] show clearly enough that the end of the curve becomes less steep the more the cure

[1] Journal of the Society of Chemical Industry, September 30, 1920, 308T.

[2] Journal of the Society of Chemical Industry, 1919, 347 T; The India Rubber World, December 1, 1919, 149

[3] Journal of the Society of Chemical Industry, 1919, 92T.

[4] O de Vries and H. J. Hellendoorn. Journal of the Society of Chemical Industry, 1917, 1260.

[5] O. de Vries, Archief voor de Rubbercultuur, 1918, 2, 237, 97 and 557; 1920, 4, 217.

[6] O de Vries and H J. Hellendoorn, Journal of the Society of Chemical Industry, 1919, 38T; The India-Rubber Journal, 1919, 57, 1165; Archief voor de Rubbercultuur, 1918, 2, 783, 791.

[7] Journal of the Society of Chemical Industry, 1919, 91T; India Rubber Journal, 1916, 52, 717; 1919, 57, 1163; Archief voor de Rubbercultuur, 1917, 1, 217; 1918, 2, 771.

[8] Journal of the Society of Chemical Industry, 1916, 715, 1046; and Agricultural Bulletin, F. M. S., No. 27.

is advanced. Even the set of curves reproduced by Schidrowitz[3] would seem to show a similar difference.

While therefore the upper, straight ends of the curves do not run parallel for increasing times of cure, we have further to consider whether the slope, determined by Schidrowitz's method, that is, 0.4×(length at 1.04 kilograms—length at 0.60-kilogram) remains constant. Schidrowitz and coworkers find this to be the case in their method of testing. We do not find constancy in our testing; the slope, determined by Schidrowitz's method, increases with increasing times of cure. We have often controlled this fact for the curves obtained in testing large samples, and invariably found this increase in slope for increasing times of cure.

The figures in Table I may be cited as an example. The state of cure is indicated in the first column by the position of the stress-strain curve in our usual manner, i. e., by its length at 1.30 kilograms. The second column gives the difference in length for 0.20-kilogram increase in load, or the slope of the upper part of the stress-strain curve in per cent when drawn on the scale of the Schopper machine. The third column contains the slope determined by Schidrowitz's method.

Table I

Length at 1.30 kg.	Slope of Upper End	Slope (Schidrowitz)
1070	33.6	34.7
1050	32.2	35.1
1030	30.8	35.4
1010	30.1	35.7
990	29.9	36.0
970	29.7	36.35
950	29.5	36.7

The changes in both properties are clearly illustrated by this table. It is of importance for the study of the exact nature of stress-strain curves that the slope of the upper part of the curve becomes smaller (the curve flatter) on increasing the time of cure, while the slope determined by Schidrowitz's method shows a gradual increase. The two methods therefore do not give results which run parallel for increasing states of cure.

It is not yet apparent what differences in method of curing or testing cause this divergency in our case, while in Schidrowitz's testing they remain constant. The mixture is nearly the same (Schidrowitz's testing 8 sulphur on 100 rubber, in our own 7½ on 92½, or 8.1 on 100). The temperature of vulcanization, room-temperature during testing, and probably minor details in method of curing and testing differ.

While therefore the mathematical formulas for the stress-strain curves, evolved by Schidrowitz and his coworkers, are not strictly applicable to our testing results, there is a strong indication that these authors are nevertheless on the right track with their speculations on the deeper nature of the stress-strain curves. They conclude that for each sample there is a correct or optimum state of cure, represented by a conchoidal curve for which $a = b$, and giving an ideal balance of properties, the toughness (tenacity) equalling the limit of extension. This optimum state of cure is calculated to lie lower on the paper, the higher the figure for "slope" or "type." We have shown[4] that the maximum tensile strength is a property which follows this law; it is found lower on the paper, the higher the figure for slope. This proves, in our view, that Schidrowitz and his coworkers, in their mathematical speculations, have arrived at the truth, though their formulas probably present the case in too simple a form. In a former paper we have given some figures for the position of the maximum of tensile strength for samples with different slopes. As the maximum of tensile strength in our mixture is rather flat, it is difficult to determine the exact position of the curve, which gives a maximum tensile strength. Combining all our published and unpublished results, we estimate the length at 1.30 kilograms of the curves giving the maximum tensile strength at 992 and 957 for slopes of 36 and 40, respectively.

[3]Journal of the Society of Chemical Industry, 1919, 347T, Figure 1.

Table II

Slope after Schidrowitz........	34	36	38	40	42
Slope of upper part of curve........	27.5	29.9	32.2	34.6	37.0

Schidrowitz and his coworkers give for the correct cure the following extensions at a load of 1.04 kilograms per square millimeter: 884 and 850. This means a length of 984 and 950 times the original; using our figures from Table II, and assuming, as is approximately true, that the curve has already reached its straight part at a load of 1.04 kilograms, we calculate the lengths at 1.30 kilograms for Schidrowitz's correct cure as 1023 and 995 for slopes of 36 and 40, respectively. These figures are higher than ours, but the difference in length, distance between the curves, is very similar, 38 against 35 units.

Strict comparisons are impossible as the methods of curing and testing differed; it cannot be said whether Schidrowitz's correct cure and the maximum of tensile strength coincide or not. A relationship between the two is, however, very probable.

SUMMARY

The slope of the stress-strain curve, that is the increase in load necessary to obtain a certain increase in length, or, in other words, the resistance to stretching, is a property well worth attention in rubber testing. Determined after the formula of Schidrowitz and Goldsborough it gives besides tensile strength and rate of cure, an independent property, which is especially typical in judging lower grades, and which, by its direct relationship to permanent set seems to have a deeper meaning.

The mathematical solution of the stress-strain curves as conchoidal curves evolved by Schidrowitz, Goldsborough, and Hatschek, does not strictly hold good for our method of testing; the conclusions of the above authors as to a "correct" cure are, therefore, not generally applicable. Still, the parallelism between this supposed "correct cure" and the actual maximum of tensile strength tends to show that a relationship exists, though the mathematical formulation may be more complicated than that supposed by Schidrowitz and his coworkers.

PHENANTHRENE

One of the newest coal tar derivatives for which commercial applications are now being found is phenanthrene. This is an aromatic hydrocarbon closely related to anthracene. In physical appearance when pure, it is a white crystalline solid with a melting point of 100 degrees C. It is being marketed as a distilled product of approximately 80 per cent purity, which grade appears to be suitable for most commercial purposes. A more refined product could be furnished, however, to meet special requirements.

Phenanthrene is especially interesting to the rubber manufacturing industry as a wax substitute. It is used to replace carnauba, ceresin, stearic acid, paraffine and other waxes in wire insulation and other rubber work.

DETERMINING THE SPECIFIC GRAVITY OF PIGMENTS

For the determination of the specific gravity of a pigment a 50-cc. pycnometer with kerosene as wetting medium has been found most satisfactory. In order to remove all occluded air from the pigment, it is necessary to apply a vacuum of not more than three millimeters for from one-half to two hours before completely filling the pycnometer and weighing at 15.6 degrees C. The pigment must be thoroughly dry.

CHEMICAL PATENTS

THE UNITED STATES

Sulphurous and sulphuric acids and their anhydrous and gaseous forms, generated by the oxidation of the rubber in vulcanized rubber goods having a foundation fabric, are neutralized by subjecting the goods to a suitable heat and treating them in a hermetically sealed chamber with undiluted ammonia gas

under the greatest pressure possible without injury to the goods, whereby the gas is enabled to impregnate the rubber throughout, and then removing the heat and pressure, causing the gas to remain imprisoned in the elastic pores of the rubber.—William Edgar Muntz, London, England. United States patent No. 1,354,123.

Composition for treating fibrous material consisting of asphalt; a metallic oxide sulphur; a vulcanization accelerator; and a solvent liquid for certain of these substances:—William D. Pardoe, assignor to Thermoid Rubber Co., both of Trenton, New Jersey. United States patent No. 1,354,996.

Impermeable and Non-Hygroscopic Material consisting of vulcanized fiber coated with a film of celluloid of acetyl-cellulose firmly adhering to the surface.—Mario Arosio, Milan, Italy. United States patent No. 1,355,586.

Vulcanized Caoutchouc and Process by Which Vulcanization is effected consisting in incorporating with a caoutchouc mix an alkyl substituted thio-urea accelerator having an alkyl group in ortho position and then vulcanizing the mix.—Winfield Scott, assignor to The Goodyear Tire & Rubber Co., both of Akron, Ohio. United States patent No. 1,356,495.

Process for Treating Fibrous Material and the Products obtained thereby. The process consists of treating fibrous material which comprises applying thereto a lubricant dissolved in a volatile solvent, evaporating the solvent and treating the material so prepared with a vulcanizable plastic, the proportion of the lubricant being relatively small to obviate deleteriously affecting the bond between the fibre and plastic. The lubricant includes castor oil and beeswax.—Alfred E. Jury, Newark, New Jersey, assignor by mesne assignments to Morgan & Wright, Detroit, Michigan. United States patent No. 1,356,920.

THE UNITED KINGDOM

Vulcanizing India Rubber in Solution is effected by the addition of sulphur and small quantities of nitroso-benzene or a similarly constituted nitroso-hydrocarbon of the cyclic series. In an example, ten grams of rubber and one gram of sulphur are dissolved in 150 grams of carbon disulphide. Six-tenths of a gram of nitroso-benzene is added and the solution shaken. In about 30 minutes the solution sets to a jelly, which, on evaporation of the solvent, yields vulcanized rubber, insoluble in the solvents for raw rubber.—S. J. Peachey, 5 Yew Tree Road, Davenport, Stockport, England. British patent No. 146,734.

India Rubber. Rubber previous to vulcanization is mixed with a proteid substance, such as glue, which has undergone decomposition or hydrolysis. The proteid after hydrolysis with alkalies, alkaline earths, etc., may be treated with carbon dioxide. The resulting product is preferably mixed with water to form a paste or jelly and incorporated with rubber, which is then dried and vulcanized. The proteid substance may be added to the rubber in various proportions from 5 to 30 per cent.—The Goodyear Tire & Rubber Co., assignee of C. W. Bedford, both of Akron, Ohio. British patent No. 146,992.

India Rubber. Filling, coloring, or like materials in powdered form to be incorporated with rubber are mixed with a colloidal solution, for example, glue, which is then incorporated with the rubber, dried and vulcanized. To prevent the glue from hardening, pine oil, asphaltic oils, turpentine, glycerine, etc., may be added to the mixture.—The Goodyear Tire & Rubber Co., assignee of R. C. Hartong, both of Akron, Ohio. British patent No. 146,993.

JAPAN

Accelerators for Vulcanization of Rubber. A solution of sodium or potassium in primary or secondary aromatic amines is used. Ten parts by weight of sodium or potassium in 100 parts by weight of aniline oil, diphenylamine or toluidine is especially suitable.—D. F. Twiss and The Dunlop Co. Japanese patent No. 34,944.

OTHER CHEMICAL PATENTS

GERMANY

PATENTS ISSUED, WITH DATE OF ISSUE

No. 328,610 (February 20, 1917.) Method for making soft and elastic vulcanized products. Farbenfabriken formerly Friedrich Bayer & Co., Leverkusen near Koln-on-Rhein.

328,611 (February 3, 1917.) Method for the acceleration of vulcanization. Stanley John Peachey, Heaton Mersey, Manchester, England.

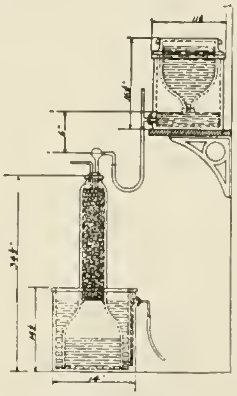
329,171 (January 3, 1917.) Method for the preparation of synthetic rubber materials which in consequence of lack of viscosity and elasticity can not be easily worked upon cylinders. Akkumulatorenfabrik Akt.-Ges., Berlin.

329,293 (February 6, 1916.) Method for the manufacture of a material, similar to leather or celluloid, resisting acids and not soluble in benzine. Stanley John Peachey, Heaton Mersey, Manchester, England.

LABORATORY APPARATUS

HYDROGEN SULPHIDE GENERATOR

The apparatus here illustrated is one of the most convenient for the purpose of supplying hydrogen sulphide for large laboratory or small manufacturing requirements.



Parsons Automatic Generator

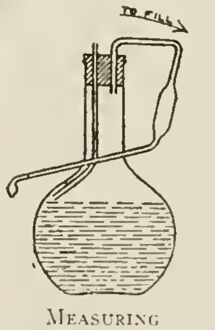
Hydrogen sulphide is essential for many chemical tests and manufacturing operations. The newest application is probably in the Peachey patented process of cold vulcanization.—Eimer and Amend, 211 Third avenue, New York City.

CONTAINER FOR ALKALINE SUBSTANCES

A container of fibrous material has been patented, the inner surfaces of which are coated with a solution of cellulose ester mixed with a non-solvent and with a material to render the coating when dried less brittle, rendering the surface of the container impervious to the action of moist alkalies.—The Research Laboratories Co., assignor of G. W. Howlett, both of Toledo, Ohio. United States patent No. 1,355,976.

AUTOMATIC MEASURING DEVICE

A very convenient automatic measuring device by A. W. Lorenz, for use in routine analyses to measure reagents with speed and reasonable accuracy, is here shown.



Measuring Flask

The bottle can be handled with one hand, and with greater convenience and speed than in pouring from a bottle in one hand into a measuring cylinder in the other. At the same time, measurements are quite as accurate, and perhaps more so, than rapid measurements from a graduated cylinder. The device will consistently deliver amounts varying by not more than one half a cubic centimeter.

In using, the bottle is tilted back in the direction of the arrow, to a horizontal position, when the pipette will fill rapidly, then bring the bottle to its normal position and the pipette will deliver its charge.

The device is constructed of an ordinary wash bottle and pipette of the desired size. The angles to which the tube of the pipette is bent should be substantially as shown, so that it will fill without trapping air, and deliver rapidly. The bulb of the pipette should be as close to the bend on the delivery end as possible, so that undelivered solution may run back in the bulb without trapping air bubbles. The small bulb at the end is to prevent the splashing of drops, forced up by air bubbles, while filling the pipette. The bottle should never be quite filled and the air tube leading into it should project above the surface of the liquid at all times.

THEORY OF ACCELERATION IN VULCANIZATION

The well known French rubber chemist, André Dubosc, recently published[1] his very illuminating theory on acceleration of vulcanization of rubber in the case of such organic accelerators as piperidine, para-nitroso-dimethyl aniline, hexamethylene tetramine and thio-carbanilide. Incidentally he regards Spence's discovery and introduction of organic vulcanization accelerators as marking as important an epoch in the development of the rubber industry as the discovery of vulcanization by Goodyear.

The author's theory, for which he does not claim perfection, clearly accounts for the hitherto unexplained singular and energetic action of the accelerators mentioned. The leading features of the author's paper are given in the following abstract:

REACTION OF AMINES WITH SULPHUR

If a known accelerator, hexamethylene tetramine for example, is mixed with sulphur, placed in a sealed tube, and heated for a few minutes at 135 to 145 degrees C., it is found that besides sulphide of carbon or hydrosulphuric acid, sulfocyanic acid is generated. All organic accelerators derived from amines inevitably give this same reaction.

PRODUCTION OF HEXAVALENT SULPHUR

At the vulcanization temperature, sulfocyanic acid separates, yielding hexavalent sulphur and cyanhydric acid. The latter body, kept at vulcanization temperature, combines in the presence of ordinary divalent sulphur, producing unstable sulfocyanic acid, which by dissociation again furnishes hexavalent sulphur. If the temperature is kept constant, the reaction continues while free divalent sulphur remains.

This is a catalysis where the cyanhydric acid acts as catalyzer. Its practical effect is to transform ordinary divalent sulphur into hexavalent sulphur, the action of which during vulcanization is entirely different. This variation of valence in an elementary body is common.

ACTION OF HEXAVALENT SULPHUR

Hexavalent sulphur, freed at the time of dissociation of sulfocyanic acid, is susceptible in vulcanization of saturating three free double bonds belonging to rubber with which it is in contact. These double bonds may belong either to two different molecules of rubber or to three. A single molecule of rubber reacting with ordinary, divalent sulphur will saturate only one double bond.

SPEED OF VULCANIZATION

If vulcanization is considered as the saturation, by sulphur, of a certain number of free double bonds in the rubber molecule and three such bonds, instead of one, are saturated in a given time, the speed of the reaction will evidently be tripled.

It is found, experimentally, with most of the accelerators containing an active amino group, that the time needed for vulcanization is reduced in the proportion of three to one. This is the case with piperidine and thio-carbanilide. If the accelerator contains several active amino groups the reduction of time for vulcanization may be considerably further reduced. This is the case with hexamethylene tetramine or furfuramide.

The hypothesis explains the modification of the speed of vulcanization by the liberation of hexavalent sulphur by dissociation, resulting from the products of decomposition of the initial accelerator and the sulphur of an intermediary body (sulphocyanic acid). This is a case of catalysis by stages: first, there is decomposition of the initial accelerator producing a catalyzer, cyanhydric acid; second, the sulphur of the mixing or the hydrosulphuric acid combines, generating sulfocyanic acid, which, third, dissociates furnishing hexavalent sulphur and regenerating the catalyzer, cyanhydric acid. Thio-sulfocarbanic acid, which, according to Kratz[2] and Bedford,[3] is present in all reactions due to accelerators, also leads to the formation of sulfocyanic acid and the liberation of hexavalent sulphur under the influence of heat, with saturation of three double bonds of the rubber in reaction, and regeneration of catalytic cyanhydric acid. In fact, this latter would seem to be the true accelerator and to correspond with Spence's "active principle."

If it be admitted, as Kratz has observed, that the cyclic nucleus of accelerators is broken during vulcanization, it easily explains the formation of sulfocyanic acid. This hypothesis also explains why, in rubbers vulcanized with the aid of accelerators, there is never found a trace of these bodies, either in the aqueous, or in the acetone extract. They are not true accelerators but under suitable conditions of temperature they are capable of generating, by decomposition, a catalyzer which will react on the sulphur. This catalyzer, cyanhydric acid, which remains in the mass after vulcanization, in the form of sulfocyanic acid, or rather, of sulphocyanates, insoluble in consequence of combinations with the charges, can be determined by Chelle's method for cyanhydric acid, which is used in toxicological analysis.

INCREASE IN TENSILE STRENGTH

Rubber vulcanized in the presence of accelerators shows marked increase of breaking strength over the same rubber vulcanized in the ordinary manner. This change seems to indicate that rubber vulcanized in the presence of accelerators is more highly polymerized than that treated without accelerators. These facts of practical experience have, up to the present time, remained unexplained. Our theory affords a means of explanation. In fact, if we admit the formation of hexavalent sulphur during vulcanization, it is easy to see the cause of the change of polymerization which occurs.

Reverting to Weber's theory of vulcanization[4], we know that the different molecules of rubber united to each other, form physical aggregates, a kind of open chain preserving at each end a double bond which will saturate an atom of divalent sulphur in ordinary soft vulcanization. In this case polymerization is limited to a single aggregate containing a smaller or larger number of molecules.

Considering the action of accelerators, let us admit that they generate hexavalent sulphur. As already explained, this body may react on free valences of two or three molecules of rubber. In explanation of this, our theory provides that on the same atom of hexavalent sulphur polymerization will take place as follows:

(1) In the case of an aggregate of rubber molecules, the end molecules of which have a double bond, these will be broken and give a molecule of rubber of which the four valences will be saturated. The aggregate will have its polymerization increased by one molecule and its resistance to break will be modified, in a slight degree only.

(2) In the case of vulcanization by hexavalent sulphur, saturation of the terminal free valences of three physical aggregates of rubber will take place. Polymerization will therefore be three times as great as that produced by ordinary vulcanizations, because it acts on three aggregates instead of one. Resistance to break, dependent on polymerization, will therefore be very notably increased and theoretically ought to be tripled, and this has been demonstrated experimentally.

THE CASE OF NITROSO ACCELERATORS

At first sight the theory seems to apply only to accelerators of the amino (NH_2) or imino (NH) groups and to leave out the nitroso compounds discovered by Peachey, but such is not the case. The nitroso bodies decompose during vulcanization and generate cyanic acid. The latter, under the influence of sulphur, yield sulphurous anhydride and sulfocyanic acid. The sulfocyanic

[1] Le Caoutchouc et la Gutta Percha, September 15, 1920.

[2] "The Effect of Certain Accelerators Upon the Properties of Vulcanized Rubber," The India Rubber World, June 1, 1919, page 485; November 1, 1920, page 95.

[3] "Reactions of Accelerators During Vulcanization," The India Rubber World, January 1, 1920, page 206.

[4] "The Chemistry of India Rubber," 1906 edition.

acid dissociates and leaves hexavalent sulphur, and the liberated cyanhydric acid again functions as a catalyzer, as indicated above. Thus, nitroso compounds would seem to react in the same way as the aminic accelerators.

The theory therefore is general and the true accelerator is cyanhydric acid. In the presence of divalent sulphur, it changes into unstable sulfocyanic acid at vulcanization temperature. Under these conditions, the valence of the sulphur having been modified to the hexavalent condition, is in the course of vulcanization, while the regenerated cyanhydric acid would then continue the cycle of the reaction.

THE DETERMINATION OF TRUE FREE SULPHUR AND THE TRUE COEFFICIENT OF VULCANIZATION IN VULCANIZED RUBBER[1]

By W. J. Kelly[2]

It is the object of this paper to present two methods, one for the true free sulphur determination and the other for a more accurate figure for the coefficient of vulcanization than could be obtained by the older methods.

The sulphur present in vulcanized rubber may be divided into four parts:

Sulphur soluble in acetone: (1) combined with resins and proteins; (2) true free sulphur.

Sulphur insoluble in acetone: (1) combined with rubber; (2) combined with resins and proteins.

METHODS FOR DETERMINING TRUE FREE SULPHUR

Considering first the sulphur which is soluble in acetone, it is evident that a solvent which would dissolve either the sulphur or the organic material (part of which may contain sulphur of combination) without affecting the other, would solve the problem. Unfortunately, all solvents for either will dissolve both to a greater or less extent. The entire extract very readily dissolves in 95 per cent alcohol. The alcohol will also dissolve about 0.04 grams of sulphur in 100 cc., the amount of sulphur usually obtained in an ordinary analysis. If, however, the extract is treated with alcohol already saturated with sulphur, it will dissolve all of the organic material present but none of the elementary sulphur. The sulphur remains in the flask after the solution is decanted, and can be weighed as such or oxidized and weighed as barium sulphate.

Preparation of Saturated Alcohol.—The saturated solution of sulphur in ethyl alcohol, to be referred to as "saturated alcohol," is made by heating an excess of sulphur with the alcohol for about three hours at 70 degrees to 75 degrees C. and allowing to cool slowly to room temperature. Before used it is allowed to stand at least 24 hours in order to insure complete crystallization of the dissolved sulphur. As all later crystallizations are carried out at room temperature a variation of a few degrees in the temperature at which equilibrium is reached does not materially affect the results. As a precaution, however, the solution is kept in contact with solid sulphur to insure saturation at all times.

Details of Method.—A one-gram sample of the ground rubber is extracted with acetone for 16 hours, in an Underwriters' apparatus. The acetone is distilled off, the residue dried at 60 degrees to 65 degrees for half an hour and treated with 50 cc. of saturated 95 per cent alcohol, and the flask and contents weighed. An accuracy of 0.5-gram is sufficient for this weighing. It is then warmed to about 50 degrees C. for a few minutes to insure complete solution of all the organic material and allowed to cool slowly to room temperature. Before it has reached this temperature the flask is again weighed and any alcohol lost during the heating is replaced with pure 95 per cent alcohol. The flask is then well covered and allowed to stand for 24 hours to permit the complete crystallization of any of the elementary sulphur of the extract which may have dissolved. The liquid is then carefully decanted, and the residue washed two or three times by decantation with 5 cc. of saturated alcohol and dried. It may then be weighed directly, or oxidized and weighed as barium sulphate.

It is unnecessary to wash the residue with pure alcohol inasmuch as the amount of sulphur left by the evaporation of the saturated alcohol is very slight. One cc. of 95 per cent alcohol will dissolve only 0.0004-gram of sulphur and it is easily possible to decant the liquid so that not over 0.52-cc. will remain in the flask.

COEFFICIENT OF VULCANIZATION

The combined sulphur in rubber stocks has been considered to be the sulphur which was not extractable with acetone. In case inorganic sulphides were present a correction was made. As stated above, however, it is possible that some of this sulphur may be combined with resins and proteins in acetone-insoluble compounds. Hence, a method whereby the residual sulphur could be determined after these compounds had been separated from the rubber would give a much better value for the coefficient of vulcanization.

It has been shown[3] that about 85 per cent of the resin of *Hevea* rubber is saponifiable. Such being the case, it is probable that part at least of any resin sulphur compounds which are insoluble in acetone would also be saponifiable and rendered soluble in alcoholic potash. The protein matter will also be hydrolyzed and some of these products will dissolve in the alcoholic solution. In any case any sulphur extracted by this method will not be sulphur which has been combined with the rubber. The many failures to remove the combined sulphur by any means substantiate this view.

The experiments of Spence[4] show that all of the free sulphur is extracted by acetone in about 8 hours, and hence it is probable that a 16-hour extraction will remove every trace of it.

A few experiments showed that from the stock used to determine the true free sulphur, alcoholic potash would remove an additional 0.30 to 0.35 per cent of sulphur. In order to show that this was not due to the removal of sulphur combined with the rubber or to the disintegration of the sample, successive extractions were run on the same piece. Two 4-hour extractions removed all the sulphur, absolutely no precipitate of barium sulphate being obtained when the third and fourth extracts were oxidized and treated with barium chloride.

Details of Method.—A one-gram sample of ground rubber is extracted 16 hours with acetone and the residue dried. It is then boiled for 8 hours with 75 cc. of a 5 per cent alcoholic potash solution and washed once or twice with hot alcohol. As the removal of the last traces of alkali is very difficult the sample is extracted 16 hours (over night) with alcohol in an Underwriters' apparatus. The solutions are then mixed and the alcohol distilled off. The residue is oxidized first with 15 cc. of a solution of bromine in potassium bromide (120 grams potassium bromide and 160 grams bromine in one liter of water) in order to prevent the violent action of fuming nitric acid on alkali, and finished with nitric acid. The barium sulphate is precipitated in the usual manner.

As there is always considerable silica formed from the glass it is necessary to evaporate twice with hydrochloric acid, thoroughly dehydrate, and remove the silica before precipitating the sulphate.

APPLICATION OF METHODS

These methods were applied to a series of cures on a stock made up of 100 parts of pale crêpe and five parts of sulphur.

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[1]Abstracted from the paper read before the Rubber Division of the American Chemical Society at St. Louis, Missouri, April 12-16, 1920.
[2]Research Laboratories, The Goodyear Tire & Rubber Co., Akron, Ohio.
[3]Hinrichsen and Memmler, "Der Kautschuck und seine Prüfung."
[4]Kolloid-Zeitschrift, 9, 300.

The results are given in the table below as parts of sulphur per 100 of rubber

Cure Hours	True Free S	Sulphur in Alc.-KOH Extract	Coefficient of Vulcanization	Sulphur in Resin and S. Compounds (Sol. in Acetone) (by Difference)
0.5	4.39	0.00	0.61	0.00
1.0	3.93	0.00	1.03	0.04
1.5	3.74	0.03	1.21	0.02
2.0	3.18	0.03	1.63	0.16
2.5	2.54	0.07	1.93	0.46
3.0	2.12	0.13	2.30	0.45
3.5	1.76	0.26	2.51	0.47
4.0	1.27	0.33	2.88	0.52
4.5	0.85	0.49	3.14	0.52
5.0	0.54	0.34	3.54	0.58

From these results it is evident that the theories of vulcanization proposed in the past, none of which took into account the formation of these compounds, are based on false figures and cannot be considered sufficiently accurate.

SUMMARY

Of these two new methods for rubber analysis the first gives the correct value for free or elementary sulphur in rubber goods, and the second a lower and more accurate value for the coefficient of vulcanization than can be obtained by any of the older methods. This work was all done on pure gum stock without any accelerator, and the methods developed are now being expanded to meet the conditions which obtain in compounded stocks.

TIRE PRICES REDUCED

As their contribution toward the price adjustments being made in most industries throughout the country, in order to stabilize business and restore normal living conditions, several leading American tire companies have announced sweeping reductions which put prices back where they were before the general price advance in March went into effect. Other companies are expected to take a similar course.

These price reductions were not unexpected, as it had been no secret for some time that the process of liquidating inventories had proved slow and that cancellations of orders and a decline of new business had found some manufacturers with rather heavy stocks on hand. Evidence of this condition has been seen in the gradual increase in unemployment in Akron and other rubber centers attendant upon the curtailment of operations by tire companies.

Last spring price advances of 15 to 20 per cent were made and dealers stocked up heavily in advance. Sales fell off greatly during the summer, however, due partly to the wave of economy and retrenchment which has swept the country and the resulting general depression in the motor trades; partly to the declining raw material market, and partly to the fact that cord tires are giving a surprisingly long mileage.

Instead of attempting to maintain a high level of prices until the high cost tires on hand are moved, leading tire manufacturers are meeting the general decline in the raw material market with a reduction in prices to stimulate trade, thus giving consumers the benefit of the reduction during the autumn riding season when many replacements are usually required and preparations are made for winter driving.

Since last spring the two principal commodities entering into tire manufacture have dropped off sharply in price, and these are important factors in the price reductions announced. Crude rubber, which a few months ago was selling at 50 cents per pound, is now quoted at less than 18 cents, the lowest price in history. Cotton has dropped from 40 cents to 20 cents a pound, and fabrics which were selling at $2.80 per pound early in the year are now quoted at $1.85. Labor costs alone are still at their highest figure.

Following the lead of the Ford Motor Co. in reducing car prices to meet the consumer demand, the Lee Tire & Rubber Co. with commendable foresight led the way in tire price reductions. Effective October 1, reductions of 15 to 20 per cent were made on its entire line of fabric, cord, puncture-proof fabric and puncture-proof cord tires. Although raw material costs on that date did not fully justify these reductions, officials of the company were convinced that future costs of materials would be certain to justify them. The new prices represent a considerable sacrifice of profits, but it was felt that the company in shouldering this loss was taking a big and necessary step toward the restoration of general conditions to a pre-war basis.

The United States Rubber Co., with no forward purchases of crude rubber and favorably situated with respect to fabric supplies, was quick to meet the trend of the times toward lower levels, and effective November 1 announced a reduction of 15 per cent on inner tubes; 12½ per cent on Ford size fabric tires; 10 per cent on all other fabric tires and solid truck tires. Also, a slightly smaller reduction on Royal Cords.

The Mason Tire & Rubber Co., has published price reductions up to 12½ per cent effective November 1 on all its production, including fabric, junior cord and regular cord tires and tubes for passenger automobiles, and pneumatic, solid and cushion truck tires. Ownership and operation of its own tire fabric spinning and weaving mills, which produce its entire supply of cord fabrics, is a big factor in this company's ability to reduce prices at this time.

Price reductions by The B. F. Goodrich Co., effective November 1, range from 9 to 15 per cent and average 12 to 13 per cent.

The new list of the Ajax Rubber Co. shows reductions running from 10 to 15 per cent on all grades and types.

The Fisk Rubber Co. reductions, effective November 1, were 10 to 15 per cent on all cord and fabric tires except Ford sizes, which were slightly advanced.

Effective November 15, The Goodyear Tire & Rubber Co. reduced its prices 7½ per cent on All-Weather tread cord casings and 14 per cent on fabric casings. The prices of inner tubes remain unchanged.

The Miller Rubber Co. reductions, effective November 15, are 5 per cent on heavy duty tires; 7 per cent on cords; 12½ per cent on Ford sizes, and 10 per cent on all others.

The Pennsylvania Rubber Co. reductions, effective November 15, are 10 per cent on fabrics, 7 per cent on cords.

The Firestone Tire & Rubber Co. has announced reduced prices on its line of fabric tires only, the manufacture of which has been discontinued by the company.

It is believed that these price reductions will induce many motorists who had thought to put their cars into winter storage, because new tires were needed, to reequip and keep them in commission for the winter. Winter motoring affords many pleasures and advantages, and with the numerous devices on the market for comfort and safety has become increasingly popular in recent years. Indications are that the winter will be a mild one, and extensive preparations are everywhere being made to keep the main roads open to traffic throughout the season.

Tire company officials are optimistic and believe the bottom of the slump has been reached. They report a steady movement of surplus tire stocks from the warerooms of dealers throughout the country, but do not anticipate a return to normal production for some months yet. Several plants were closed a week for inventory taking and most of them are operating with a curtailed force or on a part-time basis.

Tire price reductions are beginning to be reflected in other lines of rubber goods, The Goodyear Tire & Rubber Co. and the Manhattan Rubber Manufacturing Co. having cut prices on certain lines of mechanical rubber goods 10 per cent. It is believed that reduced prices may be named on all lines of mechanical rubber products owing to the liquidating pressure in certain quarters of the industry.

New Machines and Appliances

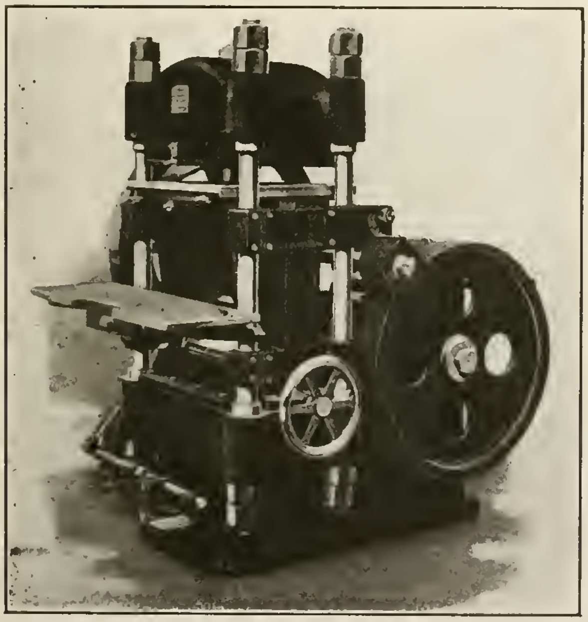
SAFETY DEVICE FOR TOGGLE PRESSES

Toggle presses used for making small rubber molded articles are continuous running machines, and operate at a certain number of cycles per hour. A definite time is allowed during each cycle for changing the molds before the platen of the press starts upward. Occasionally an operator does not remove his hand from the platen soon enough, resulting in a severe injury when the platen moves toward the upper head of the press.

That these conditions can be overcome has been successfully demonstrated by a prominent rubber company who installed the safety device shown in the diagram on all their toggle presses. Production is now limited only by the speed of the operator.

To eliminate the personal hazard, a magnetic clutch is installed on the driving shaft. One member of the clutch drives the press through a pinion and is bushed on the main driving shaft to which is keyed the other clutch member. Upon disengaging the clutch while the press is operating, the platen comes to rest almost instantly, making it unnecessary to stop the motor and flywheel.

Connected in each circuit to the clutch are two push button switches and a limit switch of the rotating cam type, the latter



Seybold Toggle Press

being directly connected to the driven member of the press and makes a complete cycle for each cycle of the press. The push buttons are mounted on the front of the press, convenient to the operator.

To start the press, the operator puts his hands on the push buttons for a moment or so. This keeps his hands out of danger and at the same time starts the clutch, the circuit for which is maintained by the limit clutch.

The platen completes the upward stroke. As soon as it starts downward the operator removes the mold and inserts another. If his work is completed before the platen starts on the upward stroke he depresses both push buttons for an instant, until the switch has time to maintain again the circuit for the clutch. However, should he fail to complete his work before the platen starts the upward stroke, the limit switch automatically releases the clutch and consequently stops the press. In case he fails to keep up with the press, it automatically stops. There is no possibility of the operator becoming caught in the press. Upon fail-

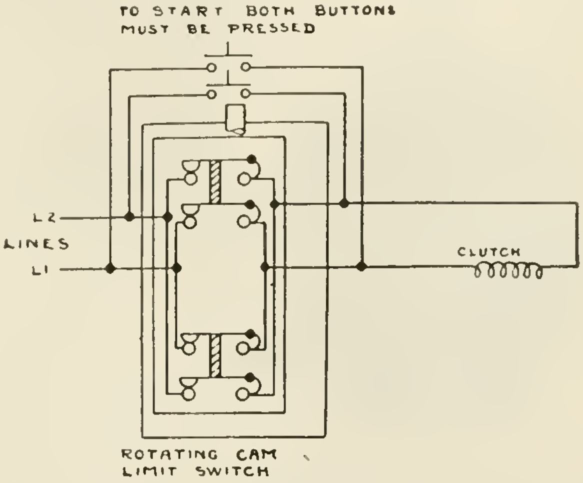


Diagram of Connections Between Push Buttons, Limit Switch and Clutch

ure of power, it also automatically stops and it can be started only by pressing both push buttons.—Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin.

MACHINE FOR SIFTING COMPOUNDING MATERIALS

Sifting machines have demonstrated their utility in removing trash, specks, or foreign matter from materials used in compounding, thereby insuring uniformity in the sifted product. The Rotex sifter here shown is unique in that it operates with a level rotary sieve motion and includes a patented ball cloth cleaning device, making it particularly efficient in sifting fine, soft or sticky materials.

The sieve box is made light in weight to avoid excessive vibration and strongly braced to withstand the driving strains. The sieve motion is level and rotary at the head end, elliptical in the center and reciprocating at the extreme tail end. The sieves and also the dust cover frame which holds them in place are readily removed, making the sifter box accessible for cleaning or changing sieves of different mesh. Each sieve consists of a frame having a sieve cloth on its upper side, a ball supporting

Rotex Sifter

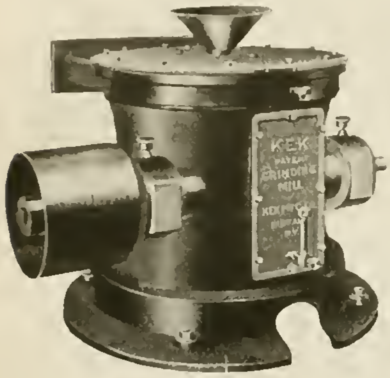
screen on its lower side and a set of ball cloth cleaners. The balls are confined in pockets below the sifting cloth and being deflected upward by beveled divisions they strike the sieve cloths very lightly but frequently, thereby cleaning the cloths without wearing them.

These machines are made in several sizes and capable of making the necessary number of separations in handling a wide range

of materials. Not over ½-h.p. is required to operate the largest machine while the smallest designed for laboratory work requires only ¼-h.p.—The J. H. Day Co., Cincinnati, Ohio.

GRINDING MILL FOR RUBBER MANUFACTURERS

This grinder should be of interest to any one who has to grind hard rubber dust, asbestos, scrap leather, and fabric used in making composition soles. Its usefulness is, of course, not confined to these items alone, as it can be used for grinding a wide range of compounding ingredients. The chief feature of construction is the horizontally placed grinding surface, which causes the material to work gradually and evenly outward from the center into the annular chamber which encircles the grinding plates. This chamber terminates in a rectangular mouth-piece near the top of the machine, whence the material is carried into the receiving bin.



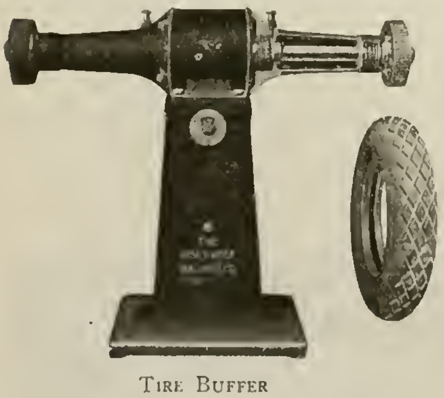
"KEK" UNIVERSAL GRINDING MILL

The mill is cylindrically shaped with the hopper or feed inlet in the center of the top plate. The grinding medium consists of two taper-disked steel plates fitted with steel pins. The top plate is a fixture bolted down to the body of the machine, but the lower plate rotates by means of a worm spindle driven by a worm wheel connected with the shaft. A combination gear, enveloped and locked up in an oil bath, gives the necessary high speed for fine grinding.—Chemical Engineering Co., Limited, Manchester, England. United States agents, J. P. Devine Co., Buffalo, New York.

TIRE ROUGHING AND BUFFING MACHINE

This machine has demonstrated its usefulness not only in tire factories, but also in the retreading and the repairing of tires. It is simple in design, ruggedly constructed for hard service, and to meet the requirements of the largest pneumatic tires.

The spindles are of one-piece construction and are made from high-grade steel. All the wheels are fitted directly on the spindles, which withstand all working loads and pressures without being thrown out of alinement. The bearings are completely enclosed from dust and grit, and they are provided with heavy felt protector washers on each side of the bearing housing. Every machine is fitted with a quick-acting switch. The operating handle is conveniently located in front of the motor, with the switch enclosed in the base. This insures the best possible protection and permits ready access to the switch mechanism by simply removing the cover plate. The motor parts need not be disturbed. The motor is arranged either for direct or alternating current. The machine in the illustation is supplied with a rasp for coarse work, and a buffing wheel. Heavy felt, leather or grinding wheels may also be easily fitted on the spindles. Two men can work at the machine at the same time, and as it is equipped with an automatic starter, an inexperienced workman can operate it without any trouble.—Hisey-Wolf Machine Co., Cincinnati, Ohio.

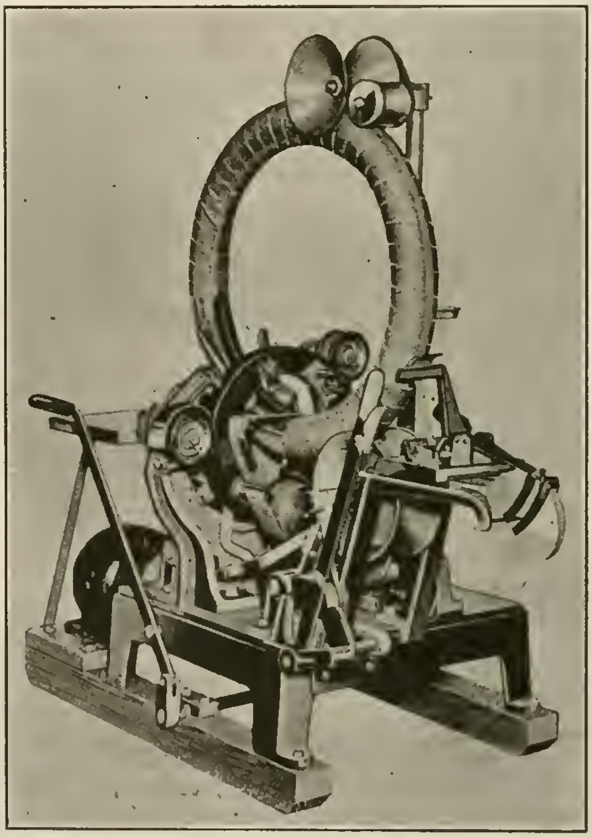

TIRE BUFFER

THE NEW PIERCE TIRE WRAPPING MACHINE

The new Pierce machine for wrapping finished tires with Kraft or string-inserted paper in 2¾-inch widths, instead of the customary 1½ inch, results in a saving of about 15 per cent on material.

A notable improvement in this machine is the bead-closing device which permits wrapping the tire when the beads are drawn closely together, thus saving material and effecting a tight, permanent wrapping. Another new feature is the location of the control lever which is so placed that one operation disconnects the power, applies the brake and opens and holds the bead-closing device until the wrapped tire has been removed and another substituted.

The edge folder has also been improved and an open back type provided which is much more readily threaded than the old one. The adjusting lever at the right of the operator permits instant adjustment for any sized tire between a 2½ by 28 to a 6 by 36.


PAPER WRAPPING MACHINE

The taping attachment applies a strip of gummed tape to the wrapping as it is being done, holding the layers together and preventing unwinding if one should break. The shuttle revolves between leather-faced pulleys which firmly support it and permit of a high speed.

This machine will wrap a tire of average size in eight seconds, and in every day use handles about 1,800 tires per day. It is driven by a motor directly connected, operating through a rawhide pinion, and with very little noise or vibration.—Pierce Wrapping Machine Co., 617 Jackson Boulevard, Chicago, Illinois.

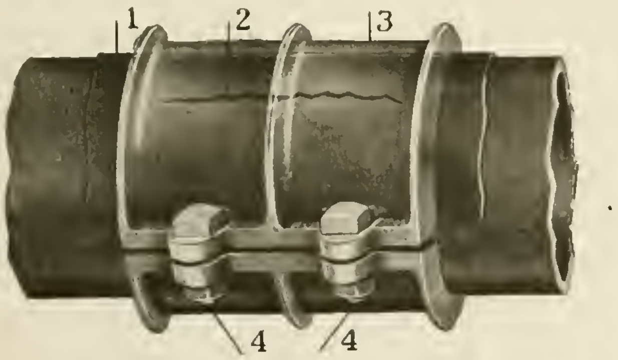
YARWAY HOLTITE PIPE CLAMP

Leaky joints and splits are common faults to all pipe lines. The loss incurred through them often runs up into big figures,

particularly when it is necessary to shut down an entire section of pipe lines for repairs.

The pipe clamp shown in the accompanying illustration is used to stop all holes and splits, in pipes. It is used either temporarily until the pipe can conveniently be replaced, or permanently.

The clamp is simple to attach. First the packing 1 is laid over the split or hole 2. Then the clamp 3 is fitted over the packing and

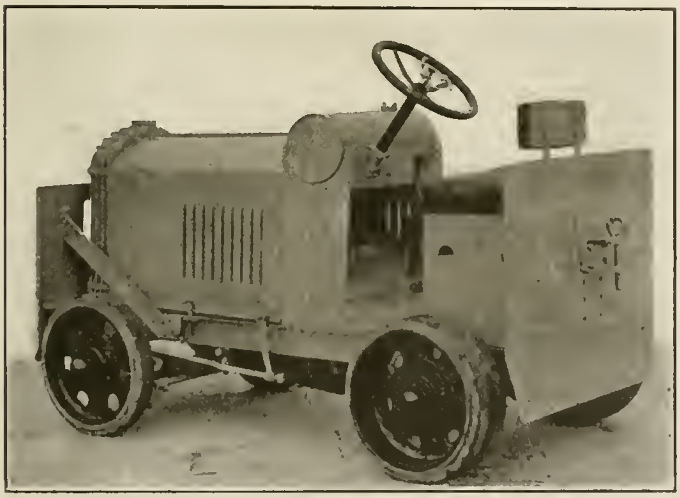


A NOVEL PIPE CLAMP

tightened by bolts 4. The clamp should never be used on pipes while under high pressure.—Yarnall-Waring Co., Philadelphia, Pennsylvania.

GASOLINE OPERATED TRACTOR FOR RUBBER FACTORIES

A new development in industrial haulage equipment is a tractor operated by a gasoline engine, instead of electric motor



GASOLINE INDUSTRIAL TRACTOR

and storage batteries. It is a specially designed all steel machine, built to withstand hard use and abuse. It is claimed to have sufficient capacity to move freight cars and still operate economically on small loads, thus offering a wide diversity of usefulness.

The motor is four-cylinder, four-cycle, rating 22.5 h. p., capable of delivering 40 h. p. at 2,000 r. p. m. The tractor is supplied with a battery type ignition with spark lever control at the steering column, six-volt starting motor, 1½-inch carbureter with dash choke control for easy starting, and a nine-gallon gasoline tank amidships at the cowl. The gasoline is fed by gravity to the carbureter. The tires are solid rubber.

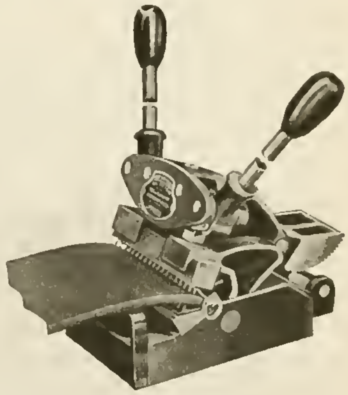
Under average conditions the trailing load is from 10 to 15 tons, although in exceptional cases the motor can be utilized for spotting loaded freight cars.—The Towmotor Co., Cleveland, Ohio.

MACHINE FOR LACING BELTS

This is a small portable machine weighing 24 pounds which can be carried to the broken or stretched belt, enabling the operator to relace the belt without removing it from the shaft. It is made of steel and all parts are practically unbreakable.

A square belt end is inserted into the slotted opening and, by working the

A "CLIPPER" JOINT



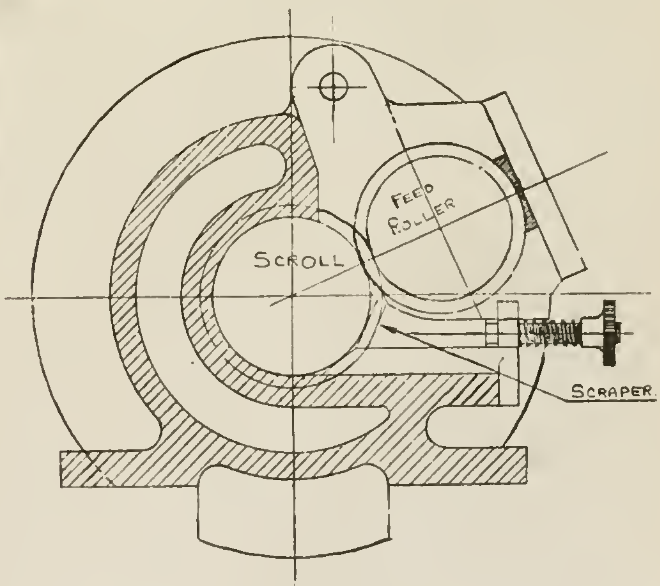
"CLIPPER" BELT LACER

levers, the hooks are pressed into it and left flush with the surface of the belt. These hooks come on cards and are easily placed in position by throwing back the center and side heads which hold the clinch bar. The hooks are pressed into both ends of the belt. Then they are interlocked and joined together with rawhide or a pin. In taking up a stretch, the necessary length is cut off, the hooks pressed in, and the two ends joined together. The loss of time for the entire operation is not supposed to be more than 3 minutes.

The machine is claimed to handle wider belts than 6 inches, by simply repeating the operation. On narrow belts, the card of hooks is cut to the required length.—Clipper Belt Lacer Co., Grand Rapids, Michigan.

SINGLE ROLLER FEED FORCING MACHINE

Roller feeding of rubber stock to tubing or forcing machines has not been developed in American rubber manufacturing practice, although it has met with favor abroad, especially in British factories. The usual form has embodied the use of two rollers placed over the stock feed opening of the tuber. This has always been a source of considerable trouble, which has now been entirely eliminated in the newest design, a cross-section of which is shown in the illustration.



SECTION OF SINGLE ROLLER FEED FOR SIMPLEX FORCING MACHINE

The material being fed is placed between the single feed roller and the "scroll," by which is meant the stock screw of the tuber.

The rubber is thus forced into the recesses of the scroll with a constant and positive feed and is prevented from encircling the feed roller by the action of a scraper located adjustably as a part of the device.

The feed roller revolves in contact with the scroll and is driven from the scroll shaft through machine cut spur gearing. Tubers with this type of roller feed are the special design and product of Francis Shaw & Co., Limited, Manchester, England.

DOGWOOD DIE BLOCKS FOR RUBBER FACTORIES

Wooden blocks are largely used in the manufacturing of rubber goods where the material is cut by means of knives or dies, such as in footwear, rubber sole and heel, and rubber mat factories. These blocks are usually of maple, although lately fiber blocks have been substituted with good results. Better than either, so the maker claims, is a block made of dogwood (*Cornus Florida*), selected from the finest growths of Texas or Virginia. A dogwood block is much harder than one of maple, closer-grained and has less tendency to warp. It has no grit to dull the die, and does not break up into sawdust as does maple. Its lasting qualities are more marked, as only ⅛-inch is planed from a dogwood block as against ¼ inch from a maple block. Its use enables a workman who cuts by hand to do with a three-pound mallet the same work that formerly required a ten-pound mallet. After competition tests with fiber cutting blocks in one of the mills of a large rubber company, the dogwood block was given preference, the price of the two blocks being about the same.—Shambow Shuttle Company, Woonsocket, Rhode Island.

MACHINERY PATENTS

PNEUMATIC TIRE REMOVING APPARATUS

This is a machine designed to remove heavy pneumatic truck tires without injury to the rim, and to replace the slow manual methods heretofore used. Referring to Fig. 1, the upper drawing is a sectional elevation with a tire in position on the machine, while the lower is a plan view.

The tire *B* is placed on top of the annular expansion chamber *A*. The arms of the spider *C* are rested on the upper edge of the rigid metal tire rim. Then the spider is secured in position by screwing down the nut on the bolt which extends from the table top upward through the spider hub.

Compressed air is admitted into the inner tube of the expansion chamber *A* through a nipple attached to a branch of the tube, which extends down below the table. The gradual inflation of the tube causes the expansion chamber *A* to expand, and in turn raise the tire upward until it slides up over the outer face of the rim. A relatively low air pressure in the tube inside the expansion chamber is sufficient to exert a large force on the tire.—Noah L. Caldwell, Knoxville, Tennessee. United States patent No. 1,352,722.

VULCANIZING RUBBER TIRES BY ELECTRICITY

The object of this invention is to use electricity instead of steam as the medium of vulcanizing rubber tires, in a simple, economical and efficient manner.

The apparatus shown in plan and elevation in Fig. 2 consists of a tire mold, preferably of metal and formed in halves, which are fastened together by bolts. The rubber tire on its core is placed in the mold. The casing thus made up forms a continuous metal ring shown at *A*. This ring becomes a single turn secondary coil of a transformer, the primary coil of which is *B* and the transformer core *C*. This is made up in the usual manner of laminated sheet iron, and it is comprised of two parts, which are readily separated, as indicated by the dotted lines, allowing the tire mold to be easily removed. The primary coil *B* of the transformer may be divided into any desired number of sections with leads, *D* to allow a wide range of heat control.

The tire mold is made up and inserted into the core of the transformer, which is then closed to its normal position. Current is supplied to the primary coil of the transformer, and a current of low voltage, but relatively high in amperes is induced into the tire mold. Due to the resistance offered to the flow of current, by the metal, the mold quickly becomes heated and the tire is vulcanized. The intensity of the heat is easily controlled by the number and the mode of connections of the sections of the primary coil.—Joseph Ledwinka, assignor to Edward G. Budd Manufacturing Co., both of Philadelphia, Pennsylvania. United States patent No. 1,348,228.

MACHINE FOR CUTTING RINGS AND WASHERS FROM TUBING

This improved device for cutting rubber packing rings or washers from tubing, works satisfactorily upon thick material necessary to produce wide rings.

Referring to Fig. 3, which shows a plan of the machine, the tubing is placed on a mandrel *A*, which is held between centers and driven by the belt pulley *B*.

The cutter head *C* has a number of spaced knives, and it is mounted on a shaft with a spur gear at one end, which meshes with a smaller gear at the end of the shaft supporting the mandrel. Each blade on the cutter head is spaced from the preceding blade a distance corresponding to the desired thickness of the packing rings. The blades project sufficiently to cut completely through the rubber tubing, the knives acting successively, due to the fact that the mandrel rotates faster than the cutter head.

Where long tubing is used, the cutter head may be intermittently moved after the cutting of one set of rings. This is done by leaving a gap in the knives, so that the knives are all out of

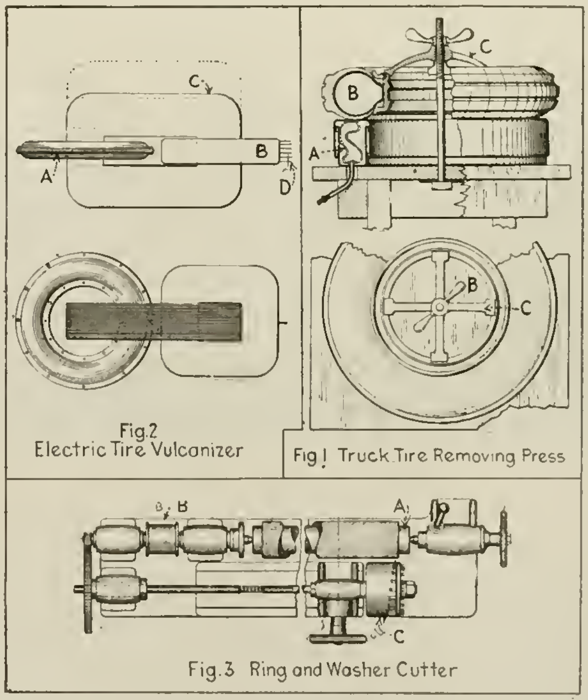


Fig.2 Electric Tire Vulcanizer

Fig 1 Truck Tire Removing Press

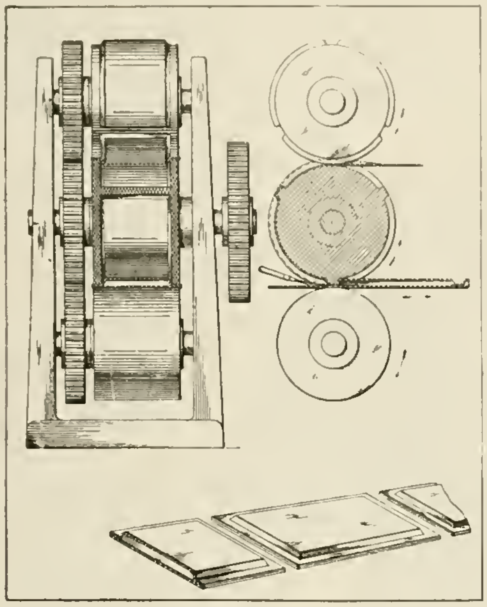
Fig.3 Ring and Washer Cutter

contact with the rubber tubing until the shifting of the cutter head is completed.—Joseph E. Perrault, assignor to Hood Rubber Co., both of Watertown, Massachusetts. United States patent No. 1,348,316.

PRODUCING A HOLLOW RUBBER BISCUIT

This invention covers the process and apparatus for producing an inflated rubber article known as a biscuit, from which bulbs, toys and similar blown goods may be made.

A special calender is employed by means of which a sheet of calendered stock is formed with successive depressions along its length, the shape of which depressions is varied according to the character of the finished article. This sheet of stock is then superimposed upon a flat sheet and two sheets are joined by



Calender for Making Blown Goods

pressure around the margins of the depressions formed in the upper sheet, compressed air or other gas being at the same time injected into the space formed by the depressions, in order to prevent adhesion of the sheets at the point where the biscuit is to be formed.

The design of calender and its mode of operation are clearly indicated in the accompanying illustrations.—Henry Z. Cobb, New York City, assignor to the Mechanical Rubber Co., of New Jersey. United States patent No. 1,349,560.

OTHER MACHINERY PATENTS

THE UNITED STATES

No. 1,353,933 Apparatus for laying or forming tire treads. H. I. Morris, assignor by direct and mesne assignments to Morris Tire Machinery Co.—both of Los Angeles, Cal.
1,353,934 Apparatus and method for making rubber elements for tires, laminated tire treads, etc. H. I. Morris, assignor by direct and mesne assignments to Morris Tire Machinery Co.—both of Los Angeles, Cal.
1,354,227 Tire mold. A. R. Thompson, Tacoma, Wash.
1,354,371 Apparatus and method for wrapping tires, etc. E. H. Angier, Framingham, Mass.
1,354,425 Apparatus for applying radial pressure to tires during vulcanization. T. Sloper, Devizes, England.
1,354,452 Mixing machine for rubber, etc. D. R. Bowen and C. F. Schnuck, assignors to Farrel Foundry & Machine Co.—both of Ansonia, Conn.
1,354,459 Expansible core for tires. C. G. A. Bäckdahl, Stockholm, Sweden, assignor to United States Tire Co., New York City.
1,354,463 Slitting and rewinding machine. J. A. Cameron and G. B. Birch, assignors to Cameron Machine Co.—all of Brooklyn, N. Y.
1,354,464 Slitting and rewinding machine. J. A. Cameron and G. B. Birch, assignors to Cameron Machine Co.—all of Brooklyn, N. Y.
1,354,595 Tire rebuilding device. E. Borman, Chicago, Ill.
1,354,754 Pressure clamp for vulcanizing apparatus. S. B. Hucy, deceased, by F. C. Burkhalter, administrator—both of Wichita, Kans.
1,354,849 Tire-tread puller. J. Schmidt, Tracy, Cal.
1,355,104 Slitting and rewinding device. J. A. Cameron and G. B. Birch, assignors to Cameron Machine Co.—all of Brooklyn, N. Y. (Original application divided.)
1,355,106 Winding mechanism. R. McC. Johnstone, Roselle Park, N. J., assignor to Cameron Machine Co., Brooklyn, N. Y.
1,355,107 Winding mechanism to nullify transverse wrinkles in a web. R. McC. Johnstone, Roselle Park, N. J., assignor to Cameron Machine Co., Brooklyn, N. Y.
1,355,278 Apparatus for inserting bristles in rubber pads. W. T. Sherman, Troy, assignor to Henry T. Hughes Co., Inc., New York City—both in New York. (Original application divided.)
1,355,305 Rubber mixing machine. D. R. Bowen and C. F. Schnuck, assignors to Farrel Foundry & Machine Co.—all of Ansonia, Conn.
1,355,335 Pulverizer. W. Haserdahl, San Francisco, Cal., assignor to Allis-Chalmers Manufacturing Co., Milwaukee, Wis.
1,355,518 Textile disintegrating machine. F. von Osten, assignor of ½ to C. Scheeler—both of East Orange, N. J.
1,355,525 Apparatus and method for producing cord tire carcass material in strip form. E. K. Baker, Chicago, Ill.
1,355,734 Apparatus for manufacturing solid band tires. F. Cole, Leyland, England.
1,355,885 Rubber mixing machine. D. R. Bowen and C. F. Schnuck, assignors to Farrel Foundry & Machine Co.—all of Ansonia, Conn.
1,356,173 Air bag for inner tubes. C. L. Smith and E. S. Webster, assignors.
1,356,485 Machine for cutting bias strips from tubular fabric. A. C. Bunker, Montclair, N. J.
1,356,596 Separable sectional tire core. J. W. Brundage, assignor to The Miller Rubber Co.—both of Akron, O.
1,356,597 Retreading vulcanizer. C. T. Byerley, Kansas City, Mo.
1,356,691 Rubber mixing machine. D. R. Bowen and C. F. Schnuck, assignors to Farrel Foundry & Machine Co.—all of Ansonia, Conn.
1,356,721 Collapsible tire core. F. L. Johnson, Akron, O.
1,356,891 Apparatus for manufacturing solid tires. W. J. Steinle, Elmhurst Heights, N. Y., assignor to Morgan & Wright, Detroit, Mich.

THE DOMINION OF CANADA

204,187 Apparatus and process for recovering solvent. E. I. du Pont de Nemours & Co., assignee of T. Baker—both of Wilmington, Del., U. S. A.
204,710 Repair vulcanizing device. W. Oppenheimer, Brawley, Calif., U. S. A.
204,759 Tire-building machine. The Goodyear Tire & Rubber Co., Akron, O., assignee of W. C. Tyler, Racine, Wis.—both in U. S. A.
204,896 Tire repair vulcanizer. C. Nordstrom, Milwaukee, Wis., U. S. A.
204,924 Battery-jar forming machine. J. H. Wagenborst, Jackson, Mich, U. S. A.
204,952 Collapsible tire core. H. A. Denmire and The General Tire & Rubber Co., assignee of ½ interest—both of Akron, Ohio, U. S. A.
205,052 Expansible core for vulcanizing tires. C. Holm, Bowman, North Dakota, U. S. A.
205,139 Apparatus for cutting blanks. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of W. Kent, New York City, U. S. A.
205,147 Machine for forming articles of fabric and rubber. Firestone Tire & Rubber Co., assignee of H. F. Maranville—both of Akron, Ohio, U. S. A.

THE UNITED KINGDOM

146,621 Press for molding rubber, etc. A. Roberts & Sons, Lancaster, and F. J. and A. E. Charles, 73 Great Lister street, Birmingham.
147,164 Apparatus for trimming strip of uniform width from selvedges of fabrics. The Goodyear Tire & Rubber Co., 1144 East Market street, Akron, assignee of A. P. Lewis, 347 College street, Wadsworth—both in Ohio, U. S. A. (Not yet accepted.)
147,248 Repair vulcanizer for tire treads. H. K. Wheelock, F. A. Weller, and W. R. Fontaine, 1730 South Los Angeles street, Los Angeles, Cal., U. S. A.

GERMANY

PATENTS ISSUED, WITH DATE OF ISSUE

328,292 (April 1, 1919.) Appliance for the reclamation of solvents for the manufacture of rubber goods. Paul Francke, 29 Funkenburgstrasse, Leipzig.
328,545 (November 6, 1915.) Apparatus for the preparation of rubber footwear for vulcanization. Boston Rubber Shoe Co., Malden, Mass., U. S. A.
329,255 (December 14, 1919.) Tube catch for rubber-ring cutting machine. Karl Kochler, 14 Kollenrodtstrasse, Hannover.

PROCESS PATENTS

THE UNITED STATES

No. 1,354,174 Manufacture of inner tubes. H. Dech, assignor to Mercer Tire Co.—both of Trenton, N. J.
1,354,992 Retreading rubber tires and finished product. E. Nestler, Bergenfield, N. J.
1,355,206 Manufacture of hollow articles of rubber by molding on fusible core. H. A. Woofter, Swampscott, assignor to Thomson Electric Welding Co., Lynn—both in Mass.
1,355,265 Manufacture of composite unwoven cord fabric. R. B. Respess, New York City.
1,355,534 Manufacture of composite rubber and fiber fabric. E. G. Buchmann, Chicago, Ill.

THE DOMINION OF CANADA

204,185 Recovering solvent. E. I. du Pont de Nemours & Co., assignee of T. Baker—both of Wilmington, Del., U. S. A.
204,186 Recovering solvent. E. I. du Pont de Nemours & Co., assignee of T. Baker—both of Wilmington, Del., U. S. A.
204,320 Repairing pneumatic inner tubes, etc., with sheet and raw rubber cemented and vulcanized over break. T. A. McAllister, Augusta, Ga.
204,329 Manufacturing fillers for rubber or paint from precipitate obtained by clarifying the juice in sugar manufacture by means of evaporation. W. B. Rosevear, Jr., Detroit, Mich., U. S. A.
204,585 Manufacturing tire treads from hot vulcanizable plastic rubber and rapidly cooling to reduce shrinkage. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of J. J. Shea, Hartford, Conn., U. S. A.
204,679 Manufacturing belting of diagonal strips of rubberized woven fabric. C. G. Gates, Denver, Colo., U. S. A.
204,767 Manufacturing inner tube with fabric band cured on inner side, having flaps at edges. The Premier Tire & Rubber Co., Limited, assignee of R. E. Wright and H. T. Pyke, all of Hamilton, Ont., each an assignee of a half interest of C. F. Fisk, Trenton, N. J., U. S. A.
204,842 Producing tire patch materials of rubberized fabric. C. O. Duffy, Dallas, Tex., U. S. A.
204,945 Manufacture of rubber footwear. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of J. M. Rice, F. A. Joseph, and A. D. Rupp, coinventors, all of New Haven, Conn., U. S. A.

New Goods and Specialties

VENTRILOQUIAL HEAD WITH RUBBER FACE

A ventriloquial head that gives a most novel and lifelike effect secured by the use of rubber for the face has been invented by an Englishman. The accompanying illustration shows a reproduction of two of these heads compared with the natural one of the inventor himself. The absence of all joints or lines around the mouth and jaw permits a natural expansion of the lips and cheeks which is said to be uncanny in its very lifelikeness. The advantages claimed for this head are as follows: In place of the usual strap or handle, with strings to operate the movements and springs to make them return, the operator's hand enters the head and the fingers bear directly on the mechanism, thus having absolute control of each part. The index finger operates the eyes, and can make them look in every direction. The second and strongest finger operates the lower jaw movement, which is always active. The third finger is used for manipulating the upper lip for singing or sneering. The wrist is employed in the neck, giving a natural nodding or shaking motion. The device has been patented in Great Britain and the United States.—The Norton-Bretna Manufacturing Co., 18-19 Craven street, Charing Cross, London, England; F. A. Ellis, inventor; American patentee and agent, Walter J. Ellis, 140 West 38th street, New York City.

The Ellis Ventriloquial Head and Its Inventor

Soderling "Dustite" Respirator

THE "DUSTITE" RESPIRATOR

The accompanying illustrations indicate how the Soderling "Dustite" respirator is worn and the appearance of the respirator itself. This is made of rubber so shaped as to conform to the contour of the nose and face, while an aluminum rim holds in place the filter which is renewable.

This is said to be one of the best for use in the industries where any kind of dust is present, and for spraying paint and other mixtures. It does not interfere with vision, is comfortable, and permits breathing through a dry filter, having no sponge or pad requiring wetting or washing. This is said to be the only respirator approved by the Underwriters' Laboratories, and is protected by the Walter Soderling patent recently sold to the present manufacturer.—Willson Goggles, Inc., Reading, Pennsylvania.

"Dustite" Respirator in Use

RUBBER FEET PREVENT MARRING

Among the various uses for rubber, that which employs it in the form of small pads or feet applied on the bottom of comparatively heavy articles to prevent marring polished surfaces, finds a new application every little while. The good-looking bread-board made of hardwood, either in the natural finish or polished, with "Ivory Pyralin" rim and cutting frame of nickel, is one example.—Home Helps Manufacturing Corporation, 39 West 38th street, New York City.

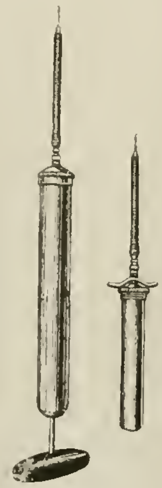
Another instance is in the case of an electric motor for running an ordinary sewing machine. Here the rubber is applied in the form of bumpers in the base. With other attachments made to use with this motor, it can be utilized as a knife grinder, a silver polisher, a cream or egg whipper, or to operate a small electric fan.—Hamilton-Beach Manufacturing Co., Racine, Wisconsin; representative, John Jorgensen, 114 Liberty street, New York City.

A REINFLATABLE TENNIS BALL

Taylor Tennis Ball

The newest novelty in tennis balls is, perhaps, the one shown here. It is a reinflatable one, the point at which inflation is to be made being indicated by an indelible spot on the ball. Of great endurance and resiliency, bounding true and fair, this ball is constructed with an inner ball of rubber to which an inside knob of soft rubber is attached. Through this the needle of the inflating device is inserted before the felt cover is adjusted at the factory; afterward the black dot on the ball indicates where this spot is and where the needle of the "reflator" is to be applied when necessary. The ball is inflated until it feels sufficiently hard, then the needle is withdrawn and the reinflation is complete. As an extra precaution, the punctured spot may be pressed together with pliers, to make the seal doubly safe.

The inflating device, called a "reflator," is pictured in the lower corner of this page, in two sizes. The No. 1 is for individual use and has a 5½-inch pump, a detachable needle, and an extra needle. The No. 2 has a 10-inch pump, is intended for club use, and has both a detachable needle and detachable handle. An extra needle is included with this, also.—Alex Taylor & Co., Inc., 26 East 42nd street, New York.



Nº2 Nº1

"Tennis-Ball Reflator"

"SUPERFIX" RUBBER MEND

A rubber repair material called "Superfix" is being marketed which, it is claimed, will repair glass cuts, rim cuts, holes, sand blisters, etc., in tires, as well as punctures, rips, tears, and blowouts. It is also used for mending hot-water bags, rubber boots, gloves, hose and other kinds of rubber articles. One canful makes 100 small repairs, no vulcanizing being required.—The Superfix Rubber Co., Elyria, Ohio.

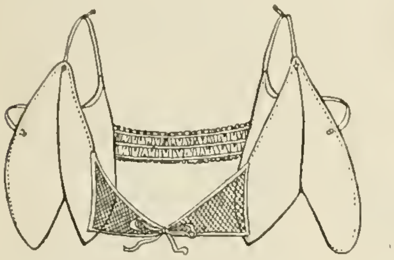
A CLEAR-VOICE TELEPHONE ATTACHMENT

A new telephone mouth-piece of hard rubber allows the voice to sound natural, it is claimed, and prevents the speaker being overheard. Excess vibration is provided an outlet through small holes at regular intervals drilled through from the end next the telephone to the shoulder just above the screw-thread, as indicated in the picture. A crystal bead hung on a monel metal bar and shown here in the cut-out, breaks up the sound waves and also prevents foreign articles such as pencils from being poked into the mouth-piece. A shoulder for a muffler plate is also provided.—The Evolution Phone Co., Inc., 48 Greenwich avenue, New York City.

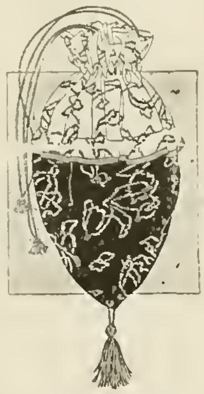
Pape "Theraphone"

RUBBER DRESS ACCESSORIES

Of the two novelties shown here, the dress shields, which have a connecting strap of shirred fabric across the back, derive their name, "Shirlastic," from this feature, which is patented. A double strip of muslin attached to the back edges of the shields forms a casing for the insertion of narrow elastic webbing or cords. These shir the strip when not under tension and provide means to prevent the shields from slipping away from position. There are also shoulder straps of elastic and similar ones over the arms, while shaped sections of net, fastened by tying, form a brassiere effect at the front.



"Shirlastic" Dress Shield



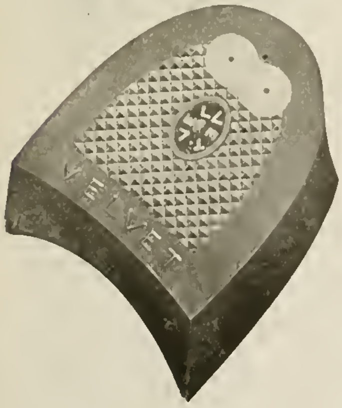
Ornamental Rubber Beach Bag

"Shirlastic" ribbon, a shirred ribbon-covered elastic, is also to be marketed by the same manufacturer. It is to be used for garters, baby carriage straps, camisole trimmings, boudoir caps, etc., and may be had in different widths, in both plain and fancy patterns.

The tasseled beach bag, made of pure rubber, has an attractive design in colors printed on the outside. It is of good shape and roomy, in graceful pattern, and the opening is easily gathered up with draw-strings.—I. B. Kleinert Rubber Co., 719 Broadway, New York City.

A STEP TOWARD SAFETY

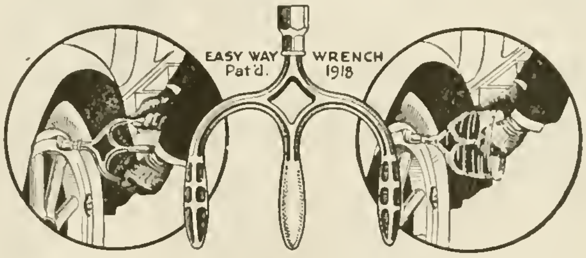
Rubber heels have come into such general use that the question is not, "Do you wear rubber heels?" but rather, "Do you prefer rubber half-heels or whole-heels?" Many persons use whole-heels on outing shoes and half-heels on more dressy footwear. Made for all tastes is the "Velvet Neverslip Friction Plug" rubber heel, which comes in many sizes, both whole style and half style, with or without the inserted friction plug, said to prevent slipping. These heels show very careful workmanship, both in molding and finishing, and have not the objectionable clumsy appearance of low-grade heels.—Frank W. Whitcher Co., Boston, Massachusetts.



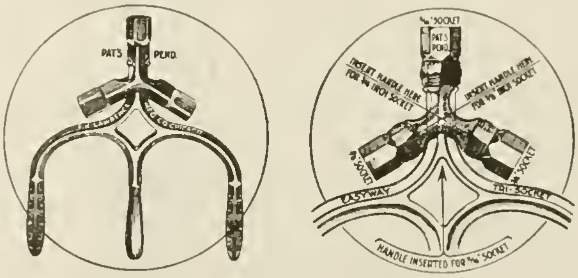
"Velvet" Plug Heel

A TIME AND TEMPER SAVER

A handy tool commendable to the motorist for its simple working principle is the "Easy-Way" wrench, which has two handles for gripping and starting the nut and a central one to continue the twirling motion until the nut comes off. Handles are of highest grade malleable steel and the entire tool is handsomely finished in black rubber enamel. A later development is the "Easy-Way Tri-Socket" wrench, to fit practically all makes of demountable rims. It combines in one tool sockets for ⅝-, 11/16- and ¾-inch nuts. The handle can be conveniently adjusted to use whichever socket is required.—F. K. Lawrence Manufacturing Co., 615 First National Bank Building, Chicago, Illinois.



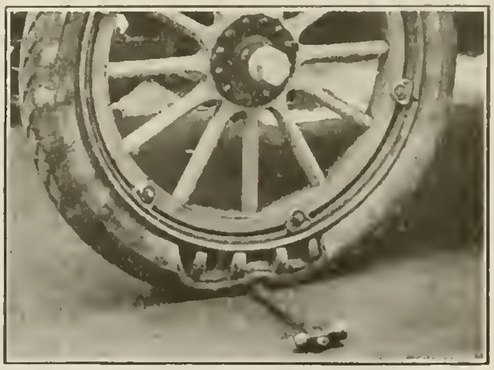
"Easy-Way" Wrench



"Easy-Way Tri-Socket" Wrench

THE "NATIONAL AIRLESS" TIRE

A tire having the general appearance of the ordinary pneumatic, yet differing essentially from it inasmuch as it does not require inflation, is the "National Airless," being manufactured by a company in Los Angeles. The tire uses neither inner tube nor compressed air, but contains instead a bridgework of rubber piers and ribs inside a casing and vulcanized into one piece, the whole designed to give resilience without the risks of punctures or blow-outs. It is the intention of the company, which has already a large number of these tires in operation in the Southwest, to set up a large factory soon in the south end of the city. Application has been made for a patent.—National Airless Tire Co., North Main street, Los Angeles, California.

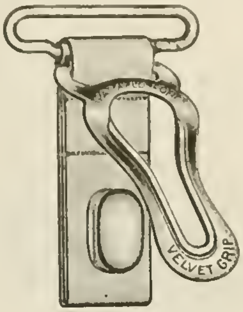


Inner Tire with Rubber Piers and Ribs

THE OBLONG RUBBER BUTTON FOR GARTERS

A new feature of certain well-known garters is the oblong rubber button clasp used on the "Velvet Grip" hose supporter and also on the "Natty-Pad Boston" garter, a newly trade-marked style which the manufacturer has sold so far only in South America. The advantages of the new style of button, according to the makers, are that no single thread can be overstrained, owing to the large number of threads clasped around the oblong shank. For this reason no ordinary strain can injure the most delicate stocking, and dropped stitches are reduced to a minimum.—George Frost Co., 551 Tremont street, Boston, Massachusetts.

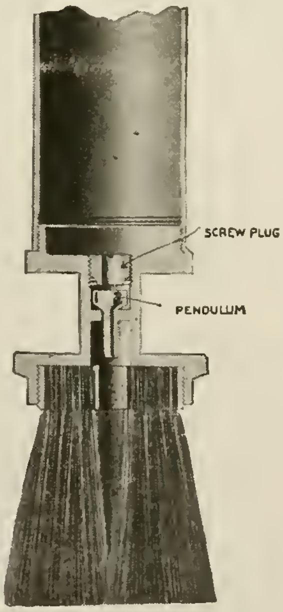

"Natty-Pad" Garter Button



Oblong Rubber Button

FOUNTAIN STENCIL BRUSH

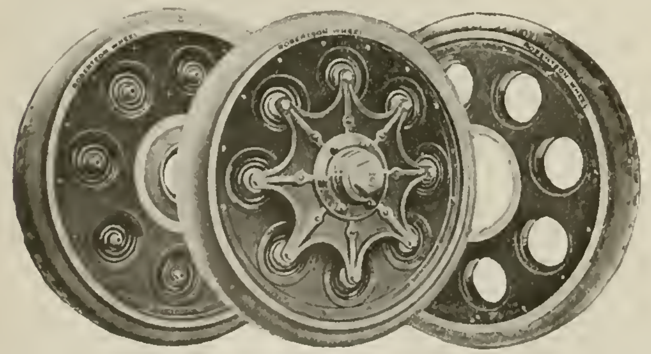
A convenience for shipping departments is a hard rubber fountain stencil brush for marking or stenciling packing cases for freight and express shipments. The ink is contained in the cylindrical hard rubber handle of the brush, somewhat on the principle of a fountain pen. Below the screw plug which closes the barrel is a pendulum which regulates the flow of ink. Rubbing the brush across the stencil moves the pendulum, allowing the ink to reach the bristle tip. New bristle tips can be obtained. This brush is patented in the United States and foreign countries.—Garvey Fountain Brush & Ink Co., 7th and Howard streets, St. Louis, Missouri.



Garvey Stencil Brush

PARALLEL SUSPENSION WHEEL

In order to distribute the load remote from the center of this wheel and as near the rim as possible, the inventor devised a series of flanged housings for the spiral spring cushioning elements. These keep the springs in alinement with respect to other parts of the wheel. Within these springs is suspended the fixed, spider portion, fastened to the rubber-cushioned hub. The hub cushion acts to keep the rim in concentric relation to the center and prevents convulsive vibration of the springs around the rim. Within the spider plates around the hub are large hard fiber washers which function against steel plates and serve to check the lateral displacement of the rim in the event of skidding. There being no friction during the normal operation of the wheel, this is only a precautionary measure against severe lateral thrusts. The wheel thus takes care of all vertical, torsional, tangential, lateral, and radial thrusts. It is said that tires mounted on this wheel last longer and that more mileage is made on a given quantity of gasoline with this wheel equipped with an ordinary solid rubber tire, than with a rigid wheel equipped with a pneumatic tire.—Robertson Resilient Wheel Corporation, 1697 Broadway, New York City.


Robertson Parallel Suspension Wheel

A SELF-FILLING FOUNTAIN PEN

A fountain pen that will never "sin" is the manufacturer's quaint description of the "Master," a self-filling model with patented features that prevent leaking, inking the fingers, and kindred faults. The barrel is of hard rubber, with especially large ink reservoir, so that many letters can be written without refilling. The pen is a 14-karat gold one.—Bankers' Pen Co., 76 Fifth avenue, New York City.


"Master" Fountain Pen

ELASTIC ARCH BRACE


Jung Arch Brace

A corrective appliance, said to be superior to the ordinary arch supports, is made of elastic webbing, reinforced at the shaped front part with a stitched strip of fabric. The 2-inch "XXX" and the 3-inch "Miracle" are light in weight and comparatively thin. Patented three years ago, and recently put on the market, druggists and shoe dealers now sell this brace.—The George H. Jung Co., Cincinnati, Ohio.

A FABRIC AND CORD TIRE

Another cord tire for which the makers claim special features is the "Fabri-Cord" tire, which is absolutely guaranteed against stone-bruise blowouts. "Fabri-Cord" tires combine fabric plies and cord plies in their construction, having two inner plies of heavy fabric next a cushion of live rubber from bead to bead, then two plies of cord for resiliency, two more plies of fabric, two more of cord, one of fabric to prevent loosening, and outside of these a rubber cushion ply, a breaker and a long-wearing heavy tread. This unique construction is shown in the accompanying illustration, and is peculiar to the "Fabri-Cord" tire. It claims to get full mileage from every ounce of rubber in the tread.—Terrell Tire & Rubber Co., Kansas City, Missouri.


"Fabri-Cord" Tire

THE "CUDDLE-UP" HOT-WATER DOLL

The "Cuddle-Up" doll is a doll-shaped rubber hot-water bottle with a very warm spot in its heart for little babies. It is practical and its efficiency is in no way spoiled by its odd shape. It is provided with a knitted suit that serves as clothes and cover, adding to its comforting powers when placed in baby's carriage or at the little feet. The "Cuddle-Up" doll will doubtless prove a very popular gift, one that can be appreciated by the mother and loved and cherished by the child.—Alden R. Chambers, 757 Boylston street, Boston, Massachusetts.

Activities of The Rubber Association of America

MEETINGS

A meeting of the Rubber Reclaimers' Division of the Association was held in New York City on November 9, at which prevailing trade conditions were discussed in a general way, as a result of which a joint conference of scrap rubber dealers and reclaimers was held in New York on November 19.

A meeting of the Hard Rubber Division was held in New York City on the 24th instant.

The next meeting of the Board of Directors is scheduled for November 30 at New York City.

The November regular meeting of the Mechanical Goods Executive Committee was held in New York on Tuesday, November 23.

The November regular meeting of the Executive Committee of the Tire Manufacturers' Division, scheduled for Wednesday, November 17, was omitted. The next meeting of this Committee will be the December regular meeting on December 15.

GENERAL

The Association has undertaken the gathering of statistics on a monthly basis from individual tire manufacturers who are members of the Tire Manufacturers Division, relative to the inventory, production and shipments of pneumatic and solid tires and inner tubes and the amount of cotton fabric and crude rubber consumed in that production, the Association in turn to furnish the totals compiled from the individual returns to each member participating in the arrangement. This work is progressing as rapidly as possible, and it is expected that, early in December, a report of total inventory, production and shipments as of November 30 will be available.

ANNUAL MEETING AND BANQUET

The regular annual meeting of The Rubber Association will be held at the Waldorf-Astoria Hotel, New York City, on the afternoon of Monday, January 10, 1921. On the evening of that day, the twenty-first annual dinner of the Association will be held in the grand ball-room at the Waldorf-Astoria. Information will soon be transmitted to members of the Association concerning the price of the dinner tickets, the names of the speakers, etc.

RECOMMENDED SPECIFICATIONS FOR PNEUMATIC CORD TIRES

The following is a reproduction of a resolution adopted by a majority vote of the Executive Committee of the Tire Manufacturers' Division on July 29, 1920, concerning minimum and maximum cross section widths of pneumatic cord tires, with an amplification of the resolution in the form of a detailed list of minimum and maximum cross section widths of tires, rim sizes and widths, and standard S. A. E. inflation pressures:

RESOLUTION

In view of the well-recognized economic advantages which have been derived by the public and by the individual tire manufacturers as a result of the adoption by those manufacturers of the standardization program recommended by the War Service Committee, which program restricted the number of tire sizes, and with a view to retaining and extending these advantages by standardizing, as far as practicable, the actual sizes of tires made in accordance with that program;

Now Therefore, it is resolved that the Executive Committee of the Tire Manufacturers' Division recommends to the individual tire manufacturers who are members of that division that the actual cross-sectional width of pneumatic cord tires when inflated in accordance with the S. A. E. standards be not less than the nominal width marked thereon or greater than ten per cent in excess of such nominal width; it being understood, however, that the nominal width of the so-called 5-inch tire shall, in accordance with custom, be considered as 5¼ inches.

A. L. Viles, General Manager.

Minimum and Maximum Cross-Section Widths of Pneumatic Cord Tires

Marked Size		Cross-Section Dimensions Minimum (In Inches)	Cross-Section Dimensions Maximum (In Inches)	Rims Size	Rims Width	Inflation Pressure Lbs. Per Sq. In.
30x3½	Cl.	3.50	3.85	30x3½	2.05	50
31x4	Cl.	4.	4.40	30x3½	2.05	60
32x3½	S.S.	3.50	3.85	32x3½	2.3125	50
32x4	S.S.	4.	4.40	32x4	2.6875	60
33x4	S.S.	4.	4.40	33x4	2.6875	60
32x4½	S.S.	4.50	4.95	32x4½	3.125	70
33x4½	S.S.	4.50	4.95	33x4½	3.125	70
34x4½	S.S.	4.50	4.95	34x4½	3.125	70
33x5	S.S.	5.25	5.77	32x4½	3,125	80
34x5	S S.	5.25	5.77	34x5	3.75	80
35x5	S.S.	5.25	5.77	34x4½	3.125	80
36x6	S.S.	6.	6.60	36x6	4.33	90
38x7	S.S.	7.	7.70	38x7	5.	100
40x8	S.S.	8.	8.80	40x8	6.	110
42x9	S.S.	9.	9.90	42x9	6.67	120
44x10	S.S.	10.	11.	44x10	7.33	130
48x12	S.S.	12.	13.20	48x12	9.	140

The cross-section dimensions referred to are those of the finished tires and not the tire molds.

The cross-section dimensions referred to are to be determined by measuring new, unused tires not sooner than a half hour and not later than one hour after mounting on the rim and inflating to the S. A. E. standard pressure.

In determining the cross-section dimensions each tire is to be mounted on a wide standard rim of the same nominal size as the tire, with the exception of the 31 x 4 Cl., the 33 x 5 S. S., and the 35 x 5 S. S., which are to be measured, respectively, on the 30 x 3½ Cl., the 32 x 4½ S. S., and the 34 x 4½ S. S. rim.

The only sizes to be affected by the recommended cross-section widths in the table are those perpetuated sizes which are now or which may be recognized as such by The Rubber Association of America, Inc., for original equipment by vehicle manufacturers, and this does not affect those other sizes which are to be produced to provide for replacements.

GUARANTY AGAINST PRICE DECLINE

New York, November 13, 1920.

To the members of the Tire Manufacturers' Division and the Footwear Division:

There is enclosed a copy of the brief filed by counsel for this Association with the Federal Trade Commission in connection with its inquiry into the practice by manufacturers of guaranteeing to the distributer or dealer protection against loss in the event of a decline in prices.

Previous communications from this office have informed you concerning the part taken by this Association in the investigation by the Commission, beginning with the development of information in detail concerning the exact practices and views of tire and rubber footwear manufacturers with respect to the subject and the presentation of an expression of opinion from the tire and rubber footwear industry to the Commission by a committee representing this Association at the "Trade Practice Submittal" or informal hearing, held by the Commission in Washington on October 5.

It is not expected that the Commission will issue any formal announcement as a result of its inquiry and the representations made to it by the various interested industries and it is thought that it will simply use the information obtained in disposing of such specific complaints as may come before it.

At the close of the informal hearing on October 5 the Commission announced that it would accept briefs from those who might wish to file them and counsel for this Association concluded that it would be advisable for us to take that action, and the enclosed copy is sent you as a matter of information.

A. L. Viles, General Manager.

IMPORTANT INFORMATION DESIRED FROM MEMBERS

New York, November 8, 1920.

To rubber manufacturers and reclaimers:

There is enclosed Questionnaire No. 103 in duplicate, calling for certain information concerning the business of your company for the first six months of the year 1920, which we are

desirous of having your company return, with the information asked for, within the shortest time possible.

This questionnaire calls for information similar to that which was obtained from questionnaires Nos. 101 and 102, covering the year 1919, and we are hopeful that with the increased familiarity of our members with this work the response will be much more prompt than heretofore.

A report of totals covering the year 1919 with respect to the average total daily number of employes, number of pounds of crude rubber consumed, and the total sales value of shipments of the manufactured product, has been prepared and is being distributed with this letter.

A. L. Viles, General Manager.

RUBBER TRADE INQUIRIES

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The editor is therefore glad to have those interested communicate with him.

(831) A subscriber requests information as to substitutes for camel's-hair brushes for the application of rubber cement and tube splicing acid, and desires to know where they may be obtained.

(832) A manufacturer inquires where he can obtain selenium oxychloride.

(833) A correspondent desires the addresses of German manufacturers of electricians' gloves, net-lined white acid gloves, and sponge rubber, with view to exclusive sales proposition.

(834) A correspondent desires to know the best commercial method of finding the percentage of lead hydrates and lead carbonates in ordinary white lead.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS

Addresses may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or from the following district or cooperative offices. Requests for each address should be on a separate sheet, and state number:

District Offices	Cooperative Offices
New York: 734 Customhouse.	Cleveland: Chamber of Commerce.
Boston: 1801 Customhouse.	Cincinnati: Chamber of Commerce; General Freight Agent, Southern Railway, 96 Ingalls Building.
Chicago: 504 Federal Building.	Los Angeles: Chamber of Commerce.
St. Louis: 402 Third National Bank Building.	Philadelphia: Chamber of Commerce.
New Orleans: 1020 Hibernia Bank Building.	Portland, Oregon: Chamber of Commerce.
San Francisco: 307 Customhouse.	Dayton, Ohio: Dayton Chamber of Commerce.
Seattle: 848 Henry Building.	

(33,799) Quotations are desired in Australia on several tons of chicle. Information as to the time of delivery is requested.

(33,919) A merchant in France desires to purchase from American manufacturers and exporters ebonite in rods, plates and tubes, and vulcanized American fiber in plates, sticks and tubes.

(33,935) An agency for automobile tires is desired by a firm in France.

(33,940) A dental supply house in Japan desires to purchase, cash against documents, rubber in any quantity up to 500 pounds. Quote f. o. b. American port.

(33,965) A commercial agent in Serbia proposes to organize a trade bureau for the Balkans and later to open branches in Zagreb, Sofia, Bucharest, and Piræus, and maintain industrial exhibits and a warehouse for the sale of rubber goods and other American products.

(33,971) A commercial agency firm in Germany desires to import rubber goods, pneumatic tubes and covers for automobiles, vulcanized fiber, belting and mackintoshes.

(33,983) An English firm desires to purchase or secure an agency for raw materials of all kinds, especially those kindred to the rubber trade. Quotations should be given f. a. s. Atlantic ports or c. i. f. English ports. Payment to be made in New York or London against documents.

(34,011) A mercantile firm in Sumatra desires to place a trial order and secure an agency for the sale of tennis and golf balls. Complete catalogs and price lists are requested and also samples. Quote c. i. f. Belawan via Singapore or Batavia. Payment to be made by 30 days' draft, or through New York.

(34,013) An engineering equipment company in Wales desires to secure an agency for the sale of balata belting. Quote c. i. f. Welsh port.

(34,040) A commercial agent from the Far East, who is at present in the United States, is about to return to India and desires to secure an agency for the sale of rubber goods.

(34,055) A manufacturer in Chile wishes to receive catalogs and prices of machinery for making rubber goods, such as raincoats, overshoes, and boots. Payment to be in cash.

REVISED RUBBER TRADE LISTS

The following trade lists of importers of rubber goods have lately been revised and published by the Commercial Intelligence Section of the Bureau of Foreign and Domestic Commerce, and may be obtained from the Bureau by referring to the title and file number of the list desired.

	File No.
Importers of and dealers in rubber goods for industrial purposes in Canada	BE–1001
Importers of and dealers in rubber boots and shoes in Canada	BE–1002
Importers of rubber tires in Canada	BE–1003
Drug stores and dealers in druggists' sundries in Canada	BE–1004
Importers of and dealers in rubber goods in Newfoundland	BE–1005
Importers of various lines of rubber goods in London, England	BE–2001
Importers and manufacturers of rubber goods in Glasgow, Scotland	BE–4001
Importers of rubber goods for industrial purposes in Copenhagen, Denmark	EUR–2031
Importers of rubber shoes in Copenhagen, Denmark	EUR–2032
Importers of rubber goods in Tunis, Tunis	EUR–3002
Importers of and dealers in rubber goods in Palermo, Italy	EUR–6001
Importers of rubber goods in Lisbon, Portugal	EUR–10010
Importers of rubber goods in Tangiers, Morocco	EUR–17000
Importers of rubber goods in Colombia	LA–14009
Importers of rubber goods in Norway	EUR–9012
Importers of insulated wire and friction tape; rubber goods for industrial purposes, in Rio de Janeiro, Brazil	LA–12004
Importers of rubber coats in Rio de Janeiro, Brazil	LA–12005
Importers of toys and games in Rio de Janeiro, Brazil	LA–12006
Importers of rubber tires in Rio de Janeiro and Bahia, Brazil	LA–12007

INTERESTING LETTERS FROM OUR READERS

A REMEDY WANTED FOR PITTING VULCANIZERS

To the Editor:

Dear Sir:—

It has been brought to the writer's attention that sulphurous acid was being formed in the heater during the vulcanization of hard rubber.

Have any articles been published in The India Rubber World explaining the formation of sulphur dioxide and giving a remedy for the pitting of vulcanizers?

Power Engineer.

When sulphur is used as a vulcanizing agent, sulphur dioxide will form in the vulcanizer and there is no way to prevent it. The article, "Steam Requirements for Vulcanizing," published in The India Rubber World, October 1, 1920, deals with this question.—The Editor.

"PONTOP" FOR COLLAPSIBLE AUTOMOBILE TOPS

New live rubber and an extra heavy fabric base give exceptional flexibility and rugged strength to "Pontop," a new material for collapsible automobile tops. Severe usage is said not to harm "Pontop," destroy its beauty, or shorten its period of serviceability.—Du Pont Fabrikoid Co., Wilmington, Delaware.

THE OBITUARY RECORD

WELL-KNOWN CHICAGO MECHANICAL RUBBER MAN

Frank B. Henderson, for twenty years general manager of the Chicago branch of The Manhattan Rubber Manufacturing Co., Passaic, New Jersey, died November 10, 1920, after six weeks' illness with pneumonia, at his home, 5036 Woodland avenue, Chicago, Illinois, aged 57 years.

Frank B. Henderson

For many years Mr. Henderson was associated with E. B. Preston & Co. and W. D. Allen & Co., Chicago, and was one of the senior members of the mechanical rubber fraternity in Chicago. His next connection was with the Boston Woven Hose & Rubber Co., Cambridge, Massachusetts, where he remained only a few months, resigning to join the forces of the Manhattan company.

When The Manhattan Rubber Manufacturing Co. opened its Chicago branch, Mr. Henderson was appointed general manager and built up the business from practically nothing to the largest branch of the company. His death is regarded as a distinct loss to the firm.

He was a member of the Chicago Athletic Club, Midlothian Golf Club and South Shore Club, all of Chicago.

Mr. Henderson is survived by his widow, Nellie Henderson; two sisters, Miss Martha Henderson and Mrs. Edward Nell, of Indianapolis, Indiana; his daughter, Miss Ellen Henderson, and two brothers, Charles and Harry Henderson, associated with him in the rubber company.

The funeral was held November 12 from his late home. Burial was in Graceland Cemetery.

PROMINENT PITTSBURGH PURCHASING AGENT

Elvin Lourine McGrew, purchasing agent and traffic manager of the Standard Underground Cable Co., Pittsburgh, Pennsylvania, died suddenly October 8, 1920, in the Hotel Imperial, New York City, while on an eastern business trip.

Elvin L. McGrew

Mr. McGrew was born in New Alexandria, Ohio, March 11, 1863. He was educated in the public schools of Jefferson County, and at the age of sixteen entered the employ of the Pennsylvania Railroad as a telegraph operator. He remained with the railroad in various capacities until 1900, at which time he resigned as agent in New Cumberland, West Virginia, and went to Pittsburgh to fill the position he held at the time of his death. In that capacity he was prominently identified with the rubber trade, being a large purchaser of various grades of crude stock for use in the production of rubber insulated wire at the factories of the company in Perth Amboy, New Jersey; Pittsburgh, Pennsylvania; Oakland, California, and Hamilton, Ontario.

Mr. McGrew was for two years president of the National Association of Purchasing Agents and one of the prime movers in its organization. He still retained his position as one of its directors He was a member of the Methodist Episcopal Church, of Crafton, Pennsylvania, the Free and Accepted Masons, the I. O. O. F., The Traffic Club of Pittsburgh, and The Rubber Association of America.

He is survived by his widow, Annie Elliott McGrew, a daughter, Mrs. F. L. Dudgeon, and a son, Elliott B. McGrew, all of Crafton, Pennsylvania.

FORMER DIRECTOR OF UNITED STATES RUBBER CO.

Commodore E. C. Benedict, nearly 87 years of age, a retired banker and former director of the United States Rubber Co., New York City, passed away at his home at Indian Harbor, Greenwich, Connecticut, November 23, 1920, after more than a year of illness. A more extended obituary will appear in our January issue.

J. D. Raw, a director of The Portage Rubber Co., and retired merchant, died at his home, 317 Rhodes avenue, Akron, of heart failure, November 7, aged 67 years. He came to Akron from Marysville in 1909.

THE EDITOR'S BOOK TABLE

"Plantation Rubber and the Testing of Rubber." By G. Stafford Whitby, Ph.D., M.Sc., A. R. C. Sc., Assistant Professor, Department of Chemistry, McGill University, Montreal, Canada. Longmans, Green & Co., London, New York, Bombay, Calcutta and Madras. Cloth, illustrated, 5½ by 8½ inches, xvi + 559 pages. This book is one of the "Monographs on Industrial Chemistry," edited by Sir Edward Thorp, C.B., LL.D., F.R.S.

In this volume, Professor Whitby not only furnishes for students of the technology of rubber a systematic digest of published investigations on the preparation and testing of plantation rubber, but he discusses the data from the vantage point of his own scientific observations and study of the problems of plantation rubber production in the Far-East. The subject-matter is arranged in two main divisions:

Part I. The Preparation of Rubber. Treats of *Hevea brasiliensis* as cultivated; the occurrence and composition of rubber latex; methods of tapping, coagulating, preparation and characteristics of the various market grades of rubber.

Part II. The Testing of Rubber. Contains very full discussions on the following topics: stress-strain relations of rubber, technique of tensile tests and of vulcanization testing; progressive changes on vulcanization; comparison of raw rubber samples; stability of state of cure; technical mixes; viscosity determinations; hysteresis; elastic after-effect; relation of the thermal, optical and electrical to the mechanical behavior of rubber, concluding with a chapter on Poisson's ratio, which comprises the question of the change of volume of rubber on deformation.

A comprehensive bibliography is included, covering the original sources of the data presented. The volume is provided with a full index of subjects and one of authors.

Professor Whitby has earned the gratitude of every student of the technology of rubber by the very satisfactory way in which he has made available, in one volume, these results from widely scattered sources. The book will be valued as an authority in every rubber research and works laboratory.

Personnel Administration, Its Principles and Practice. By Ordway Tead and Henry C. Metcalf, Ph.D. McGraw-Hill Book Co., Inc., New York. Cloth, 538 pages, 6 by 9¼ inches.

Two members of the Bureau of Industrial Research, New York City, have set forth in this notable work the principles and best prevailing practice in the administration of human relations in industry. The field covered includes those efforts usually included in personnel management, employment, health and safety, training, personnel research, service features and joint relations. The relation of the personnel problems of each corporation to those of its industry as a whole is shown by considering the activities of employers' associations and the dealings which they may have with organizations of workers on a district or national scale. As illustrations, the successful procedure of many plants in varied industries is outlined, including the rubber and allied

trades which have been prominent in these activities. Special reference is made to the rubber text-book of The B. F. Goodrich Co., the training courses for executives of The Goodyear Tire & Rubber Co., the apprentice schools of the General Electric Co. and the Westinghouse Electric & Manufacturing Co., and the shop committee plan of the General Electric Co.

It is a book intelligently devoted to the most vital problem of the day in industry and will be read with interest and benefit by all employers, personnel executives, employment managers, students and teachers in schools of business administration who seek to advance better relations and greater productivity in industry through human cooperation, interest and creative power.

THE MOTORIST'S HANDBOOK ON VULCANIZATION. HARVEY Frost & Co., Limited, London, 1920. (Boards, 64 pages, 5½ by 8 inches.)

The popularity of this little handbook is attested by the fact that it is already in its fourth edition. It expounds chiefly the methods of using H. F. portable vulcanizers without removing the tires from the wheels. In countries where the motorist is dependent upon himself for repairs the knowledge contained in this handbook might prove invaluable, and it contains much of interest to any car owner. Condensed instructions in French and Spanish are also given.

RUBBER PLANTING. A BOOK FOR THE PROSPECTIVE ESTATE Assistant in British Malaya. By C. Ward-Jackson. With a foreword by A. B. Milne and a map of British Malaya. The Incorporated Society of Planters, Kuala Lumpur. Boards, 63 pages, 5½ by 8½ inches.

This is neither a text-book on the plantation rubber industry, nor a technical book of reference, but a much-needed hand-book for prospective rubber estate assistants, containing a wealth of reliable information about plantation life and work, the circumstances and cost of living in Malaya, and particulars of the terms of the contracts they are required to sign. The sections devoted to tropical health hints and necessary personal equipment are of particular interest. It is the only book of its kind and fills a long-felt want.

NEW TRADE PUBLICATIONS

The Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin and New York City, has issued a profusely illustrated 64-page booklet entitled "Dictionary of Uses," which outlines the many adaptations of its C-H electric space heaters to various industrial and miscellaneous purposes. In the rubber industry they are being successfully used for drying cement in the manufacture of inner tubes and for tire aging. They are also employed for heating Bakelite ovens and molding machines.

"Protecting the Sprinkler System Against Freezing" is a four-page folder describing the application of C-H space heaters to the regulation fire extinguishing system of every factory.

The Link-Belt Co., Chicago, has recently published a book covering its traveling water screens, which will be sent to anyone interested in effective, economical screening of condensing water. The book contains 24 pages and covers the subject fully.

The first complete book on brake lining ever published has been brought out by the Thermoid Rubber Co., Trenton, New Jersey, and is entitled "The Dangers of Faulty Brakes." It is a 48-page, paper-bound volume, adequately illustrated by photographs, charts and original drawings showing the results of worn-out or faulty brake linings. Subjects covered include, "Dangers Created by New Motoring Conditions," "Friction," "Co-efficient of Friction," and a complete history of the process of making Thermoid brake lining.

The 1920 Yearbook of The Merchants' Association of New York, recently distributed among its members, gives a summary of the Association's activities for the year ended May 1, 1920. Division XLIII included rubber, rubber goods and kindred lines, and has 47 prominent names listed therein. Other divisions well represented are the chemical, electrical and textile industries. The book also contains the by-laws of the Association and its plan of organization, illustrated by a chart. At the close of the year under review, the members of the Association included approximately 6,600 names.

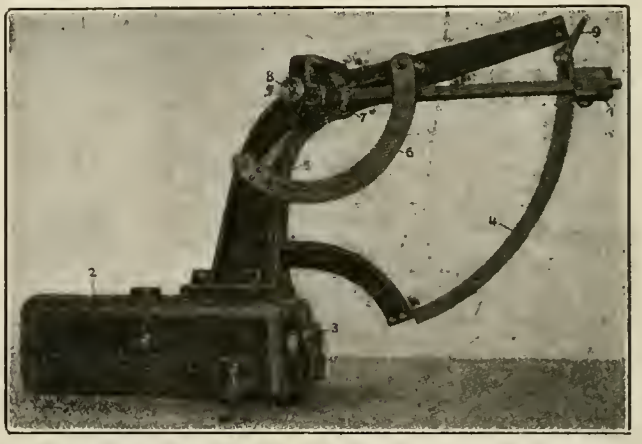
ELASTICITY TEST FOR SOFT RUBBER GOODS[1]

By Alfred Schob[2]

Elasticity is second only to plasticity in the manufacture of soft rubber goods. Several attempts have been made to construct an instrument for measuring the shock resistance of rubber; none, however, has found general application. The author has designed an instrument for measuring elasticity or resistance to shock of soft rubber which is simple in construction and easily operated. The test is applied to a rubber disk.

The apparatus is herewith shown as constructed by Louis Schopper in Leipzig, Germany. It consists of a simple pendulum (1) with a striking force weight of 200 grams and an anvil (2) 20 kilograms in weight. The test sample (3) is held upon the anvil by two springs. The pendulum is supported firmly above the anvil so that the instrument is compact. The extreme drop of the pendulum is 25 centimeters. The heaviest blow, therefore, represents 5 centimeters per kilogram. As the surface of the test sample is larger than the striking surface of the mallet it has been found advisable to make the striking surface hemispherical.

As shown, the apparatus is ready for use. By pressure upon the lever (9) the pendulum is released and drops upon the test sample. Shortly before the mallet strikes, the projection (7) engages the indicator (5) and carries it after the rebound to the maximum point reached on the scale (6). For a new test the

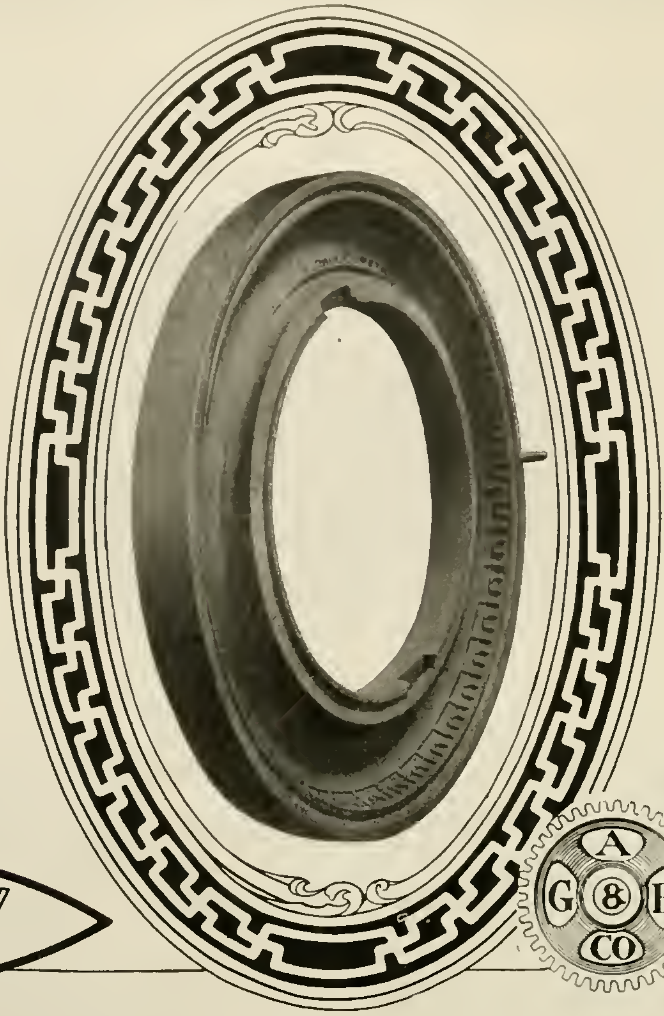


Instrument for Measuring Shock Resistance of Rubber

pendulum is suspended again at the lever (9) and the indicator is reset by pulling out the knob (8). The indicator scale is not graduated in degrees of arc but is based on the percentage of the drop distance so that it is possible to read directly the result. To permit tests with different drop distances of the pendulum the release lever may be fastened at different places on the pendulum guard or arc. The graduations on the scale read for both full drop and half drop tests. If other drop distances are used one simply reads the result of the full drop and multiplies this with the reciprocal value. If, for instance, the test is made with 0.3 of the drop distance the result is multiplied by 1 ÷ 0.3. No allowance is made for friction and air resistance. In reality these are very small. The errors caused by friction and air resistance amount to 2 per cent approximately.

It is absolutely necessary in making elasticity tests of soft rubber to standardize the character and condition of the testing sample. Upon this basis it will be possible to make exhaustive tests of various kinds of caoutchouc in different mixtures and degrees of vulcanization.

[1] Gummi-Zeitung, August 13, 1920.
[2] German Government Material Testing Office, Berlin-Dahlem.



News of the American Rubber Industry

DIVIDENDS

The Ajax Rubber Co., Inc., New York City, has declared a quarterly dividend of $1 per share, payable December 15 on common stock of record November 30, 1920.

The Brunswick-Balke-Collender Co., Chicago, Illinois, recently declared its quarterly dividend of one and three-quarters per cent, payable November 15 on common stock of record November 5, 1920.

The Canadian General Electric Co., Limited, Toronto, Ontario, has declared its quarterly dividend of two per cent on stock of record December 15, 1920, payable January 1, 1921.

The Converse Rubber Shoe Co., Malden, Massachusetts, has declared the semi-annual dividend on its seven per cent preferred stock.

The Firestone Tire & Rubber Co., Akron, Ohio, recently declared its quarterly dividend of one and three-quarters per cent, payable November 15 on preferred stock of record November 1, 1920.

The General Electric Co., Schenectady, New York, has declared a quarterly dividend of $2 per share and a semi-annual dividend of two per cent in stock, both payable January 15 on stock of record December 8, 1920.

The B. F. Goodrich Co., Akron, Ohio, and New York City, has declared a quarterly dividend of $1.50 per share, payable February 15, 1921, to common stock of record February 4, 1921, and a quarterly dividend of $1.75 per share, payable January 1, 1921, to preferred stock of record December 21, 1920.

Hamilton Tire & Rubber Co., Detroit, Michigan, declared a cash dividend of six per cent on all stock of record at its annual meeting in October.

The Hood Rubber Co., Watertown, Massachusetts, has declared a quarterly dividend of one and three-quarters per cent payable November 1 to stock of record October 20, 1920.

The National Aniline & Chemical Co., New York City, has declared a quarterly dividend of one and three-quarters per cent, payable December 31 on preferred stock of record December 13, 1920.

Swinehart Tire & Rubber Co., Akron, Ohio, has deferred payment of dividend on the common stock, but has declared the regular quarterly dividend on the preferred stock, payable December 15, 1920.

FINANCIAL NOTES

At a special meeting of the common stockholders of the Hood Rubber Co., Watertown, Massachusetts, October 27, it was voted to change the existing common stock into 100,000 shares of common stock without par value and holders of the outstanding common stock heretofore having a par value of $100 a share were notified to exchange the certificates therefor for shares of common stock without par value on the basis of two shares without par value for each share previously outstanding, this exchange to be made as of November 5, 1920. From that date dividends are to be declared on shares without par value only.

The Goodyear Tire & Rubber Co., Akron, Ohio, has passed the quarterly dividend on the common stock for the first time in its existence of 22 years. The outstanding common stock exceeds $61,000,000, and the outstanding preferred approximates $59,000,000. The action on the regular quarterly dividend on the preferred will be taken in January. The common paid 12 per cent annually until the last meeting, when it was reduced to 10 per cent.

Net sales of the Lee Tire & Rubber Co., the operating organization of the Lee Rubber & Tire Corporation, for the nine months ended September 30, last, amounted to $6,204,586, compared with $4,492,189 in the same period in 1919, an increase of $1,712,397. After all charges, but before tax reductions, there was a net profit in the nine months of $640,684, contrasted with $460,512 in the same period a year ago, an increase of $180,172.

In reply to a request for a statement regarding the dividend policy of the United States Rubber Co. and of its position generally, Colonel Samuel P. Colt, chairman of the board, said:

"The officials of the United States Rubber Co. see no reason to change the policy of the company adopted over a year ago when the common stock was placed upon an 8 per cent dividend basis.

"The profits of the company for the year will substantially exceed all regular dividend requirements, notwithstanding the falling off in the tire trade, which constitutes only one-third of the entire business of the company.

"The company's situation as to crude rubber, in which there has been an unusual price decline, is all that could be asked. The company has no forward contracts and, therefore, has taken advantage of making purchases at the lower levels of prices, which, together with the substantial supply from its own eastern plantations, puts the company in a most favorable position as to crude rubber.

"The company has heretofore made liberal reserves from income to cover possible shrinkage in inventory values due to decline in prices."

The Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio, will reduce the par on its capital stock from $100 to $10 a share. Calling in the old stock has resulted in a drop in value on the local exchange from $40 to $4.50 a share.

The stockholders of the Westinghouse Electric & Manufacturing Co. have authorized an increase of $30,000,000 in the indebtedness of the company, and also increased the capital stock from $75,000,000 to $125,000,000.

NEW YORK STOCK EXCHANGE QUOTATIONS

November 20, 1920

	High	Low	Last
Ajax Rubber Co., Inc.	32½	31¾	31¾
The Fisk Rubber Co.	14¼	14	14
The B. F. Goodrich Co.	41	40⅛	41
The B. F. Goodrich Co., pfd.	80¼	80	80
Kelly-Springfield Tire Co.	41	40¼	41
Kelly-Springfield Tire Co., pfd.	...	...	...
Keystone T. & R. Co., Inc.	8⅞	8⅜	8⅞
Lee R. & T. Corp.	17¾	17¾	17
United States Rubber Co.	61½	59	59½
United States Rubber Co., pfd.	100½	100½	100½

CLEVELAND STOCK EXCHANGE QUOTATIONS

The following quotations on the Cleveland Stock Exchange, November 19, of stock of the principal rubber companies were supplied by Otis & Co., Cuyahoga Building, Cleveland, Ohio.

	Last Sale	Bid	Asked
Firestone T. & R. Co.	103	100	...
Firestone T. & R Co., 1st pfd.	87½	85½	88¼
Firestone T. & R. Co., 2 pfd.	81½	...	85
General T. & R. Co., pfd.	89	...	...
The B. F. Goodrich Co.	41½	...	...
The B. F. Goodrich Co., pfd.	83	...	...
The Goodyear T. & R. Co.	42¾	41	42
The Goodyear T. & R. Co., pfd.	69	68¾	69
Kelly-Springfield T. & R. Co.	49	...	...
Kelly-Springfield T. & R. Co., pfd.	120	...	...
The Miller Rubber Co.	99	90	99
Portage Rubber Co.	45	...	38
Portage Rubber Co., pfd.	57¼	56	...
Star Rubber Co.	350¾	...	...
Swinehart T. & R. Co.	39	...	...
Victor Rubber Co.	16	15	22

NEW INCORPORATIONS

Ash, Claudius, Sons & Co., U. S. A., Inc., October 11 (New York), $150,000. Charles A. Sykes, president and treasurer; Clarence E. Greene, vice-president; Matthews Brown, secretary. Principal office 1 and 3 Union Square, New York City. To manufacture dental rubber.

Cartwell-Wilson Tire Co., Inc., November 6 (New York), $10,000. W. B. and J. Wilson, both of 64 Bedford avenue; I. M. Coggins, 804 Mutual Life Building—all of Buffalo, New York.

Chase Tire Sales Corporation, October 26 (New York), $50,000. L. G. and A. M. Chase—both of 14 Verona place; B. C. Ribman, 125 Prospect Park, West—all of Brooklyn, New York. To deal in automobile tires.

Cotton Rubber Works, The, November 6 (Delaware), $25,000. W. I. N. Lofland, F. Jackson, C. L. Harmonson—all of Dover, Delaware.

Downing Tire Stores Corporation, November 19 (New York), $100,000. D. R. Downing, 1985 Creston avenue, Bronx, N. Y.; C. M. and C. J. Downing—both of South Orange, N. J. To manufacture automobile tires, etc.

Estates Crude Rubber Corporation, The, November 16 (New York), $25,000. E. C. Sweeney, Jr., Hartsdale; W. P. McKown and L. Caminez, both of 50 Church street, New York City—both in New York. Principal office, New York City. To deal in crude rubber.

Federal Detachable Rim & Wheel Corporation, November 17 (New York), $2,000,000. L. G. Lacy, P. H. Fitzpatrick, C. Hanna—all of Syracuse, New York. Principal office, Syracuse, New York. To manufacture automobile wheels and rims.

International Products Corporation, November 18 (Delaware), $1,000,000. T. L. Croteau, M. A. Bruce, S. E. Dill—all of Wilmington, Delaware. To deal in crude rubber and to manufacture rubber, etc.

Jefferson Rubber Co., The, October 1 (Wisconsin), $303,000. R. W. Lyons, president; C. R. Girton, vice-president; W. E. Taube, secretary; W. S. Henry, treasurer. Principal office, Jefferson, Wisconsin. To manufacture rubber products, including cord and fabric tires and inner tubes.

Leatherware Company, The, October 28 (New Jersey), $250,000. H. H. Picking; C. O. Geyer; Gordon Grand. Principal office, 525 Main street, East Orange, New Jersey. To buy, sell and otherwise deal in and with, and to export and import, leather-substitute compositions and compounds, rubber compositions and compounds, paper compositions and compounds, etc.

Lorraine Rubber Co., Inc., November 10 (New York), $20,000. C. and R. Bernheim, 18 Wilson place, Mt. Vernon; S. Solomon, 616 W. 207th street, New York City—both in New York. Principal office, Bronx, N. Y. To manufacture rubber goods.

Northeastern Rubber Co., Inc., October 22 (New York), $250,000. M. Boyle; R. Swinnerton; A. B. Royce—all of 31 Nassau street, New York City. To deal in crude rubber, etc.

Paragon Tire Corporation, November 10 (Delaware), $20,000. W. I. N. Lofland; F. Jackson; R. Dunn—all of Dover, Delaware.

Protex-In-Tire Co., Inc., October 26 (New York), $25,000. J. Steinman; L. E. Jennings—both of 176 Livingston street; H. W. Brock, 478 Jefferson street—both of Brooklyn, New York. To manufacture inner liners for tires.

Star Rubber Co., The, November 19 (New York), $10,000. G. Norris, F. L. Driscoll, H. Buette—all of 115 Broadway, New York City. Principal office New York City. To manufacture automobile tires, etc.

Tire Improvement Corporation, October 22 (Delaware), $500,000. T. L. Croteau; M. A. Bruce—both of Wilmington, Delaware.

PERSONAL MENTION

Edward S. Babcox has become vice-president of the *India Rubber Review*, published in Akron, Ohio, which has recently been taken over by a corporation, the editorial and business policies remaining unchanged. Mr. Babcox is well known through former connections with the Firestone Tire & Rubber Co., the Rubber Products Co., *The Christian Herald*, and The Akron Advertising Agency Co.

Charles E. Campbell, for the past 18 years factory manager of the Ashland, Ohio, plant of the Camp Rubber Co. and the Faultless Rubber Co., has removed to his new home at Great Neck, Long Island. Mr. Campbell expects to spend the balance of the current year in a study of manufacturing conditions in the East, with the idea of establishing himself in the rubber sundries manufacturing line about January 1.

J. H. Mullen, who is associated with the St. Louis office of The Manhattan Rubber Manufacturing Co., recently sailed for Paris on the "Olympic," accompanied by Mrs. Mullen. They will tour France, Italy, Switzerland and Spain.

John B. Tuttle, recently chief chemist of Plant No. 2 of the Firestone Tire & Rubber Co., Akron, Ohio, has severed his connection with that company to enter business for himself. He has opened an office at 68 Bank street, New York City, as a consulting chemist and rubber technologist.

Arthur G. Spurlock has been appointed treasurer of the H. H. Robertson Co., Pittsburgh, Pennsylvania, in charge of finances, accounting, credit, collections, etc. For the past four years, Mr. Spurlock has been associated with the American Refractories Co., Chicago, in a similar capacity. The large growth of the H. H. Robertson Co.'s business has necessitated separating the duties of secretary and treasurer, formerly fulfilled by Joseph Myshrall. Mr. Myshrall will continue as secretary in charge of corporate records and correspondence, contracts, office management and similar duties.

S. R. Converse, since 1916 assistant advertising manager of The Goodyear Tire & Rubber Co., has resigned to become advertising manager of the Dunlop Tire & Rubber Corporation of America, Buffalo, New York.

RECENT CHANGES IN ORGANIZATION AND PERSONNEL OF UNITED STATES RUBBER CO.

The new organization plan of the United States Rubber Co. places under unified control the manufacturing and selling activities of the two groups of the company heretofore known as the Mechanical Goods Division and the Footwear Division. It creates the position of second vice-president for four of the company's executives, and it effects a new grouping of other departments and provides new responsibilities for many individuals in the organization.

Vice-president Homer E. Sawyer takes general charge of the two divisions which have been merged. Vice-president J. Newton Gunn will remain in general charge of tires and accessories.

George H. Mayo and Edward J. Coughlin have been made second vice-presidents to serve under Mr. Sawyer. Mr. Mayo will have under his general direction all sales of footwear, clothing, mechanical and miscellaneous goods, while Mr. Coughlin will have charge of the large group of factories engaged in their manufacture.

Mr. Mayo will be assisted by Charles C. Case as general manager, mechanical sales; William F. Enright, general manager of footwear sales; N. Lincoln Greene, general manager of clothing sales; and W. E. Barker, general manager, tire sales.

Mr. Coughlin will be assisted by Myron H. Clark as general manager, footwear and miscellaneous factories, and Harlow W. Waite as general manager, mechanical factories.

Charles J. Butler has been appointed second vice-president of the United States Rubber Co., in charge of tire manufacturing. He will be assisted by George W. Seiberling as general manager of tire factories, and has appointed the following, also: Erwin Meyer, chief consulting chemist, tire factories; John J. Shea, factory manager, Colt Plant, Revere Rubber Co., Providence, Rhode Island; A. P. Delahunt, chief accountant, Colt Plant, Revere Rubber Co., Providence, Rhode Island. George S. Shugart, vice-president of the United States Tire Co., remains in charge of tire sales.

Raymond S. Willis has been appointed second vice-president and will have general charge of purchasing, stocks of raw materials and supplies, and transportation. He will be assisted by William H. Marsh, general purchasing agent; George F. Hichborn, general traffic manager; and James A. Reilly, general storekeeper.

Cyrus S. Ching has been appointed supervisor of industrial relations, Charles F. Lindsay becomes technical assistant to the president, and Eric C. Burkman, executive secretary, president's office.

William G. Parsons has relinquished the title of comptroller, but will continue as vice-president with general supervision over the accounting and treasury departments. Henry B. Hubbard has relinquished the title of assistant comptroller and has been appointed financial manager of sales. William O. Cutter, formerly assistant comptroller, has been appointed comptroller and Harold B. Grouse and Herbert M. James, assistant comptrollers.

Second vice-president Mayo has announced the following appointments: Thomas J. Needham, formerly manager of the Omaha Branch, manager branch store sales; Charles A. Blake, formerly assistant to manager, footwear division, manager sundries sales; George E. Goodwin, manager clothing branch stores; Fred P. Lundy, formerly assistant to A. W. Lawrence, supervisor leather and felt footwear branch stores; John J. Meacham, formerly manager of the St. Louis footwear and clothing branch, manager of the Omaha general branch; C. P. Melton, formerly manager of the Dallas footwear and clothing branch, manager of the St. Louis footwear and clothing branch; Thomas P. Sullivan, promoted from assistant manager to acting manager of the Dallas branch; Walter H. Linck has been promoted from assistant manager to manager of the Philadelphia footwear and clothing branch.

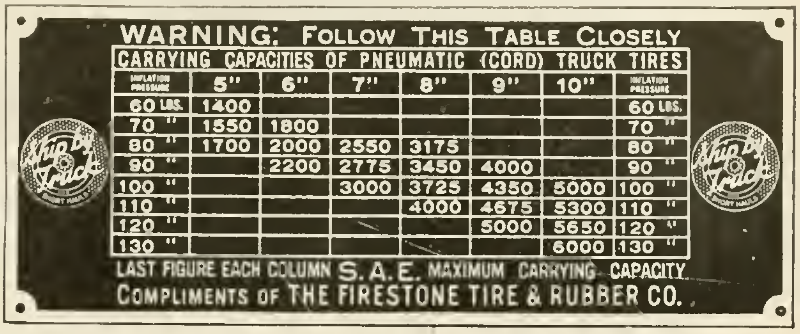
C. C. Case, general manager mechanical sales, has announced the following appointments; W. Gussenhoven, formerly central district manager, mechanical goods division, general sales manager mechanical goods, with headquarters in New York; F. B. Williams, formerly assistant to general manager mechanical goods division, manager of agricultural line, canvas belting (including tractor belts), jar rings, plumbers' specialties, and molded specialties; H. L. Williamson, manager of mechanical production and sales development department, to have supervision over construction, production, changes, eliminations, or additions to mechanical lines; J. A. McIntosh, assistant manager of mechanical production and sales development department; S. E. Abramson, formerly western manager conveyor belt department, district manager central district; E. F. Brownworth, formerly manager packing department, supervisor store stocks; H. N. Winner, manager packing department.

W. F. Enright, general manager footwear sales, has announced the following appointments: Edward R. Bartlett, formerly manager of Philadelphia branch, production manager footwear sales; H. J. Haefelein, formerly assistant to general selling agent, distribution manager footwear sales.

AN OVERLOADING AND UNDERINFLATION WARNING

One of the most costly errors made by motor truck drivers is the careless underinflation of tires. Like overloading, this practice causes rapid deterioration of the tires and eventually a big cash loss to the truck owner.

The Firestone Tire & Rubber Co., Akron, Ohio, is now sending to truck manufacturers who equip their output with Firestone tires a stock of hand-etched zinc plates, 2 by 5 inches in size, to be attached to the cowl of each truck before it leaves the factory. The plate bears a warning against overloading and underinflation, together with a table showing the carrying capacity of pneumatic (cord) tires of various sizes and the proper inflation for each. The figures are based on computations made by the Society of Automotive Engineers. A pamphlet with full instructions for the application of giant cord tires and demountable rims is also furnished for placing in the tool box of each truck, as a ready reference.



WARNING: FOLLOW THIS TABLE CLOSELY

CARRYING CAPACITIES OF PNEUMATIC (CORD) TRUCK TIRES

INFLATION PRESSURE	5"	6"	7"	8"	9"	10"	INFLATION PRESSURE
60 LBS.	1400						60 LBS.
70 "	1550	1800					70 "
80 "	1700	2000	2550	3175			80 "
90 "		2200	2775	3450	4000		90 "
100 "			3000	3725	4350	5000	100 "
110 "				4000	4675	5300	110 "
120 "					5000	5650	120 "
130 "						6000	130 "

LAST FIGURE EACH COLUMN S. A. E. MAXIMUM CARRYING CAPACITY

COMPLIMENTS OF THE FIRESTONE TIRE & RUBBER CO.

A SECTIONAL TUBE REPAIR

When a tube blow-out covers an area which it is impossible to repair by patching, and where the condition of the remainder of the tube is such that a new section is justified, a new section should be inserted 5 inches longer than the section removed. This will allow a 2½-inch lap at each end, to insure adequate strength.

Bevel the inside edges of the tube and the outside edges of the section to be inserted. This may be done by turning the edges over a splicing or wooden mandrel, and beveling ½-inch from the end. Use a sharp knife. The work will be facilitated, if the knife is kept wet.

Buff the beveled edges 3 inches back from each end of both tube and insert, and apply two coats of .048 cement, allowing each to dry. Then apply the acid curing solution about 2 inches in width with a camel's-hair brush and quickly slide the tube off the large mandrel over the turned back edge of the tube on the smaller mandrel. This should be accomplished in not more than ten seconds, owing to the rapidity with which the acid curing solution vulcanizes. Wrap tightly with bands of rubber, approximately 1 inch wide and 2 feet in length. Allow to stand for fifteen minutes.—*Miller Tire Trade News.*

THE "BULL DOG" INNER TIRE

The "Bull Dog" inner tire is an article that, according to its manufacturer, would save the lives of thousands of tires if their owners could be converted to its use. It is constructed of three plies of Sea Island tire fabric vulcanized in pure rubber, formed exactly to fit inside the different sizes of tires. Bull Dog inner tires are said to reinforce a tire completely by adding three plies of fabric and can be installed by anyone in a few minutes. They vulcanize themselves in, will never creep, pinch or wrinkle, and are strong enough to stand the full pressure of the tube. By their use the makers guarantee that ninety-five per cent of punctures can be eliminated.—Eastern Auto Specialty Co., Utica, New York.

THE NEW HOME OF S. BIRKENSTEIN & SONS, INC.

December 1, 1920, is moving day for the home office and warehouse in Chicago, and the Philadelphia branch of S. Birkenstein & Sons, Inc., dealers in scrap rubber and other waste materials. On this day this old and well-known firm moves its executive offices and warehouse into the new $500,000 building at 1030 to 1056 West North avenue, corner of Hawthorn street, Chicago, Illinois, probably the largest and finest building of its kind in America.

S. Birkenstein & Sons' New Plant at Philadelphia, Pennsylvania

It is a substantial four-story structure of reinforced concrete, with street frontages of 335 and 100 feet, respectively, affording 90,000 square feet of floor space. At the rear it is served by two railroad sidings accommodating twelve freight cars. The plant is brilliantly lighted by large windows on all sides and thoroughly equipped with all the latest devices for handling the materials in which the firm deals, including three large electric elevators, several platform scales and smelting furnaces and presses in the basement. Commodious and handsomely furnished offices, including the general offices, eight private offices and a directors' room, occupy about one-third of the second floor. At the opposite end of this same floor, tastefully arranged rest rooms and shower baths are provided for employes.

The Philadelphia branch will move simultaneously into new quarters at 25th and Ellsworth streets, where with spacious offices and warehouse it will be in position to enhance the already splendid service this branch has been giving the Eastern trade.

The New York and Minneapolis offices, as well as the warehouses in St. Louis, Milwaukee, Dayton and Indianapolis, will remain as before. All told, the business now occupies some 400,000 square feet of floor space, as contrasted with the 7,500 square feet of the first Chicago warehouse.

Like most successful firms, the house of Birkenstein had a modest beginning and its expansion resulted from square dealing and steadfastness of purpose. The business was originated by Sigmund Birkenstein in 1860. In 1871 the unpretentious building which housed the entire business was destroyed in the great Chicago fire. The insurance companies were unable to make good the loss, but with only a good name and an indomitable will Sigmund Birkenstein paid his debts and started again. In 1890 he purchased his partner's interest and continued alone until in 1890 his son, Louis, became a partner and the firm name was changed to S. Birkenstein & Son. In succeeding years his sons, Harry, Albert and Milton, were admitted to the firm, which became S. Birkenstein & Sons. Sigmund Birkenstein died in 1900, but the sons have continued to develop the business, and in 1919 the firm was incorporated to enable many faithful employes to share its success by acquiring stock.

The present officers of the company are Louis Birkenstein, president; Harry Birkenstein, vice-president; Albert Birkenstein, secretary; Milton Birkenstein, treasurer, who, together with Jesse Long, manager of the New York office, constitute the board of directors.

PRICE GUARANTY ON RUBBER GOODS

The Federal Trade Commission at Washington recently heard representatives of manufacturing interests in a discussion of the trade practice of a guaranty against price decline. It was claimed that the custom tended to make lower prices to the consumer because of its stabilizing effect on markets. M. E. Clark declared the rubber industry, of which he was spokesman, unable to operate effectively without use of the guaranty. He said that 55 out of 69 of the principal tire and rubber manufacturers employ it because of the seasonal demand for their products and because dealers will not accept the risk unless they have assurance that prices will remain at or above the level at which the purchase was made. Mr. Clark asserted that practically all manufacturers of motor tires had been compelled to make refunds to their dealers under the guaranty contracts when the slump in the markets came last year, and in his belief, as a result of the guaranty, the consumer had obtained the benefit of lower prices much sooner than had the dealers been loaded up on high-priced stocks on which they must carry their loss alone.

New Home of S. Birkenstein & Sons at Chicago, Illinois

THE RUBBER TRADE IN THE EAST AND SOUTH

By Our Regular Correspondent

NEW YORK AND EASTERN NOTES

The Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin, has recently acquired the property at 137th street and Southern Boulevard, New York City, as an additional plant for the manufacture of "Thermoplax" and "Pyroplax" molded electrical insulation. The five-story building on this property has been completely equipped with presses for this work. When working at capacity the new plant will have an output equal to the company's insulation plant in Milwaukee, which has been running two shifts day and night for the past three years. The New York plant will take care of the company's eastern business and is in charge of F. J. Boller, formerly of the Milwaukee insulation department.

George R. Sweeney, George W. Sniffen, and Charles R. Sweeney have formed a crude rubber brokerage partnership to be known as Sweeney, Sniffen & Sweeney, with offices at 24 Stone street, New York City.

Wallace L. Gough, india rubber, gutta percha and balata, has reestablished his office at 12 State street, New York City.

The Allen Machine Co., Erie, Pennsylvania, recently removed its eastern and export department in New York City from 17 West 42d street to 5 Columbus Circle. M. A. Pearson is the sales engineer in charge.

Henry F. Lodge, the well known specialist in white barytes, has become associated with the J. C. Finck Mineral Milling Co., St. Louis, Missouri, and will be located with E. M. & F. Waldo, eastern sales agents for the Finck company, whose offices are at 11 Broadway, New York City.

Netherlands Corporation for Oversea Trade announces its removal from 135 Front street to 44 Beaver street, New York City.

The Alliance Tire Company has removed to larger quarters at 215 West End avenue, near 70th street, New York City.

The forty-first annual meeting of the American Society of Mechanical Engineers will be held December 7-10, 1920, at the Engineering Societies Building, 29 West 39th street, New York City. Transportation and its problems will be the keynote of the meeting and there will be a discussion of important phases by experts.

The Tireheal Manufacturing Co., which was recently incorporated, has offices at 17 Battery Place, New York City. It manufactures "Tireheal," a preparation used to heal punctures in automobile, motorcycle and bicycle tires. The officers are: V. S. Gavito, president; F. Troncoso, vice-president; Javier Pina, treasurer, and David R. W. Arscott, secretary.

The Powertown Tire Corporation, whose home office is at Buffalo, New York, has established a factory branch for the distribution of Powertown cord tires at 434 West Main street, Waterbury, Connecticut. Spencer B. Bedell is manager of the new branch.

PENNSYLVANIA NOTES

The Shenango Tire & Rubber Co. is erecting a plant 60 by 262½ feet at Greenville, Pennsylvania, for the manufacture of "Shenco" quality test cord tires and tubes. The building will be one- and two-story with basement, of concrete, brick and steel fireproof construction and is intended to be one of the most modern and efficient rubber plants in the country. The total estimated cost, including machinery, will be $225,000. The plant is expected to be ready for occupancy not later than May, 1921, and will have a capacity of five hundred tires and one thousand tubes per day. Officers and directors of the company are C. E. Shurtliffe, president and general manager; C. T. Kinney, vice-president; W. N. Raach, secretary and treasurer; H. J. Huff, and B. L. Eaton.

The Wyoming Tire & Rubber Co., Wilkes-Barre, Pennsylvania, has recently reorganized and has purchased the Perma-Loc Manufacturing Co. It is the company's intention to expand the business of the Perma-Loc and it is now doubling its selling force.

The Sure-Foot Heel & Rubber Co., Gettysburg, Pennsylvania, has been capitalized for $150,000, and incorporated under the laws of Pennsylvania, to manufacture a detachable rubber heel invented by S. F. Snyder, who is secretary and treasurer of the new corporation. Other officers of the company are O. J. McNitt, president; H. T. Weaver, vice-president; R. M. McKay, general manager. The directors include, besides these officials, P. B. Rice, W. E. Pitts and Henry Scharf, Sr. The company has a large brownstone factory building situated beside the tracks of the Philadelphia & Reading and Western Maryland railroads. Machinery has already been installed with a capacity of 200 gross of heels per day, and the general manager reports a large demand.

Allen Tire & Rubber Co., 510 Hamilton street, Allentown, Pennsylvania, reports that the first unit of its new plant at Bachman Terrace has been completed and practically all the machinery installed. The second unit is under roof and will soon be completed.

The United States Compression Inner Tube Co. Pittsburgh, Pa., expects to have the first unit of its plant at Kittanning, Pennsylvania, in operation about January 1, 1921. A large force of men is at work installing the equipment which includes rubber machinery of the latest type. The plant will be run by electrical power, steam being used only to cure the rubber and heat the plant in cold weather. The plant in Kittanning will be the largest of the company's three plants when all the units are built and will handle all business east of the Mississippi river.

The United States Rubber Co. has moved its Philadelphia office, sales, sample and stockrooms from its former location to 509 Market street, where several floors of that building are now occupied.

Plans are being prepared for a pumping station and rubber cement building for the Traveler Rubber Co., Bethlehem, Pennsylvania. The company manufactures automobile tires, and recently completed its main plant at a cost of about $150,000.

SOUTHERN NOTES

At a stockholders' meeting of The Dixie Rubber Co., 766 Randolph Building, Memphis, Tennessee, a new set of directors was elected as follows: R. J. Williams, John H. McBee, Robert M. Newton, A. B. Reese, R. E. L. Morgan, Dr. B. F. McNeal, C. B. Box, Dr. R. B. Crisler and W. H. Powell. William J. Green, who is assistant secretary-treasurer, reports the stockholders to be well pleased with the future prospects of the company.

Claude Hartwell has been made special factory sales representative of the International India Rubber Corporation, South Bend, Indiana, in charge of Indiana, Southern Ohio, Southern Illinois, and the States of Kentucky and Tennessee. Mr. Hartwell has a long and successful record as a tire salesman, and the advantage of a close personal acquaintance with the majority of tire buyers in the territory he is taking over.

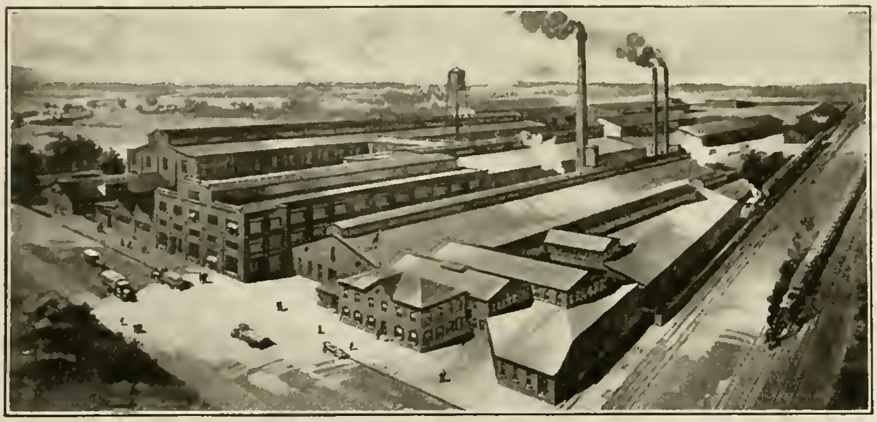
F. J. Sellers has been appointed sales representative of the International India Rubber Corporation, South Bend, Indiana, to cover North and South Carolina, Georgia, Florida, Alabama, Mississippi, and Louisiana.

Louis Götting, general export manager of The Gordon Tire & Rubber Co., Canton, Ohio, has left for a trip of several weeks in Old Mexico and Cuba. Mr. Götting will establish a branch of the company's export department in Mexico City, and will return via Cuba where he will remain for some time to attend to the company's increasing business in that island.

HISTORY OF THE THERMOID RUBBER COMPANY

The story of the growth of the Thermoid Rubber Co. begins in March, 1876, with the purchase by Allen Magowan, then superintendent of the Whitehead Brothers Rubber Co., of a triangular bit of farm land on the outskirts of Trenton, approximately forty acres in extent. Mr. Magowan was far-seeing in his purchase, and four years later he resigned his position and together with Frank A. Magowan and Spencer Alpaugh, founded the firm of Magowan, Alpaugh and Magowan, manufacturers of rubber, each of the three partners having an equal share. The triangular piece of farm land became the site of their two small buildings. The whole factory was only as large as the present brake lining and calender departments of the Thermoid Co., but excellence of products, not size of plant, is what builds firm reputations, and the new company's belting, hose, car springs and bumpers, packing, valves, and wringer rolls became well known, bringing deserved success.

A few years later the company built a factory for the manufacture of rubber carriage cloth and maintained it as the Empire Rubber Co. They afterwards bought the plant of the Star Rubber Co., moved the machinery of the Empire works there, absorbed the business, and added mechanical rubber goods and later bicycle tires to their line. About this time Mr. Alpaugh sold his interests to the Magowans and the company became known as the Trenton Rubber Works. In 1881 the concern was incorporated as the Trenton Rubber Co. The purchase of the Hamilton Rubber Co. in the early 90's enabled the Magowans practically to monopolize the rubber business in Trenton.



Plant of the Thermoid Rubber Company, Trenton, New Jersey

Every business suffers reverses, however, and in 1895 and the two years following, one failure was weathered and a second occurred. The Trenton Rubber Co. was sold to the Stokes' interests, the name was changed to the Trenton Rubber Manufacturing Co., under which it was incorporated, September 7, 1897. Under the new ownership and management the company continued to grow, the most important addition to their line being asbestos products. The popularity of the company's brake lining increased to the extent where it became necessary to manufacture under a brand, to protect both trade and consumer. The name "Thermoid" was chosen, a derivative from the Greek *thermo* (hot), because the brake lining had demonstrated its unique resistance to heat. This trade mark became so well known that the company decided to adopt it as a firm name, and in July, 1909, the Trenton Rubber Manufacturing Co. became the Thermoid Rubber Co.

The automobile industry having given the most positive proof that it had become a factor in transportation and had come to stay, the Thermoid Rubber Co.'s expansion policy dictated the manufacture of such accessories as tires and tubes, radiator hose, rubber bumpers and the like. Increased production demanded additional floor space and in 1915 and 1916 new buildings were added, including a two-story structure for the hose and Thermoid-Hardy disk departments. Other buildings have followed, until at present the plant stands as shown in the illustration.

Backing a trade mark with the firm's integrity based the success of the Thermoid Rubber Co., which has been further established by a spirit of cooperation throughout the entire organization that enables it to face the future with increasing optimism.

THE RUBBER TRADE IN NEW JERSEY

By Our Regular Correspondent

TRENTON NOTES

The slump in the tire industry is still being seriously felt at the Trenton factories, especially where tires are the only product. The stock rooms of the plants have virtually been cleaned out of all grades of tires and the retail stores stocked up. Rubber manufacturers do not expect, however, that the tire industry will begin to show signs of activity until early spring. Some of the plants have laid off a number of tire makers, while others have cut down the working hours so that employes can do all their work by daylight, and find this a better plan than laying off tire makers. The mechanical end of the rubber industry is holding its own and is expected to be brisk during the winter. The slackening up in business also affects the plants where hard rubber goods are manufactured.

A number of Trenton rubber manufacturers were represented in the rubber divisions of the big political parades held in Trenton, both before and after election. The United & Globe Rubber Co. and the Globe Rubber Tire Manufacturing Co. had the largest turnouts. The Thermoid Rubber Co., Essex Rubber Co., and the Semple Rubber Co., had many floats in the line. The girl employes of the Essex company, dressed in white, paraded and sang political songs. John S. Broughton, president of the United & Globe Rubber Co., and Robert J. Stokes, secretary of the Thermoid Rubber Co. were members of the Republican committee in charge of the parade.

Frederick W. Bechtel, for eighteen years associated with the Empire Tire & Rubber Corporation, Trenton, as a mechanical engineer, has resigned to accept a similar position with the Crescent Insulated Wire & Cable Co., also of Trenton. The employes of the Empire company gathered in the main office of the company and presented Mr. Bechtel with a handsome gold watch as a token of the esteem in which he is held by them.

The Department of Rubber Technology of the School of Industrial Arts of the city of Trenton announces a course of twenty lectures by William F. Zimmerli, Ph.D., chief chemist of the Howe Rubber Co., New Brunswick, formerly assistant professor of chemistry in charge of the course in rubber chemistry at the Municipal University of Akron, Ohio. The course will cover the history, theory and practice of the rubber industry and is intended for all in the rubber industry without technical training who wish to broaden their knowledge of the general subject of rubber. Lectures will be given on Tuesday and Friday evenings during the months of December, January and February and questions and discussions will follow each lecture. For details, address Frank F. Frederick, director, The School of Industrial Arts, Trenton, New Jersey.

A verdict of $14,630 has been awarded in the United States District Court to the John E. Thropp Sons Co., Trenton, against the Hardman Rubber Corporation, New Brunswick. The Thropp company sued to recover the purchase price of equipment for

making tires furnished the Hardman company. The Hardman company contended that the apparatus was not usable and filed a counter claim. Judge Bodine dismissed the counter claim.

Sydney J. McCabe, connected with the Pocono Rubber Cloth Co., Trenton, has removed to Trenton from Leechburg, Pennsylvania, and purchased the West State street residence of William G. Zimmerman, vice-president of the Zee-Zee Rubber Co., of Yardville.

The Economy Tire Store has opened an establishment at 156 East Front street, Trenton, with George MacTighe as general manager.

The Grizzly Rubber Co. has opened a store at 576 Perry street, Trenton, and announces that a Grizzly tube will be given free with the purchase of every tire.

John O. Bigelow, 786 Broad street, Newark, New Jersey, who was recently appointed by the United States courts as receiver for the Trent Rubber Co., Trenton, has asked creditors of the company to present their claims. Mr. Bigelow intimates that the Trent Rubber Co. is solvent.

The executive and sales offices of the Globe Rubber Tire Manufacturing Co. are now located at its factory in Trenton.

MISCELLANEOUS NEW JERSEY NOTES

A questionnaire has been mailed by Warren C. King, president of the Manufacturers' Council of New Jersey, to more than 2,000 manufacturers, including the various rubber concerns, with the request that the manufacturers take a vote on the following: "Do you favor a continuation of daylight saving by moving the clock forward for one hour March 31 and returning to standard time on October 30 each year?" In his letter to the manufacturers President King said:

"Advocates of daylight saving have urged that it would prove a great benefit to factory workers. We have had two years' experience and the advantage is still a question. There has never been a vote taken on this important matter among the employes of the factories and the Manufacturers' Council feels that the opinion of the employes should be obtained to determine once and for all their desire to have daylight saving continued during the summer months."

The store of the Star Tire Exchange, 229 Broad street, Elizabeth, New Jersey, was damaged recently by fire to the extent of more than $15,000. The stock of the store amounted to $35,000, but some of the tires were saved.

The Atlantic City Tire & Rubber Corporation, Atlantic City, New Jersey, has purchased a site on Mediterranean avenue, where it will erect at once, for the manufacture of tires and tubes, a modern plant having a capacity of about 400 tires and 500 tubes per day.

Judge Freeman Woodbridge, of New Brunswick, New Jersey, has handed down a decision to the effect that theft insurance paid on a tire must be returned to the insurance company in the case of recovery of the tire. The owner of a machine at New Brunswick had a valuable tire stolen from his machine, and an insurance company adjusted the loss with him. It was later learned that the tire had been stolen as a joke and subsequently the insurance company demanded the return of the money.

John Tenney, president of the Howe Rubber Co., New Brunswick, has been made a director of the Hysig Co., Plainfield, New Jersey. This company contemplates the erection and equipment of a factory for the manufacture of the Hysig signal for motor cars.

De Mattia Brothers, Garfield, New Jersey, manufacturers of rubber mill machinery, have had plans prepared for a mezzanine floor type building to cost in the neighborhood of $200,000, to be erected adjacent to the present foundry at Clifton. Actual operation on the addition will be postponed until general conditions become somewhat more settled.

The NoCeem Rubber Corporation, Harrison, New Jersey, has the following officers; president, Harry S. Quick; vice-president and general manager, W. L. Fairchild; treasurer, Edward S. McGrath; secretary, Avery McDougall. It manufacturers the "NoCeem" corrugated red cord inner tube.

The Stockton Rubber Co., Stockton, New Jersey, was forced into bankruptcy in the United States District Court of New Jersey, owing to shortness of working capital. The plant of this company is at present in first-class condition and ready to resume operation.

The Rubberset Co., Newark, New Jersey, intends to erect a one-story machine shop at its Wilson avenue plant to conform with the general type of buildings now at this plant. The company reports its machine shop requirements have become so great that it is necessary to maintain a shop at this factory as well as the large machine shop at the Ferry street plant.

Employes of Brighton Mills, Inc., Passaic, New Jersey, have erected a fitting memorial to their coworkers who died in the World War. The monument, placed on a mound near the entrance to the Passaic plant, is a finely proportioned two-ton boulder bearing a bronze tablet with the following inscription: "Dedicated to the men of the Brighton Mills who made the supreme sacrifice. 1917—The World War—1919. Harry Miller, Neil Visbeck, Stephen Patrick, Richard Goggin, Jacob Halpern. Erected by their co-workers." The dedicatory services were held at the close of the day's work and were attended by hundreds of workers in both plants as well as by many of the relatives of the five men to whose memory the stone has been erected. The committee of arrangements for the dedication consisted of William A. McCann, John R. Meader and Edmund Sennert.

WATSON-STILLMAN CO. REWARDS LONG SERVICE

On November 1 the Watson-Stillman Co., manufacturer of rubber machinery, Aldene, New Jersey, conferred souvenirs of service on eight men who have been identified continuously with the firm for more than twenty-five years. A watch fob was presented to Carl Wigtel and suitably inscribed gold watches were presented to Walter Watson, William Graudorf, T. W. Hammond, A. D. Carnes, J. Hardy, William Koshwitz, William Meily and C. J. Wessels as tokens of appreciation.

Walter Watson, a skilled machinist and brother of the late Thomas Watson, completed his fiftieth year on that day and in commemoration of his long and faithful services he was presented with a check for $1,000 accompanied by appropriate resolutions in which it was stated that on Mr. Watson's voluntary retirement from employment the company would pay him $65 per month during his life, and on his death $50 per month to his wife during her life. A copy of the resolutions has been framed and placed in the company's offices and a handsome eight-page brochure devoted exclusively to the day's events has been printed.

THE RUBBER TRADE IN MASSACHUSETTS

By Our Regular Correspondent

BOSTON NOTES

The representatives of the rubber trade present at the regular Fall meeting and luncheon of the New England Shoe Wholesalers' Association, held at Young's Hotel, Boston, on October 27, expressed the opinion that the rubber footwear industry is destined to be more prosperous than ever. That although there is a general feeling that prices of all commodities must be reduced, the rubber companies themselves have not yet reached that question, partly because rubber footwear prices have never advanced anywhere as much as those of leather footwear. As a matter of fact, advances in rubber and canvas footwear have been only between 27 and 30 per cent in the past 10 years. It was stated that during the past 10 or 15 years there has been a steady increase in the demand for fabric footwear. The cost of labor in the manufacture of canvas footwear is now about 41 per cent of the total cost,

as compared with 21 per cent prior to the war. The cost of crude rubber has declined to 11 per cent, compared with 25 per cent before the war, while the cost of fabrics is 27 per cent against 11 per cent formerly.

A. S. Carlton, for many years connected with Seaver & Co., has become associated with the Union Chemical Co., 27 Haymarket square, Boston, as vice-president. Mr. Carlton is considered an expert on carbon, lamp and bone blacks and gladly offers his assistance to all users of these materials.

One of the most interesting and instructive features of the annual meeting of The Associated Industries of Massachusetts was the round table discussion on financial questions conducted by Frank A. Vanderlip, a director of the United States Rubber Co. and formerly president of the National City Bank of New York. The two sessions of this conference were attended by over three hundred treasurers of member concerns, many of whom joined in the discussion and plied Mr. Vanderlip with questions, particularly regarding foreign exchange and its relation to industrial and political conditions in Europe.

Mr. Vanderlip referred to Frederic C. Hood's idea of extending help to a corporation that has got into difficulties as one of the finest ideas expressed in American finance.

S. M. Beatty has been appointed district manager of The Goodyear Tire & Rubber Co., with headquarters in Boston. Mr. Beatty joined the Goodyear forces eight years ago, handling inside sales at Springfield and has since made rapid progress, having been successively in charge of the Providence branch, manager of the Eastern division of the tire department, acting also as instructor to 300 men in the sales school teaching Goodyear policy, manager of the Philadelphia branch, and district manager at Indianapolis, in charge of the branches at Louisville, Indianapolis, Cincinnati, Dayton and Cleveland. He was tendered an official welcome when he took up his new duties.

J. Frederick Jones has been appointed manager of the Boston branch of the Portage Tire Co. Mr. Jones was previously with the Given Tire Co. on the Pacific coast. He is eminently qualified for the duties of his new position, having had practical experience in establishing the business of the Gates Tire Co. in this section of the country.

President Louis Grow, of the United Motors of New England, was given a dinner recently at the Hotel Victoria, Boston, by his associates in the trade. George R. Green, on behalf of those present, tendered Mr. Grow a substantial gift. President Samuel Grow, of the Grow Tire Co., gave an interesting talk on the tire situation.

Joseph F. Dineen, for several years publicity manager of the Boston branch of The B. F. Goodrich Rubber Co., has been appointed executive secretary of the Motor Truck Club of Massachusetts, with headquarters at 1 Beacon street, Boston. He will have charge of a monthly magazine that will be sent out to truck owners in Massachusetts and also represent the club at all legislative and municipal hearings. Mr. Dineen is well fitted for this work, owing to his previous connection with the Goodrich company, where he edited their house organ *Pep*, and also his several years' experience with the automobile department of one of the Boston newspapers.

Guy Niles, of the Boston branch of the Lee Tire & Rubber Co., recently announced that as a result of the decrease in prices for Lee tires, sales have advanced more than 400 per cent. More than 30 local dealers were added to the Boston agency within two weeks.

Walter Martin, secretary and purchasing agent of Everlastik, Inc., Boston, together with his father, returned recently from a two-months' vacation trip in England.

MISCELLANEOUS MASSACHUSETTS NOTES

W. B. Laighton, of the Hood Rubber Co., Watertown, who left for the Far East the middle of last August, is expected to land in Seattle about December 15. His trip was for the purpose of studying conditions in Japan, China, the Philippines, Singapore, India, Siberia, Manchuria and Hawaii.

The Avon Sole Co., Avon, has begun production on a large scale of a waterproof rubber slip to take the place of the rawhide slips which are often put in shoes to make them waterproof. Many firms are now using this new method of waterproofing their winter shoes. The new slip is economical and serviceable, giving the shoe resiliency and a beautiful finish to the edge of the sole. The material is supplied in both the white and tan shades and is made up into blocks, if manufacturers so prefer it, and can be shaved to any thickness desired.

Frederic C. Hood, treasurer of the Hood Rubber Co., Watertown; William H. Gleason, former treasurer of the Revere Rubber Co., Chelsea; Richard H. Rice, manager of the General Electric Co., West Lynn, and Edward F. Green, treasurer of the Crompton & Knowles Loom Works, Worcester, were among the prominent business men elected to the executive committee of The Associated Industries of Massachusetts at its annual meeting October 28.

R. S. Quinby, manager of the service department of the Hood Rubber Co., Watertown, read a very interesting paper on group insurance at the recent annual meeting of the Associated Industries of Massachusetts, outlining the plan which became effective with his company on January 1, 1919.

The English classes for employes of the Boston Woven Hose & Rubber Co., Cambridge, were resumed just after Columbus Day in a new class-room especially equipped for the purpose. Classes are held from 4.30 to 5.30 in the afternoon, the company paying for half an hour's time and the employes standing the other half.

The company's new restaurant for employes, opened early in September, is now serving a substantial wholesome luncheon to about three hundred persons daily at prices which merely cover the cost of materials and service.

An interesting new system of payment is being tried out in the employes' restaurant of the Converse Rubber Shoe Co., Malden. Instead of cash payments, as formerly, 50-cent and $2 tickets are obtained on a slip signed by department foremen, the amount being deducted from the week's pay.

The Converse Benefit Association opened its winter season of social activities at Mystic Theatre on the evening of October 24 with a motion picture and vaudeville show in which the amateur theatrical talent of the factory rivaled that of professional performers. The event was in the nature of a reception to new members.

A suggestion system has been put into effect in the factory of The Fisk Rubber Co., Chicopee Falls. Those with ideas for changes and improvements are asked to write them on special blanks, seal, and deposit them in the box provided for this purpose. They will then be collected and passed upon by a committee. Good ideas which have a money value will be rewarded with cash. Foremen and others whose duties are maintaining and improving efficient shop practice are not allowed to participate.

The Fisk Rubber Co., Chicopee Falls, has employed a specialist to examine the eyes of employes, not only for accidents, but for glasses. He will make the same thorough examination that he does in his private practice and will also see that glasses are fitted properly. For this examination the charge will be $1.50, which is $3.50 less than the regular fee. The company is to bear this difference in expense. Arrangements are also made so that the glasses can be purchased at a 10 per cent reduction.

The general safety committee of the Tyer Rubber Co., Andover, Massachusetts, is arranging for a series of moving pictures dealing with safety subjects. Excellent results are being accomplished by the company's new organization for safety, and although the mills of the company have always been remarkably free from accident, there has been a noticeable improvement in safety conditions, owing to the careful inspection by the workmen's commit-

tee, and the prompt attention by the general committee.

The Tyer Rubber Mutual Relief Association, an insurance organization by and for the employes of the Tyer Rubber Co., Andover, Massachusetts, is nearing the completion of its most successful year, the treasurer reporting a large surplus. Because of the amount of available funds and the increasing interest among the employes, it is proposed to raise the amount of the death benefit.

To expedite the reading of the more important trade and business magazines and publications, the foremen and executives of the Tyer Rubber Co., Andover, Massachusetts, have been arranged in groups which will receive the various publications in rotation. This movement is in line with that of many other business organizations which realize the value to employes of a knowledge of general trade conditions.

ACTIVE HEAD OF THE TYER RUBBER CO.

Frederick H. Jones, treasurer and general manager of the Tyer Rubber Co., Andover, Massachusetts, has the unique record of thirty-six years' continuous service with this company. Born in Andover, Massachusetts, September 28, 1867, he secured his early education at the public schools in that town. At the age of seventeen he entered the employ of the Tyer Rubber Co. as office clerk, and so well did he apply himself, that he was successively advanced to the positions of bookkeeper, salesman, sales manager and then to the executive positions which he now holds.


Frederick H. Jones

Mr. Jones is interested in numerous other enterprises, being at the present time a director in the Andover National Bank, Merrimack Mutual Fire Insurance Co., Cambridge Mutual Fire Insurance Co., Andover Press, Hamilton Emery & Corundum Co., Mechanical Rubber Manufacturing Co. and Tyer Rubber Co. Also he is a trustee of the Andover Savings Bank.

In addition to his many business interests Mr. Jones finds time to devote to agriculture, and he has a farm in Andover, a few miles from his residence. He also has an all-year home in Higganum, Connecticut, where he spends many week-ends. His favorite sports are golf, fishing and mountain climbing.

Mr. Jones is a member of several commercial associations, clubs and fraternal organizations, including The Rubber Association of America, Boston Chamber of Commerce, Automobile Association, Meadow Brook Golf Club, Belmont Spring Country Club, North Andover Country Club, Merrimack Valley Country Club, Wild Goose Club, Harmony Club, Maine Club, Boston City Club, Middlesex Club and Masonic lodges.

THE RUBBER TRADE IN RHODE ISLAND

By Our Regular Correspondent

The prospects for the next few months among the plants manufacturing rubber goods in Rhode Island are far from encouraging, according to the reports received during the last fortnight or so. Not only have several of the largest textile concerns that manufacture fabrics for tires materially curtailed their production, but the plants of subsidiary concerns of the United States Rubber Co. have also gone on short time schedules. This curtailment by these large manufacturing establishments affects the entire industrial interests of the State and already the effects of even partial closing of these mills are being keenly felt by hundreds of operatives and their families.

According to officials of the National India Rubber Co., at Bristol, Rhode Island, curtailment of production at the big plant will be necessary for the remainder of the year. The curtailment is said to be due to the lack of orders in both the wire and shoe divisions, and will affect more than 4,600 employes, 600 of whom are in the wire division. George E. Shaw, superintendent of production of the wire division, stated early in the month in the *Keds Live Wire*, the factory newspaper that several departments in the wire division will work eight hours a day, five days a week. Beginning the first week in the month, all manufacturing and maintenance departments commenced on the five-day schedule, reducing to eight hours as fast as possible. The eight-hour feature, however, was not possible in the Keds division until after November 15. All manufacturing and maintenance departments were closed Thursday, Armistice Day, remaining closed until the following Monday. The plant was also closed the day before Thanksgiving, for the remainder of the week. This schedule, however, did not affect office clerks and factory clerks.

The wringer department of The American Wringer Co., Woonsocket, Rhode Island, was closed Saturday, November 20, to remain shut down until December 6. General business depressions and market conditions were held as responsible. While this department has not been running full, approximately 600 workers are affected at this time. The mechanical roll department is kept in operation. Announcement was made by the management that, due to the readjustment period which the country is facing at present, it had been found necessary to reduce the wholesale prices on the product of the company, and it is felt that this may result in better conditions and bring about more orders for wringers and thus improve conditions.

The James P. Allen Co., Inc., engaged in the manufacture of elastic braids at 90 Bayley street, Pautucket, Rhode Island, is removing to Dixfield, Maine, where a new factory has been erected for the use of the concern. The new plant will employ from 75 to 100 persons.

Employes of the Tubular Woven Fabric Co. dedicated the new mill addition to the company's plant on Pawtucket avenue, Pawtucket, Rhode Island, on the night of October 29, with a Hallowe'en costume party. There was a grand march at 9.30 o'clock and a distribution of prizes to the dancers appearing in costumes. The new addition was brilliantly illuminated for the occasion and the interior decorations were in keeping with the harvest season.

PROVIDENCE NOTES

The United States Rubber Co. has just purchased a small tract of land on the southerly side of Sprague street, Providence, containing approximately 10,000 square feet of land. This is adjacent to the property of the Mechanical Fabric Co.

The Davol Rubber Co. Mutual Benefit Association held its second annual dance on Friday evening, November 19, at the Girls' City Club, Providence, an orchestra providing the music. The affair, which was well attended, was in charge of a committee consisting of L. P. Williams as floor director, Allan D. McQuarrie as assistant, and Frederick Keenan, Thomas Ryan, Alfred Goff, Frederick Leach, Miss Nellie Ward, Miss Annie Reilly, Miss Annie Keegan and James Shea.

A new fife and drum corps has been organized from among the employes at the plant of the National India Rubber Co., Bristol, Rhode Island.

Aager H. Bense, for ten years general storekeeper at the factory of the National India Rubber Co., has accepted a position with the O'Bannon Corporation at West Barrington, Rhode Island.

In furtherance of its plan of extension and improvement the Revere Rubber Co. has commenced the erection of a one-story workshop of brick and concrete to front on Eagle street, Providence.

Goodrich Honors Twenty-Year Service Men

Thirty-eight veterans of The B. F. Goodrich Rubber Co. who have completed twenty years of service with the company were initiated into the Goodrich 20-Year Service Order at the Second Annual Veterans' Banquet and Entertainment held in Akron, October 26.

Gold service pins were presented to the veterans following the banquet, which was attended by company officials and the 175 Goodrich employes who last year became members of the honor order. The event was marked by addresses by W. O. Rutherford, one of the veterans who in two decades rose from a clerkship to vice-presidency, and by Bertram G. Work, president, and H. K. Raymond and C. B. Raymond, vice-presidents.

After the presentation of the medals, an all-Goodrich minstrel and musical entertainment was staged to show how the spirit of seven stores. Compare that with today. Now the company is capitalized at more than $100,000,000, its sales last year were $141,000,000, and it has 108 branches and 88 foreign agents. We hope that when the members of this class lay down their responsibilities, equally great additional progress will have been made."

Interesting tales of the days when the Goodrich company was a "youngster" organization were told by H. K. Raymond. He kept all the old veterans chuckling over humorous reminiscences of the days when the company had only four or five small buildings, and everyone knew each other.

"More than 10 per cent of the people who were with Goodrich 20 years ago," Mr. Raymond said, "are still with us. That is almost a world's record. It speaks volumes both for the loyalty of the workers and the loyalty of the company. Loyalty is the

Left to Right: A. E. Roach, William Zeitler, J. Gilhooley, W. O. Rutherford, George Schwalbach, Earl Hanna, O. Leemaster, H. F. Gudehus, Joe Glatthar.

Left to Right: C. H. Smith, Chicago; J. A. Wright, H. E. Boyer, J. A. Kunkler, H. J. Zimmerman; E. E. Leach, Boston; H. F. Burgner, C. E. Kittinger, H. A. Bauman.

Left to Right: G. A. Mealy, W. D. Holland, W. S. Grove, Harry Cope, Joseph Sawyer; O. K. Butler, Yokohama; W. C. Lake, William Tohey, J. Shoemaker.

Left to Right: O. T. Schwartz, F. F. Christensen, A. F. Waldman, C. S. Lonsbury, F. E. Blower, Dennis Phelps, Herbert Plant, John Sawyer, T. W. Culley, Charles Wilson.

Goodrich honors its veterans. Percy W. Leavitt, a veteran of 40 years' service, was master of ceremonies. He is said to be the oldest active rubber worker in the United States.

In accepting the medals on behalf of the "new" 20-year veterans, Mr. Rutherford told of the progress which Goodrich had made during the last two decades, largely as a result of the loyalty of the old-timers. "In 1900," Mr. Rutherford said, "the Goodrich company had a capital of $3,000,000, its annual sales were about $5,000,000, its employes numbered 1,500, and it had most desirable trait in human nature. There is no question that much of the uncertainty of today is due to lack of confidence in the other fellow. When things are readjusted again, the true value of loyalty will be again evident."

Branch managers and representatives from Goodrich branches in all sections of the country attended the banquet and entertainment. Several of the veterans were unable to attend on account of now being stationed in foreign countries. Their medals, with congratulatory cablegrams, have been sent to them.

THE RUBBER TRADE IN OHIO

By Our Regular Correspondent

AKRON NOTES

The week ended November 14 will be held memorable in the annals of finances and industry in Akron, the rubber center of the world. During the week the reduction of tire prices started, and within three days had run its limit, The Goodyear Tire & Rubber Co. announced its financial readjustment plan and within two hours of this announcement for the first time in its history passed a dividend upon the common stock.

The first factory to reduce tire prices was The Mason Tire & Rubber Co. of Kent, which announced early in the week that a cut of 12½ per cent would become effective immediately.

Two days later, while officials of The B. F. Goodrich Co. were in New York discussing the reduction of tire prices, The Goodyear Tire & Rubber Co. made public a new scale of prices in which a reduction of 3 to 14 per cent was apparent. The Miller Rubber Co. announcement came at 5 o'clock in the afternoon and The B. F. Goodrich Co. made public its new prices showing an average decrease approximating 12 to 13 per cent shortly after 8 o'clock the same evening.

Although up to the time of writing the smaller companies have not announced decreases, it is well understood that most of them have prepared a number of price lists and the ones coming closest to the prices of the larger companies will be given out to the public within a few days.

The long looked for decrease is at hand and it is now only a matter of a few weeks until the industry will know definitely if the public has been refusing to purchase tires until the prices decreased or if motorists will persist in putting their cars up for the winter.

Reports received from every section of the country show that many motorists are running upon tires which are usually discarded and that many of them are without spares. If this is the case it would not be surprising to find the so-called large surplus of tires wiped out by the public within a few weeks. According to figures given out by George M. Stadelman of The Goodyear Tire & Rubber Co., only one surplus tire is on the market for every automobile in the country. If tire users have been holding off for lower prices they will be able to take up this surplus very quickly and leave the market ready to take on tires now being manufactured.

The passing of the dividend on common stock is looked upon generally as a wise move on the part of the Goodyear directors. In the formal letter which carried the announcement the directors stated that the action was taken to conserve the company's cash reserves.

Although it naturally hurts the pride of successful industrial heads to be compelled to pass dividends, the action of the Goodyear directors is generally looked upon as the best possible step, because actual cash is very difficult to obtain at present and the payment of the dividend would have taken $1,500,000 from the company's cash reserves. This money can be used to better advantage in the business at this time and therefore Akron bankers generally look upon the move with favor.

The refinancing of the Goodyear company, which gives $25,000,000 new credits, became public through a letter written to the sales department by L. C. Rockhill, general sales manager, in which the men are urged to redouble their efforts to get business.

The inventories of the completed goods of the company have been assigned by the company to the bankers furnishing the loan, and in this way the plant is left unencumbered and the management remains in the present hands.

Upon the same day the Goodyear dividend action was published, officials of the International Harvester Co. announced that steps will be taken immediately to increase at least 20 per cent the output of the Akron factories, producing motor trucks chiefly.

If development for future business and for a greater population can be looked upon as showing the confidence of the inhabitants of Akron in the stability of the rubber industry, regardless of the thousands of rumors which have emanated from the city during the past four months, then the verdict is "the future of the business is good."

The people of Akron were asked at the last election to pass upon a $2,000,000 bond issue to provide much needed parks; also a bond issue to provide an elaborate approach to a $2,000,000 viaduct through the heart of the city.

The issue was clear cut. If Akron is not to grow in the future, there is no need of providing parks for increasing population and the approach now contemplated, for the bridge will be adequate. The voters clearly understood the problem and approved both bond issues.

No other interpretation was placed upon this verdict by Akron business men than that the rank and file of Akron people look with equanimity on the future of the industry, especially in view of the election having restored a large measure of confidence throughout the country.

The past year was the greatest year in the rubber industry here. Reports from factory heads indicate that the business of the Firestone Tire & Rubber Co. will amount to approximately $107,000,000, which is an increase of $16,000,000 over the $91,000,000 sales record of last year.

The Miller Rubber Co. will do more than $31,000,000, as compared with $27,000,000 last year, and The B. F. Goodrich Co., with two months' business to be heard from, has unofficially stated that the business thus far this year exceeds the $140,000,000 of last year.

The figures for The Goodyear Tire & Rubber Co., showing an annual business of $205,000,000, an increase of $38,000,000 over last year, have been officially announced. Thus the four large industries have a good foundation upon which to start the coming year.

Reports regarding annual sales from the smaller plants are not available, but they have had all the advantage of the drop in fabric and crude rubber prices and their business should show a larger percentage of gain over last year and their net profits should be larger proportionately than that of the larger companies, because their inventory shrinkage will be smaller.

Some of the larger companies were caught with large supplies of raw material on their hands when the bottom dropped out of the material market, and this will be reflected in their inventory reports. The smaller companies, as a rule, did not have the money to make long-term contracts and were unable to buy up large supplies, with the result that they were able to go into the open market and purchase cheaper material.

That the industries of Akron, including the rubber companies, have done more business during the twelve months ended November 1 than during any previous year, was shown when officials of the Chamber of Commerce announced at the annual dinner and meeting, November 18, that the annual survey of the Chamber showed total sales for Akron industries of $599,240,268, as compared with $522,436,021 during the previous twelve months.

The figures gathered annually by the Chamber at present include figures from fourteen rubber factories whose sales for the present year have increased from $427,341,611 in 1918-1919 to $545,812,311 for the present year.

The pay-rolls of the Akron industries during the year amounted to $143,330,572, as compared with $117,974,891 during the previous year. The survey showed that an average of 72,397 men and women were employed in Akron during the year, as compared with 79,000 November 1, 1919.

Reports to the Chamber show that the banks cleared during the year $589,721,000; that $24,301,613 worth of building permits were issued, including 4,621 homes valued at $6,312,354; that the post office receipts amounted to $1,195,380, and bank deposits totaled $72,165,195.

The Goodyear tire plant has resumed work on a five-day-a-week basis, producing 10,500 tires and 13,500 tubes a day. The plant will be closed for one week between Christmas and New Year's.

Lucien King, advertising manager of The Goodyear Tire & Rubber Co., upon his return from an extended trip through Europe, said he believed that the Old World will become a great market for manufactured rubber products, especially tires, within the next few years. Germany, although at present still suffering from the results of the war, will become a good market as soon as she recovers, he said.

The Home Owners' Investment Co., formed by Akron rubber and business men about two years ago to build homes for workingmen who had only a lot and 10 per cent of the total cost of a home, has completed 406 homes and will complete its first program of 456 before the end of the year. Harvey S. Firestone, president of the Firestone Tire & Rubber Co., is president of the company. Although originally $5,000,000 capital stock was authorized, only $2,100,000 has been issued. In the future the company will invest payments upon outstanding mortgages and interest upon these in building additional homes. The present financial stringency has not affected the company's activities.

The drive for funds for the Better Akron Federation, which finances 22 Akron welfare agencies, will conduct its annual campaign the first four days in December, according to T. E. Smith, editor of the *India Rubber Review*, president. The goal this year will be $550,000, as compared with $1,500,000 last year. Last year's budget included building funds which will not be included this year.

E. C. Vermillion, for the past year director of Americanization for the Board of Education, Akron, and previously director of Americanization for the Firestone Tire & Rubber Co., has resigned to take a similar position in Pittsburgh, Pennsylvania. He was tendered a public reception November 15 at which many of Akron's prominent rubber men were present.

W. O. Rutherford, vice-president in charge of sales of The B. F. Goodrich Rubber Co., is one of the youngest officials in the rubber industry, and at the same time one of the oldest in point of service. He registered in the last draft during the war and is still on the "near-side" of the fifty-year mark.

As proof of his extended work in the rubber industry, Mr. Rutherford now proudly wears a Goodrich 20-year service pin. He completed his twentieth year this fall and was initiated into the Goodrich 20-year-Service Order with thirty-eight other "new" 20-year veterans.

Akron Rubber Mold & Machine Co.'s New Addition

Mr. Rutherford worked up to his present position from the ranks, winning each promotion through sheer ability. He entered the company's employ in 1900 in a minor position in the sales department.

Arthur W. Doyle, secretary of the Doyle Tire & Rubber Co., Akron, was elected to the office of prosecuting attorney by 39,558 Summit County Republicans in the recent election, a majority vote exceeding that of his opponent by nearly 12,000.

AKRON RUBBER MOLD & MACHINE CO. EXPANDS

The accompanying illustration shows part of the new addition now being erected at the plant of The Akron Rubber Mold & Machine Co., Akron, Ohio. Ground was broken for this extension about six months ago and the work has progressed steadily ever since. These additional quarters, with the installation of new machinery, will approximately double the present facilities of the company, which already cover more than 75,000 square feet of floor space.

A Corner of the Akron Rubber Mold & Machine Co.'s Plant

The new building will be of the most approved fireproof construction throughout, built of brick and tile, with sawtooth roof, giving ample light in all parts of the structure. A new power house has also been built for heating the new plant, and as an auxiliary to the heating system of the present plant, hot water boilers of highest efficiency being installed.

The other illustration is a view of the machine shop of the Akron Rubber Mold & Machine Co. that was taken during the middle of last October, which is significant, as its reflects a production condition not popularly supposed to have prevailed in the tire equipment business at this particular period. The company numbers among its patrons a great many of the largest rubber manufacturing concerns in this country and Canada, and its slogan, "Built right for right building," is known to the tire manufacturer everywhere.

MISCELLANEOUS OHIO NOTES

New officials at The Mason Tire & Rubber Co.'s plant, Kent, Ohio, include E. H. Gorsuch, formerly with the Firestone Tire & Rubber Co., who has been appointed chief chemist to succeed James H. McGachan, and I. C. Monroe, appointed assistant superintendent.

The advertising account of The Victor Rubber Co., Springfield, Ohio, has recently been taken over by The Akron Advertising Agency Co. The present extensive advertising campaign of the Victor company will be continued along new and original lines, which are confidently expected to attract nation-wide attention.

Charles S. Spies, for some time in charge of the Philadelphia office of The Faultless Rubber Co., of Akron, Ohio, has severed his connection with that company and is now vice-president and sales manager of The Toycraft Rubber Co., Ashland, Ohio, which specializes exclusively in toy balloons for the trade and for advertising purposes.

J. D. Flanagan, formerly in charge of the development of tires, tubes and accessories of the Firestone Tire & Rubber Co., has resigned to accept the position of superintendent of The Rotary Tire & Rubber Co., Zanesville, Ohio, succeeding William Sherbondy, resigned.

The Thor Tire & Rubber Co., Willoughby, Ohio, has erected a building 200 by 35 feet in dimension to accommodate its rubber heel and mechanical department, and has started production.

CLEVELAND NOTES

The McElrath Tire & Rubber Co., Cleveland, Ohio, recently raised its capitalization from $515,000 to $3,500,000. The plant, which is operated entirely by stockholders, expects to go into production about March 1, 1921, manufacturing "Track-Tread" cord tires.

At a recent annual meeting, The Owen Tire & Rubber Co., Cleveland, Ohio, elected as directors O. M. Dickison, W. J. Owen, W. R. Green and J. S. Green. Besides these directors, the present officers of the company are W. C. Owen, president; E. M. Blatz, vice-president, and W. I. Creese, secretary-treasurer.

THE RUBBER TRADE IN THE MID-WEST

THE MID-WEST MANUFACTURERS' ASSOCIATION

The November meeting of The Mid-West Rubber Manufacturers' Association was held at the Chicago Athletic Association, November 9 and was attended by 40 members. After luncheon, brief remarks were made by a number of those present, including: Walter B. Denman, Denman-Myers Cord Tire Co., Cleveland, Ohio; J. O. Schulze, Mississippi Valley Rubber Co., Iowa City, Iowa; W. E. Wilson, Akron Rubber Mold & Machine Co., Akron, Ohio; V. E. Gustafson, Cleveland, western representative, Taylor, Armitage & Eagles, Inc., and the Hunter Manufacturing & Commission Co., New York City; R. T. Conant, Brighton Mills, Passaic Co., New Jersey; P. H. Ober, Mansfield Tire & Rubber Co., Mansfield, Ohio; Edward S. Babcox, *The India Rubber Review*, Akron, Ohio; Edward F. Pfaff, *The India Rubber World*, New York City; Scott Kingwill, western representative, *Tires*, New York City, and J. B. Miller, Brunswick-Balke-Collender Co., Chicago, Illinois.

The following new members were elected:

Regular Members: Denman-Myers Cord Tire Co., Cleveland, Ohio; Mississippi Valley Rubber Co., Iowa City, Iowa.

Associate Members: Taylor, Armitage & Eagles, Inc., New York City; The Trade Press Co., publisher of *Rubber*, Cleveland, Ohio.

President J. T. Christie announced that the second annual meeting and banquet of the Association would be held on December 14, at a place to be announced later, and appointed the following committee to make the necessary arrangements and provide entertainment: W. H. Stillwell, chairman, Allen Machine Company, Erie, Pennsylvania; W. E. Wilson, Akron Rubber Mold & Machine Co., Akron, Ohio; T. J. Carroll, Brunswick-Balke-Collender Co., 623 South Wabash avenue, Chicago, Illinois; P. P. Parker, Parker Tire & Rubber Co., Indianapolis, Indiana; A. C. Eide, American Zinc, Lead & Smelting Co., 111 West Washington street, Chicago, Illinois; J. B. Longini, Pittsburgh Valve Foundry & Construction Co., Chicago, Illinois; H. S. Vorhis, secretary, Mid-West Rubber Manufacturers' Association, 332 South Michigan avenue, Chicago, Illinois.

MISCELLANEOUS MID-WESTERN NOTES

Announcement is made of a change in the corporate name of Stresen-Reuter & Hancock, Inc., Chicago, Illinois, dealer in colors, minerals and chemicals, which will be known in future as Stresen-Reuter & Biser, Inc. The change in name does not indicate change in personnel and the past policies of the company will be adhered to. The old officers remain, as follows: F. A. Stresen-Reuter, president; A. S. Proctor, vice-president; J. L. Biser, secretary and treasurer. The company has renewed its foreign connections and will import high grade lake colors.

The Monsanto Chemical Works, St. Louis, Missouri, has established a branch office in the Marine Building, 209 North La Salle street, Chicago, Illinois, with W. L. Filmer in charge, where a complete stock of the company's products is carried.

The Morse Chain Co. has opened a plant in Detroit to manufacture sprockets for front end drives, including the Morse adjustment. The company will continue to manufacture chains and power transmissions at its main plant at Ithaca, New York. The Detroit plant will be under the general management of F. C. Thompson, with F. M. Hawley as chief engineer and C. B. Mitchell as factory manager. The sales and engineering offices are located at the new plant, corner 8th and Abbott streets, Detroit.

R. R. Hayward has recently been promoted to general sales manager for the Premier Rubber & Insulation Co., Dayton, Ohio, with headquarters in Detroit, Michigan.

The annual stockholders' meeting of The Wildman Rubber Co., Detroit, Michigan, was held at Lansing, Michigan, November 8, 1920. Officers and directors for the coming year were elected as follows: W. W. Wildman, president and general manager; L. C. MacGregor, vice-president; J. C. McCabe, secretary; C. R. Twynham, treasurer. The directorate includes W. W. Wildman and L. C. MacGregor, both of Detroit; H. P. Orr, Lansing; J. C. McCabe, Bay City; and C. R. Twynham, Akron, Ohio. Work on the new million-dollar plant at Bay City, Michigan, is progressing in a satisfactory manner and a contract has been let for the main building, which is to be 165 by 365 feet, three stories and basement, of reinforced concrete.

Zwebell Brothers Co., Milwaukee, Wisconsin, manufacturer of high pressure retreading molds, sectional molds, rubber products and accessories, has increased its capital from $15,000 to $300,000 to provide for expansion and take care of the growing demand for its tire repair equipment. The company is erecting a machine shop 60 by 100 feet at Schleisingerville, near Milwaukee, which will be used for the manufacture of tire repair machinery.

The She-boy Rubber Co., Milwaukee, Wisconsin, has been capitalized at $675,000 and expects to be in operation by March 1, 1921, manufacturing rubber belting, rubber knee pads, automobile tubes, automobile inner tires, rubber boots and shoes with wooden soles. Officers are Leo Hofmeister, president and general manager; E. A. Hickey, secretary and office manager; Corty M. Halderson, treasurer and financial manager; Dr. Daniel F. Nauth, vice-president. The directorate includes Dr. A. W. Sieker, William Eickhoff, Robert Bellin, E. J. Larson, Alfred Halderson, Albert Suemnicht, and B. Brennan. The company has selected a factory site in Sheboygan, Michigan, where a plant is now in process of erection. The executive offices are at 176-182 Sixteenth street, Milwaukee.

The Jefferson Rubber Co., Jefferson, Wisconsin, was incorporated October 1, 1920, with a capitalization of $303,000, to manufacture a highly specialized line of rubber products in addition to a specially constructed 30 by 3½-inch cord and fabric tire and a general line of tubes. Directors of the company are: R. W. Lyons, C. R. Girton, William E. Taube, W. S. Henry, and W. F. Copeland. Its officers are R. W. Lyons, president; C. R. Girton, vice-president; William E. Taube, secretary; W. S. Henry, treasurer. Mr. Lyons was formerly connected with The B. F. Goodrich Co., and the Firestone Tire & Rubber Co., Akron, Ohio, and the Gates Rubber Co., Denver, Colorado. Mr. Girton and Mr. Taube were also connected with the Gates Rubber Co. The Jefferson Rubber Co. has a factory site of fifteen acres in Jefferson, Wisconsin, and has begun surveying for the first unit of the buildings. It is expected that the plant will be finished and in operation by April 1, 1921.

The Kansas City, Missouri, branch of the Rubber Corporation of America has removed from 21st street and Grand avenue to larger quarters at 717-719 Wyandotte street. The Rubber Corporation of America is a consolidation of the sales and selling organizations of the Sterling Tire Corporation, Rutherford, and the Empire Rubber & Tire Corporation, Trenton, both in New Jersey, the two manufacturing companies remaining separate and distinct.

An appointment of interest to the rubber industry is that of V. E. Gustafson as direct sales representative covering the Middle West for the products of the mills controlled by Taylor, Armitage & Eagles, Inc., and the Hunter Manufacturing & Commission Co., both of New York City.

V. E. Gustafson

Mr. Gustafson is well known in the motor and accessories industry, as he has been associated with the Firestone Tire & Rubber Co., Akron, as purchasing agent. Previous to this connection he was for many years secretary and sales manager of the Woods Motor Vehicle Co., Chicago. He will represent Taylor, Armitage & Eagles, Inc., in the sale of tire fabrics and the Hunter Manufacturing & Commission Co. in the sale of sheetings, drills, Osnaburgs, and kindred fabrics used in the rubber industry.

Mr. Gustafson's pleasant manner and agreeable personality have gained him a host of friends who predict success for him in his important new connections.

Sales representatives of the International India Rubber Corporation, South Bend, Indiana, recently appointed, include H. D. Brown, who will cover part of Kansas, Oklahoma, Missouri, and Arkansas, with headquarters at Wichita, Kansas; E. A. Bradley, whose headquarters are at Lincoln, Nebraska, and whose territory embraces Northern Kansas, all of Nebraska and Western Iowa, as well as a part of Missouri; Ray L. Hause, who has been appointed sales representative to cover Northern Illinois and the state of Wisconsin; and C. H. Fischer, who has been with the company for some time and will continue to have headquarters in Chicago and cover Michigan, Northern Ohio, Western Pennsylvania and Western New York.

R. J. Fitzgerald, for some time special sales representative of the International company, has been appointed assistant sales manager, succeeding C. H. Mayer, resigned. Mr. Fitzgerald was at one time district sales manager for The McGraw Tire & Rubber Co., Indianapolis, Indiana.

The board of directors of the Haywood Tire & Equipment Co., Indianapolis, Indiana, has increased the capitalization to $400,000, and has authorized the sale of $100,000 worth of common stock. This capital will be used to establish Haywood schools of tire surgery in all sections of the country, these schools being also agencies for the sale of Haywood equipment.

The Marysville, Michigan, plant of the Athol Manufacturing Co., operating as a branch of the Massachusetts factory, exemplifies the most modern ideas of factory buildings and machine layout and ideal working conditions are said to be provided. C. J. Strobel is superintendent; T. G. Ralph, plant engineer; Leslie Moulton, office manager; and H. H. Upton, production and cost man.

The manufacturer of the "Everychild" rubber wading bloomers described in our issue of August 1, is introducing the "Everychild" baby pants, of sheet rubber vulcanized in one piece, without stitching, strings, pins, or buttons.—Arthur Frankenstein & Co., 514 Broadway, New York City.

THE RUBBER TRADE ON THE PACIFIC COAST

By Our Regular Correspondent

LOS ANGELES NOTES

The temporary slowing up in the rubber trade throughout the country has, perhaps, been remarked less on the Pacific slope than anywhere else. None of the mills just now is attempting peak production, but all are reported busy and employing practically their full complement of workers. The mild weather on the Coast and the presence of an unusual number of tourists, especially in Southern California, have tended to keep up sales of automobile tires, which have slackened elsewhere. A good, steady demand for mechanical rubber goods is reported from the dealers in the chief cities, and prices are well maintained.

The coast manufacturers rather welcomed than opposed the recent increase in transcontinental freight rates, as in some cases it has acted as a protection against competition from the East and Mid-West. On the other hand shipping interests are, with some success, prevailing upon many manufacturers on the Atlantic coast to ignore the $6.55 rail rate and take the $3 rate from New York and other eastern points via the Panama Canal to Los Angeles in approximately eighteen days. Pacific Coast rubber manufacturers are not disconcerted by this situation. They say that they will easily meet any competition, and just now labor conditions are very favorable owing to the influx of workmen from other parts of the country where industries have slowed up. These workmen usually prefer to work for less on the Pacific coast than elsewhere because of the more generally favorable climate.

Ground has been broken for the Pacific Coast plant of the United States Compression Inner Tube Co., of Tulsa, Oklahoma, on its 12½-acre site in Burbank, Los Angeles County, California. The first spadeful of earth was turned by W. A. Blanchard, mayor of Burbank. Many representative business men of Southern California witnessed the ceremony, as also A. J. Pennington, general factory manager; C. R. Privett, Pacific Coast distributor; and J. F. Scanlon, advertising manager. Mr. Pennington has just completed a factory for the company at Kittanning, Pennsylvania. The parent plant is at Tulsa, Oklahoma. Puncture-proof inner tubes will be made exclusively at the Burbank plant.

Good headway is being made in the erection of the plant of the West Coast Asbestos Co. at Downey, California. The concern, which is a subsidiary of the E. M. Smith Rubber Co., of Los Angeles, will make rubber-asbestos articles and specialize in heavy oil and fire hose.

The Goodyear Tire & Rubber Company of California, Los Angeles, has curtailed production to 1,800 tires a day and the operating staff has been reduced to 2,000. The pay-roll runs over $50,000 a week, and two shifts are worked daily. Last month the cost of tire production was 8 per cent less in Los Angeles than in Akron. It is believed that the report recently circulated that the company was in financial difficulty was put out by stock-jobbers to frighten some of the several thousand stockholders in the southern California metropolis into parting with their shares at bargain prices. Very little stock was dislodged, it is said, although the quotation was forced down to about $80.

A concern to be known as Edward Harris, Inc., has been organized with offices at 1243 South Olive street, Los Angeles, to manufacture a full circle repair vulcanizer in which an air-bag is used. It is claimed that the vulcanizer does in 45 minutes work that ordinarily takes 3½ hours, and virtually increases the capacity of a shop four-fold. The concern, of which Mr. Harris is president, expects to have several hundred men at work in its new factory by January 1.

E. S. Firestone, branch manager of the Firestone Tire & Rubber Co., entertained the Los Angeles Firestone tire dealers recently at a banquet in the Los Angeles Athletic Club. Talks

were given by Mr. Firestone and his sales manager, Mr. Frieze. The get-together meeting was preliminary to the starting of an extensive advertising campaign.

A salesroom and warehouse, 100 by 135 feet, is being erected on the southwest corner of Los Angeles and Fourteenth streets, Los Angeles, for the Henry B. Day Co., wholesale dealers in cotton goods and rubberized fabrics used in the automobile industry. The building will cost nearly $100,000 and will be ready about January 1.

President Adolf Schleicher, of the Samson Tire & Rubber Co., Los Angeles, reports that the slowing down in the tire trade has not affected his concern, which will start running night shifts December 1. The company has 600 agencies selling its products between Tia Juana, Mexico, and Vancouver, British Columbia. It has recently enlarged its West Pico street office, and added a new machine shop, 40 by 80 feet, and another 120-h.p. steam unit at its factory.

SOUTHWESTERN NOTES

An attempt to ruin the cotton crop in at least part of southern California has been frustrated, according to J. P. Coy, horticultural commissioner of San Bernardino county, whose assistant, J. M. Peters, recently found three boll weevils in some cotton in a small box on the edge of a cotton plantation near Chino. It is believed by the commissioner that some one in the section indicated by the postmark, which is withheld by the authorities, jealous of the success of the California growers, had adopted this means for doing an astounding amount of damage to the cotton fields of California, thereby lessening the crop and advancing prices.

"Don't sell your cotton," is the urgent advice of the Arizona Cotton Growers' Association in a circular sent out to growers, who are told that an attempt is being made by strong interests to keep the price of the 1920 cotton crop at the lowest possible price for a long time to come. In order to finance those who need money the Association will arrange loans of $200 a bale. Growers are also advised to hold their cotton seed for more than $20 a ton, as it is worth more than that for fertilizing and is valuable as food for cattle.

Tucson, Arizona, bankers have agreed to finance the marketing of the Santa Cruz county cotton crop. All cotton handled by the bank will be shipped to Galveston, graded and stored, subject to selling orders from the planters.

The Texas Motor Car Association, Fort Worth, Texas, announces that construction on its Southland tire factory which was suspended during the war, has been resumed.

MISCELLANEOUS PACIFIC COAST NOTES

William E. Duersten, vice-president and general manager of the Lehigh Tire & Rubber Co., and John N. Mowe, general sales manager of the Kelly-Springfield Tire Co., have been recent visitors in San Francisco.

Ray Thurman has been appointed western representative in charge of sales of the International India Rubber Corporation, South Bend, Indiana, on the Pacific slope. Mr. Thurman is a successful newspaper advertising manager and acquired his knowledge of the automobile, motor truck and rubber business through his former connections with the Studebaker Corporation, the United States Motor Truck Co., and The McGraw Tire & Rubber Co.

The Douglas Brothers, who conduct a repair establishment known as "The Tire Surgeon" at Bremerton, Washington, have been appointed distributors of "Savage" tires.

The moratorium recently declared in Cuba has brought about a very grave situation. Ecuador, Colombia, Chile, Uruguay and the Argentine, in fact practically every other Latin-American country, with the possible exception of Mexico, is undergoing a financial crisis with a subsequent fall in exchange. American exporters should obtain reliable credit information before accepting orders from Latin-American countries at this time.

A WELL-KNOWN CANADIAN PUBLICITY MAN

Ralph W. Ashcroft, formerly advertising manager of the United States Rubber Co., and now director of publicity of the Ames Holden McCready System, Montreal, Canada, is a man of varied experience and exceptional ability. Born in Cheshire, England, in 1875, he received his education in private schools and Waterloo College, Waterloo, England.

Ralph W. Ashcroft

Graduating from college in 1889, he came to New York the following year to act as private secretary to a railway president, which position he held for five years. He then became interested in commercial journalism, export trade and advertising. In 1913 he joined the forces of the Canadian Consolidated Rubber Co., Limited, Montreal, as advertising manager, and did such excellent work that in 1916 he was put in charge of the advertising and publicity for the United States Rubber Co. and its allied companies, with headquarters in New York City. This position he held with distinction for four years, building up an efficient advertising department numbering some eighty persons.

Always a believer in Canada as a potentially self-contained industrial nation, Mr. Ashcroft was induced to resign his position with the United States Rubber Co. to take charge of the advertising and publicity of the Ames Holden McCready System. This organization includes Ames Holden McCready, Limited, manufacturers of leather footwear and jobbers of rubber, canvas and felt footwear; the Ames Holden Tire Co.; Ames Holden Felt Co.; Mount Royal Rubber Co.; Ames Holden Rubber Boot Co., and the Atlantic Sugar Refineries, Limited.

Mr. Ashcroft is a member of St. George's Society, The Rubber Association of America, Association of Canadian Advertisers, Inc., Canadian Manufacturers' Association, Montreal Publicity Association, Lotos Club, New York Athletic Club, Engineers' Club, Arts Club, Canadian Club, Montreal Club and Circumnavigators' Club.

CANADIAN NOTES

Recent changes in personnel of the Ames Holden McCready System, Montreal, Quebec, include the appointment of W. M. Angus as general sales manager. Mr. Angus has been identified with this company for many years and is well known to the trade, particularly in Quebec and the Maritime provinces. His offices will continue to be located at 1221 Mount Royal avenue, East, Montreal. J. P. Quesnal, formerly assistant manager, will succeed Mr. Angus as manager of the Quebec division, with offices at the same address.

George E. Black was recently appointed operating manager of H. H. Robertson Co., Limited, to succeed Charles McKenzie, who has been elected vice-president of the company. Mr. Black is a mechanical engineer and since his graduation from the University of Toronto has been engaged in important engineering work for the Ontario government.

The *Board of Trade Journal*, London, September 16, 1920, sums up the extent of the rubber trade of the Federated Malay States in 1919 to be greater in quantity than any other year, though not the greatest value, 106,453 tons being exported, valued 189,079,236 Straits Settlements dollars (par value of dollar = $0.567 U. S. currency). The market for rubber was reported to be considerably more favorable in 1919 than in 1918, the fluctuation in prices being much less than in previous years.

THE WEAVER WHEEL ALINEMENT INDICATOR

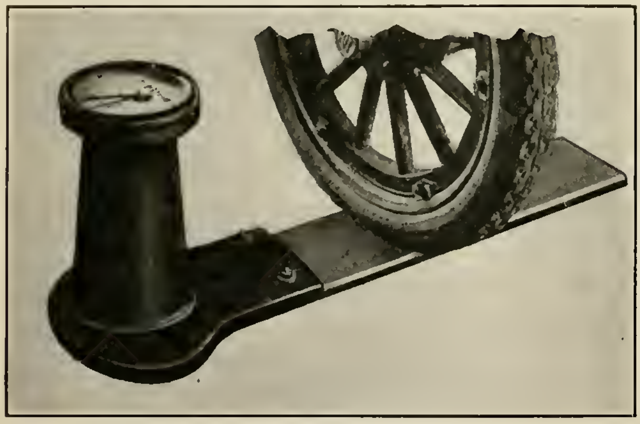
When the wheels of an automobile are parallel, the wear on the tires is at a minimum since the wheels roll with no friction. Any deviation from this develops a side thrust, or "drag" on the tires that is very destructive. If, for example, the front wheels are out of true one inch, the tires must be dragged sideways three inches in every revolution. Figuring upon this basis, a 30-inch tire would be dragged sideways 168 feet in every mile that the car is driven.

Statistics show that from fifty to seventy-five per cent of the cars being driven today have their wheels out of alinement to a greater or lesser degree, causing needless wear of tires and costing the motoring public much money.

To show motorists and garage men easily and convincingly wheel conditions, the Weaver wheel alinement indicator has been created. This instrument will accurately record the misalinement of the wheels to the minutest fraction of an inch by simply driving one wheel of the car over it.

The instrument consists only of two flat steel plates with roller bearings between, the upper plate being accurately connected with a recording mechanism which registers the movement of the plate on the dial. With the portable type, the car owner can run his car slowly over the plate and a glance at the dial will show him the misalinement of the car wheels while the car is in motion or, in other words, the true running alinement which it has heretofore been absolutely impossible to record.

The larger or stationary type is designed for installing in the runway of the garage so that cars passing in or out will pass over it. This type is equipped with an electric bell which rings



Wheel Alinement Device

if the wheels are out of alinement more than the minimum degree which the garage man chooses to establish. Ordinarily, it is considered that three-eighths of an inch misalinement is not serious and the alinement indicator can be set so that the bell will not ring unless the misalinement is more than this or any minimum which the garage man chooses to establish.—The Weaver Manufacturing Co., Springfield, Illinois.

THE AIR BAG PROBLEM

The air bag possibly causes more trouble to the vulcanizer than any other article used in repair work. The average repairman does not stop to consider that the life of an air bag depends entirely upon how it is used, and consequently it is not given the proper attention and care. This makes it an impossibility to guarantee the air bag for any definite number of cures.

Before the air bag is used, remove the valve core and inject about one-half pint of water. This can be done by pressing the sides of the air bag together and inserting the stem in a tank or vessel of water, and releasing the pressure. This should be repeated about every ten cures, as the water generates steam, some of which escapes every time the air is released from the bag after a cure.

The water in the bag keeps the gum tube soft and flexible. It prevents checking and cracking on the inside, which cause a bag to leak.

It is advisable to have two sets of air bags of each size, one for straight side, and the other for clincher tires. The reason is obvious, as the contours of the two types of casings are entirely different. If the air bag is formed to the straight side tire and then used in a clincher type, it will have to change shape each time. This injures the tube and causes the bag to leak.

Another important detail is fitting the bag in the casing. The size given on the outside of the casing does not always determine the size of air bag used. This is especially applicable to cord tires. If the air bag is too small and the next size is too large, it is better to use a smaller bag and pad it to fill out the casing properly, using one, two or even four plies of fabric if necessary.

Pads can be made from pulled fabric, and can be used indefinitely. If the bag is too small and not padded to fit, it will expand beyond its limitations, breaking the fabric or causing it to blow out. This will cause a spongy or porous cure, and the patch on the tire will wear off prematurely. Padding the air bag to insure a perfect fitting is a very essential part of the operation, if good results are to be expected. The time consumed is more than compensated for by the additional number of cures obtained.

Another air bag abuse is forcing the bag in a casing too small for it. This will cause it to crush or pinch between the beads, breaking the gum tube inside and causing the bag to leak. A bag used in this manner has the appearance of being porous when tested.

Often the repairman forgets to deflate the bag before releasing the clamps. The consequence is a blow-out in the air bag. This is the result of carelessness on the part of the user and not of faulty construction.

Air bags should be inflated to a uniform pressure at all times. If you are using 60-pound pressure in a 3½-inch bag, continue to use the same pressure and depend upon the pads to assist by filling out the casing to proper capacity. If you inflate to an abnormal pressure, it will strain the fabric, causing it to crack and lessening the number of cures.

Always soapstone the interior of all casings before inserting the air bag, otherwise it will stick and to remove without twisting or buckling will be impossible. This will cause it to break at the parts affected.

Another suggestion that is important to the repairman is the inadvisability of leaving air bags in a flattened condition. All bags should be inflated after they are used. It is necessary to their longevity to retain their natural shape when not in use.

Sometimes the repairman adopts the habit of cooling the air bag by throwing it in water. This hardens it and will cause it to crack or break quickly.—*Miller Tire Trade News.*

"TIRE SAVE" AND "JIFOID"

"Tire Save" is a putty of about the consistency of bread dough, containing a high grade of Pará rubber in its composition, as well as chemicals that produce vulcanization with exposure to air. Patches applied with "Tire Save," it is claimed, become permanently vulcanized to the tube to which it is affixed.

"Jifoid" is a self-healing cement for plugging leaks and punctures in single tube bicycle tires, without the use of either patches or plugs. This cement is put up in both tubes and cans.

Both "Tire Save" and "Jifoid" are put out by the same manufacturer.—National Rubber & Specialties Co., Chickering avenue and C., H. & D. Railway, Cincinnati, Ohio.

The Rubber Trade in Great Britain

By Our Regular Correspondent

The twice-adjourned coal strike finally materialized and occasioned a general upset. The outlook for the rubber trade, however, was by no means so serious as in other industries, where much larger quantities of coal are used. Electric power is now largely employed in rubber works, and, although the supply was reduced by most municipalities, there was no total cessation and work was carried on much as usual. The time taken for the strike to mature naturally gave firms an opportunity to look after their coal supplies, so most of the works had reserves which they utilized with care. Had the strike extended over a longer period, short time would no doubt have become general, but this is rather looked for, owing to the general slackness in the trade.

GERMAN COMPETITION

A matter which some firms are seriously taking to heart is the rejuvenation of German competition. Not only are Continental tires and packings of the Klingerite type again in our market, but there is plenty of evidence that overseas orders, which have been prominent in recent years, are being withheld owing to the attraction of German offers at lower prices. This is a matter which is by no means peculiar to the rubber trade and it is the inevitable outcome of reduced production at higher pay which now characterizes all our industries and which the exhortations of our politicians and leaders of industry have so far failed to remedy.

THE PROPOSED RUBBER CLUB

A meeting attended by about forty was held at the Queen's Hotel, Manchester, on October 8, to discuss this project. Mr. Brooking of the St. Helens Cable & Rubber Co., Limited, was in the chair. An important point brought out by the personnel of the attendance and the speeches was that so far the proposal had not received any active support from the leading manufactures with one or two exceptions. It appears that the India Rubber Manufacturers' Association imagines that the club, if formed, will become a focus of discussion of trade matters and thus poach on the preserves of this well established organization. Mr. Standring, honorable secretary pro tem., strongly combated this idea, the object of the club being, he said, to provide means for social intercourse, together with the discussion of matters relating to developments which affect the progress of the industry. There seemed to be a diversity of ideas among those present, both as to the object and the scope of the movement. While some favored the idea of a permanent club house, others pointed out that most existing clubs with large memberships had difficulty in paying their way and that the contingent expenses of such a club house would far exceed what would be reasonably expected from members' subscriptions, making a substantial subsidy from the big manufacturers an imperative necessity. At the moment there was no evidence that such generosity would be forthcoming. Other speakers who favored the idea of a club advocated meetings once a month or so in a hired room, in which case a moderate yearly subscription would cover all expenses. The chairman broached the question of the formation of a rubber institute on the lines of existing scientific and technical institutes, but the idea found little support and certainly the meeting as constituted could hardly be expected to deal intelligently at a moment's notice with a proposal of such novelty and magnitude. Speakers who said they always read with interest the reports of the proceedings of The Rubber Association of America in The India Rubber World expressed disappointment that no details of the constitution of the club were available for the meeting. The important matter as to who would or would not be eligible for membership was debated at some length, but no decision was reached. As it was obvious that there was among those present no general unanimity on the various points raised, it was decided to form a committee to consider the whole matter and make a report at a further meeting to be called when the result of the London meeting would also be known. A committee comprising the following six was therefore appointed and held its first meeting immediately after the luncheon: J. H. C. Brooking, Dr. Betteridge, H. W. Hatton, H. Hewlett, F. J. S. Gray, L. Minton and J. Walwork, with Mr. Standring as honorable secretary. The London meeting was held on October 13 at Anderton's Hotel, and a general discussion ensued on much the same lines as at Manchester. Mr. Standring, who presided, said that as far as anything had been decided, the intention was to have two centers, one at Manchester and one at London, with central control and meetings alternately at London and Manchester. It was emphasized by one speaker, as at Manchester, that if the club was to be a success it would be necessary to have the support of the leading manufacturers and he proposed that an expression of opinion should be sought from the India Rubber Manufacturers' Association. The meeting had an advantage over that at Manchester in hearing an account from H. H. Holland of the nature of the activities of The Rubber Association of America, whose hospitality he has enjoyed. In the event a provisional committee was appointed, consisting of Fordyce Jones, A. U. B. Ryall, Dr. P. Schidrowitz, A. B. Cooke, J. L. Lake, William Abbott and T. R. Buldock.

R. & J. DICK, LIMITED

In accordance with the present popular form of raising additional working capital this well-known firm of balata manufacturers has made an issue of £250,000 eight per cent seven-year notes at 97 per cent. The present company was incorporated in 1908 to take over the successful private company of the same name. The company owns a belting factory in the United States, and the boot department is carried on in numerous retail shops in the United Kingdom, as well as at the factories in Glasgow. As the assets of the company cover the principal of the loan over five times and the annual profits cover the interest over five times, the investment must be considered an attractive one by those who are in favor of such short term investments and do not anticipate a lower value for money in seven years' time..

THE INDIA RUBBER & TYRE CO.

This firm, which is located at Clower street, Salford, Manchester, makes a specialty of rubber solution which it supplies to a considerable number of firms in the Manchester district that send their cloths out to be proofed and do the making up into garments at their own factories. The making of rubber solutions, or rubber cement, as I believe it is called in America, is not at all commonly carried on as a special industry outside the rubber works proper and I do not remember having referred to it before in this correspondence. John Markus, the proprietor of the business, has the advantage of a life-long connection with the trade, having been manager of a proofing works at the early age of fifteen. Although the principal users of the rubber solution are the waterproof garment manufacturers, customers are also found in the bookmaking, millinery and hatting industries, the requirements as to composition and strength not being similar in all cases.

THE REVOLITE CO., LIMITED

This concern, situated at Cambridge street, Bradford road, Manchester, and mainly concerned with the manufacture of rubber heels and rubber composition soles, has been reconstituted

with a capital of £50,000 in 10-shilling shares. The directors are S. W. Copley, C. C. Webb and A. A. Crosier. Mr. Copley, who is a man of wealth, a short time ago bought the Ramsden estate, which covers a large part of the town of Huddersfield, from Sir James Ramsden, Baronet, for £1,300,000 and resold it to the corporation of the town, which is his native place, for the same sum. Mr. Copley has only quite recently taken any financial interest in the rubber heel business.

EXCHANGE DIFFICULTIES

Many orders are naturally being lost in this country and on the Continent generally by agents and representatives of American firms, owing to the high rate of exchange. This is a matter that cannot be righted in a day and it may possibly be a couple of years before normal conditions are restored. It seems to be the fact that American houses, when quoting British and Continental firms, oftener than not state prices in their own coinage, viz., dollars or cents, and leave either their agents or customers to take all the risk of the exchange going against them. This makes business almost impossible, particularly where the agent acts as a merchant, buying and paying for the goods he gets from the States. In many cases it means, especially if making Continental quotations, that he, the agent, is to take the risk of two rates of exchange, American and Continental. It is probably the case that much more business would result if quotations were made in the moneys of the country in which the goods were being sold, as it seems reasonably certain that manufacturers, particularly on the Continent, would rather pay a slightly higher price and have quotations in their own coinage, as it would put them in a position to fix the actual cost price of their goods. Reference is made more particularly to raw materials or semi-manufactured goods, such as reclaimed rubber, subject to periodical price changes, and not so much to manufactured goods having price lists exhibiting greater stability.

THE GIANT PNEUMATIC

The outstanding feature of the recent London commercial motor vehicle show was the giant pneumatic tire, seen in sizes ranging up to ten inches diameter. Certainly here and there these tires have been seen on motor coaches and on some of the smaller industrial vehicles, but this is really their first general introduction to the public. Compared with America it may be said that these tires are still an unknown quantity, and it is not surprising that controversy has arisen as to their potentialities. It seems to be established that they give greater tractive power, which is really only to be expected. Further, a better average pace is maintainable over varying conditions of road surfaces. This point is not of such great moment here as in America, owing to the higher average of good roads in Britain. However that may be, there is little doubt that even on good roads there is almost an entire elimination of the road shocks experienced with solid tires and this leads to a reduction in the maintenance costs of the chassis. One expert has expressed the opinion that the saving in this respect is equal to the extra cost of pneumatic over solid tires. Of course, while this may be eminently desirable in the case of the motor coach, it may be plausibly argued that for commercial haulage the extra expense would not be justifiable nor would it be desirable to run the risk of a puncture or a blow-out. It is probable then, that these tires will come into favor more slowly for road haulage than for passenger carrying. As it would not be feasible to inflate these big tires with a hand pump, 120 pounds' pressure being required, a power pump is provided, driven by the engine, with a pressure gage and sufficient flexible tubing to connect with the rear wheels. A year hence it will be possible to talk about the capabilities of giant pneumatics, especially as to whether they will stand up to heavy work under varying loads. In the case of one of our three-ton lorries the total weight when fully laden would be about six tons.

With regard to the makers of these giant tires, the prominent exhibitors were The B. F. Goodrich Co., The Goodyear Tire & Rubber Co., the Bergougnan Tire Co., of Clermont-Ferrand, and the Dunlop Rubber Co., Limited. It must not be imagined that the solid tire was in the background at the show. It was very much to the fore, and in the case of several well-known firms there were developments and improvements.

HARRISONS & CROSFIELD, LIMITED

Charles H. Clark, who presided at the annual meeting of this company, referred, as is customary with chairmen of important concerns, to the many difficulties with which they had been beset, arising out of the disturbed conditions prevailing, and then proceeded to announce increased profits of £249,000 against £200,000 for the preceding year. He emphasized the generally accepted fact that the fall in the price of rubber is not due to any lessened demand for rubber goods, but that large prospective buyers are at the moment out of the market, owing to financial conditions, and this has caused supply to overtake demand. With regard to the restriction of output of rubber, he wished it to be clearly understood that this was only a temporary measure and one not taken with a view of increasing profits, but in order to save the industry from the continuance of losses which threatened to cripple it permanently, many estates already producing at a loss at the price to which rubber has fallen. This restriction of output is really intended to safeguard the increased output of the future, Mr. Clark contended. It follows, therefore, that instead of merely looking after their own interests as traders in general are said to do, the restriction in the output of rubber is really a philanthropic act conceived in the best interests of others. With regard to this point some evident misapprehension exists and it will be recognized as debatable. With regard to rubber manufactures, the fly in the ointment of cheap rubber is the popular outcry for cheaper rubber goods, whether or not the rubber content amounts to 5 per cent or not. The fact that everything else, except the rubber in the goods, may be "up" is entirely ignored.

THE FIFTH INTERNATIONAL RUBBER EXHIBITION

The Fifth International Exhibition of Rubber, other Tropical Products and Allied Industries, to be held in Royal Agricultural Hall, London, England, in June, 1921, will certainly be an event of outstanding importance. Already upwards of thirty British, French and other governments have definitely signified their intention of participating, while several others have provisionally reserved space. Scientific bodies and commercial associations will be well represented and large spaces have been secured by leading producers, manufacturers, makers of machinery, merchants, etc. The demand for space is unprecedented.

The following governments have taken space and are well ahead with their organization for effective propaganda:

Belgium and Colonies	Gold Coast
Brazil	Haut-Senegal Niger
British North Borneo	Haute Volta
Dominica	Ivory Coast
Egypt	Madagascar
Fiji	Mauritania
France	Niger (Military Territory)
French Congo	Portugal and Colonies
French Equatorial Africa	São Paulo
French Guinea	Senegal
French Occidental Africa	Trinidad
Gaboon	Virgin Islands

Colonel Léon Osterrieth has been appointed general commissioner for the Belgian Government, and in the arrangement of the Belgian section he will be assisted by the well-known Congo explorer, Commandant Cayen.

A special committee, working under the enterprising direction of W. S. D. Tudhope, Director of Agriculture, is collecting

exhibits representative of the achievements and possibilities of the Gold Coast and its dependencies.

Arrangements for the participation of the British West Indies are under the supervision of Algernon E. Aspinall, C.M.G., O.B.E., secretary of the West Indies Committee. Trinidad was among the first of the islands to apply for space.

Brazil will occupy the same large space as on previous occasions and the São Paulo Government has, as usual, taken a separate space for a special display.

The exhibits shown by the various governments will embrace the interests not only of the rubber industry but of many other tropical products, such as oils and cotton, which are directly essential to the welfare of that industry, and of timbers, paper-making materials, foodstuffs, etc., which play a vital part in rubber developments.

The exhibition has the cordial support of the Rubber Growers' Association, the Rubber Manufacturers' Association of France, the West African sections of the Liverpool Chamber of Commerce, the Federation of British Industries, the Geographical Society of Lisbon and numerous other commercial associations and scientific bodies. Among the firms which have secured space for exhibits are many prominent producers of raw materials, manufacturers of machinery, tools, compounding ingredients, etc., and leading merchants in tropical products and allied industries.

Full particulars may be obtained from the overseas delegate, Miss Edith A. Browne, F.R.G.S., Exhibition Offices, 43 Essex street, Strand, London, W. C. 2, England.

POST-WAR DEVELOPMENTS IN BRITISH MOTOR TIRES

By Mark Meredith

Despite the fact that the price of raw rubber has shown heavy declines, there has been no reduction in the price of motor tires. On the contrary, apparently they are mounting. This is due in part to the high cost of cotton, and partly to the high cost of labor, as well as shipping and so forth. As to rubber and cotton, some of the great tire producers grow their own.

But the greatest post-war development touches rim design. It is plain that at no distant date the straight-side American tire will become universal. As far as existing motor vehicles are concerned, the older types will continue to use clincher tires, because the straight-side tire needs a different sort of rim.

The Society of Motor Manufacturers and Traders' sub-committee concerned with tires, as well as the tire trade's own organization, has for a long time been dealing with the question of reducing the number of sizes of tires on the market. Some practical progress was made in this direction before the war. Much remains to be done, however, towards economizing cost and reducing the necessity for local agents carrying very large stocks of perishable goods.. The solution is to reduce the total number of tire sizes, and that rests largely with car designers.

Perhaps the most significant development is the application of the pneumatic tire to utility vehicles, even of the 3½-ton to 5-ton varieties. Before the war it would have been practically impossible for pneumatic tires to be employed for this class of work. During the campaign, however, such tremendous strides were made in the evolution of exceedingly strong pneumatic tires, as notably those corded types produced by Palmer for aircraft, that there is now no difficulty in providing the strength necessary for carrying heavy vehicles and their loads and for transmitting the power necessary to propel them. As to cost, we are not in the experimental stage. There has been for a long time in progress in America a big development in this direction, and the results are being followed with the closest attention by the trans-Atlantic industry. Under the heading of economy, the pneumatic tire applied to the heavy utility motor vehicle comes out well on top. It enormously reduces shock, economizes road wear and tear to a remarkable extent. It goes a long way towards solving the problem of vibration occasioned by the continuous passage of such vehicles up and down thoroughfares flanked by houses.

Manufacturers are, therefore, making every preparation for building utility motor vehicles of the heaviest sizes to be equipped with pneumatic tires. Moreover, British tire manufacturers have now devoted more than a year to experiments in this connection, with the result that they feel confident that the time has arrived at which they can also standardize such tires and guarantee the results.

Thus, at the time that the roads of Great Britain are being taken in hand by the government at the motorists' expense, we have the welcome prospect that in future a large proportion of utility motor vehicles will not destroy them at the rate they have done in the past.

THE RUBBER TRADE IN EUROPE

By a Special Correspondent

GREAT BRITAIN

Declared exports of rubber from London to the United States during the nine months ended September 30, 1920, totaled $30,259,702, as against $13,863,539 in the corresponding period in 1919. Attention may be drawn to the striking fall in the value of raw rubber exported from London in September, 1920, which was only $17,666 as against $590,005 in September of the preceding year.

Among the articles imported from the United States into Liverpool during the years 1918 and 1919, the following were listed under nondutiable goods:

	1918		1919	
	Quantity	Value	Quantity	Value
Non-Dutiable Goods				
Airplanes, airships, balloons, and parts of	....	$5,933,109	....	$8,885,265
Rubber:				
Boots and shoes ... *dozen pairs*	6,372	254,774	32,502	271,512
Tires and tubes and accessories	....	....	....	219,893
Manufactures, n. e. s.	....	910,399	....	957,046
Waste and reclaimed ... *centals*	....	....	6,330	98,678
Gutta-percha, crude ... *hundredweight*	9,498	703,676	752	62,159

Exports of crude rubber from Liverpool to the United States in 1919 were 7,247,838 pounds, valued at $2,985,350, as against 191,186 pounds, valued at $49,230 in 1918.

Recent reports from Great Britain contain an account of an extraordinary general meeting of the The Dunlop Rubber Company, Limited, held in London, September 11, 1920, for the purpose of considering a resolution to increase the capital to £20,000,000 by the creation of 2,500,000 one-pound shares, and a further resolution to capitalize £7,500,000 and pay a bonus of three pounds free of income tax to the ordinary shareholders by the allotment of one-pound shares to that amount.

A. L. Ormrod, who presided, announced that the increase in capital stock would provide the company with authorized capital more than sufficient for the capitalizing of £7,500,000 and the payment of the proposed bonus. Sir Henry Dalziel seconded the resolutions, which were carried unanimously, thereby nearly trebling the company's capitalization, which is now approximately $100,000,000.

The Waste Trade Journal, 150 Lafayette street, New York City, has opened offices at 32 Great Tower street, London, E. C. 3, England, in order to give its readers more efficient service. A competent reportorial staff has been engaged to gather news concerning the cotton, rubber and other industries of interest to its readers, and special facilities for advising and assisting the trade with regard to foreign business have been made available.

A. G. Spalding & Bros., sporting goods dealers, have removed from Buchanan street to their new quarters at 335 Sauchiehall street, Glasgow, Scotland.

FRANCE

Our French contemporary, *Le Caoutchouc et la Gutta-Percha*, announces that Dr. David Spence, the well-known rubber chemist and authority on accelerators, will be a regular collaborator. Dr. Spence is vice-president and general superintendent of the Norwalk Tire & Rubber Co., Norwalk, Connecticut.

Société Méridionale de Caoutchouc, at Arudy (Basses-Pyrénées), with a capital of 3,000,000 francs, has been formed to manufacture rubber goods. The directors are Messieurs Filleul and Disson.

Société Le Caoutchouc Industriel du Sud, at 2 bis, rue de la Riboti, Nice (Alpes-Maritimes), is capitalized at 350,000 francs. The director is M. Letainturier.

Willig et Ottoz, at Aubervilliers (Seine), will manufacture soles, heels and various other rubber articles.

FRENCH RUBBER IMPORTS

According to an official publication, France imported during 1919, 32,453 tons of crude rubber compared with 19,927 tons in 1918. The amounts for the past year were derived as follows: 3,235 tons from Brazil; 12,638 tons from England; 517 tons from French Congo; 321 tons from Senegal; 1,006 tons from West Africa; 8,294 tons from the East Indies; 6,442 tons from other countries. The total value was 216,130,000 francs.

During 1919 the imports of manufactured rubber goods totaled 11,772 tons, valued 221,134,000 francs. These goods were chiefly of American origin.

BULGARIA

In the list of goods which may be imported into Bulgaria without previous authorization are: Erasers for school use, rubber tubing, belting and articles of rubber or gutta percha, excepting motor tires other than for motor lorries and omnibuses.

DENMARK

The volume of imports and exports of rubber from Denmark for 1918, 1919, compared with 1913, is as follows:

	Imports			Exports		
	1913	1918	1919	1913	1918	1919
Rubber:						
Raw ....tons	1,153	59	7,097	.....	.....	.....
Manufactures	10,126	614	20,681	768	.....	.....

FINLAND

During the period from January 1 to July 31, 1920, out of applications for licenses to import into Finland rubber and rubber products to the value of 63,100,000 Finnish marks (Finnish mark equals $0.193 at normal exchange) the Finnish Trade and Industrial Commission granted licenses to the value of 40,200,000 Finnish marks.

NORWAY

The statistics of Norway's imports of rubber manufactures for the January-June period of 1920 are herewith given, together with those of 1914. The official figures are quoted in weight:

		January-June, 1914	January-June, 1920
Soles, rings, and matting, etc.	*kilos*	438,095	103,248
Galoshes	*kilos*	285,718	57,554

RUBBER IMPORTS AND EXPORTS OF FRANCE

Statistics of rubber imports and exports of France during 1913, 1918 and 1919 are given in Table I, the weights in metric tons of 2,204.6 pounds, and the values in francs and dollars. Table II shows the values, in francs and dollars, of rubber exports to and imports from the United States, Great Britain, Italy, Spain, and Argentina in 1919.

Out of a total of 17,441 tons of crude rubber, 11,286 tons, valued 79,457,000 francs ($10,884,522), came from Great Britain, no imports from the United States being given in the French statistics. Of the imports of manufactured rubber Great Britain supplied 9,214 tons, valued 186,581,000 francs ($25,559,042), while the United States sent 3,469 tons, worth 76,977,000 francs ($10,544,795).

Great Britain was France's best customer for rubber goods as well as her chief source of supplies of crude rubber. French exports to Germany during 1919 are given in Table III, the trade with the Rhenish Provinces, occupied by the Allied Armies, and that with other Germany being shown separately.

The condition of trade in rubber goods between France and the United States during and after the war is shown by the following statistics of the invoiced value of rubber exports declared at the Paris consulate general for shipment to the United States during 1918 and 1919:

	1918	1919
India rubber scrap	$34,413	$280,448
Rubber goods	52,575	....

Factories handling rubber goods are among those which have taken the longest to recover their former activity.

TABLE I

	1913			1918			1919		
	Metric Tons	Francs	Dollars	Metric Tons	Francs	Dollars	Metric Tons	Francs	Dollars
IMPORTS—									
Rubber:									
Crude	17,441	122,783,000	$23,697,119	18,974	133,578,000	$23,853,214	30,698	216,113,000	$29,604,522
Manufactured	3,326	44,386,000	8,566,498	6,438	112,851,000	20,151,964	13,022	270,227,000	37,017,397
EXPORTS—									
Rubber:									
Crude	16,687	75,537,000	14,578,641	2,564	18,050,000	3,223,214	9,910	69,770,000	9,557,534
Manufactured	6,930	100,288,000	19,355,584	4,177	95,888,000	17,122,857	11,163	225,851,000	30,938,493

TABLE II

	United States		Great Britain		Italy		Spain		Argentina	
	Francs	Dollars	Francs	Dollars	Francs	Dollars	Francs	Dollars	Francs	Dollars
IMPORTS										
Rubber, and manufactures of:										
Crude	....	....	79,457,000	$10,884,522	....	....	....	....	....	....
Manufactured	76,977,000	$10,544,795	186,581,000	25,559,042	2,434,000	$333,425	....	....	....	....
EXPORTS										
Rubber goods	....	....	42,003,000	5,753,836	11,332,000	1,552,329	12,080,000	$1,654,795	3,822,000	$523,563

TABLE III

	Rhenish Provinces, Occupied Territory			Other Germany			Totals		
	Metric Tons	Francs	Dollars	Metric Tons	Francs	Dollars	Metric Tons	Francs	Dollars
EXPORTS									
Rubber goods	1,407	25,224,000	3,455,342	150	3,098,000	424,384	1,557	28,322,000	3,879,726

THE RUBBER TRADE IN AUSTRIA AND GERMANY

By a Special Correspondent

The Austrian rubber industry faces a crisis with the coming of the winter. Austrian rubber manufacturers complain that they have not received the foreign support promised to them by the reparation commission and that production becomes increasingly difficult. The exchange rate of the Austrian crown is still declining and makes it impossible to buy raw materials, without which no manufacturing for export can be attempted. Coal also is very scarce and it is quite well known that some manufacturers have taken to smuggling coal in wagon lots to keep their factories going. Every decline in the price of the crown of course brings about a further increase in the cost of all articles. The number of unemployed is increasing because factories have to close down. Experts who have studied the situation are of the opinion that the Austrians are somewhat to blame for their present situation. The nation is slow in getting under way again and being deprived of many of its natural markets by the peace treaty, recuperates only slowly.

GERMAN MANUFACTURING CONDITIONS UNSATISFACTORY

The automobile industry, which is promising well at the moment, is still hampered much by the governmental attempt to control luxuries. During the height of the summer when the automobile industry should be most busy the factories were working with a reduction of 30 and more per cent of their capacity, which naturally has a very depressing effect upon the demand for tires and other rubber accessories. Also the bicycle industry has been quieter than usual.

The rubber industry reports a further increase in the cost of production, caused principally by increases in wages which, however, seems to have been counterbalanced by an improvement in the working methods. The working hours are set at 48 hours per week during the height of the summer. Reductions, however, have taken place to 40 hours in some instances.

The general public is still determined not to buy at the present high prices and a real recovery can only be expected after the prices have come down to a more favorable level, an event which may not be deferred much longer.

Another contributory cause to the present economic depression is the uncertainty about the final outcome of the taxation measures which are now under consideration. With large confiscations of personal property ahead of the taxpayer, manufacturers and consumers alike are inclined to go rather slow and there is a visible tendency to keep transactions to as low a level as possible.

CRUDE RUBBER

While Germany only a few months ago had difficulty to secure all the rubber required for its rubber industry, there has been noticeable during the last weeks a steady decline in the demand, with the result that prices have slumped in Hamburg. This is the more surprising as during the same time the exchange rate of the mark has declined again, which as a rule has led to an increase in the price of all imported materials. Lack of occupation in the rubber factories no doubt is the principal cause of the present depression in the German raw rubber market, but it seems that the comparatively heavy purchases of rubber importers during the beginning of the year is a contributory cause. Most rubber is sold at present f. o. b. store in Hamburg. Reclaimed rubber of American origin is offered for delivery four to six weeks from date of order. Very little American reclaimed rubber is at present in stock in Hamburg, but the demand is not very large.

TRADE NOTES

The German industry is apparently tired of being made the scapegoat for everything that goes wrong in modern Germany. Socialistic government in Germany does not seem to be successful and judging from the temper of a meeting of participants in the last Leipsic Fair the patience of the industry seems to have been severely tried. A resolution was passed during this meeting calling upon the Government to discontinue the system of crippling industrial enterprise in Germany by doing away with the export restrictions and the various other institutions destined to regulate trade and industry. If the Government is not prompt in taking the hint, action on the part of the industry was promised at the meeting and something like an employers' strike has been proposed as a remedy.

The recent extraordinary meeting of the Hannoversche Gummiwerke Excelsior A. G., in Hannover-Limmer, was interesting for the information given to the shareholders about the operation of the large works of that firm and the development of the rubber industry in Germany generally. The company has been compelled to buy coal from America to keep going and the director pointed out that consequently no difficulties were expected from the fuel shortage in the future. The capacity of the establishment was considerably extended during the last year and the total turnover of the firm has been increased. This is due partly to a larger production but also to the higher prices that were obtained. The management expects that the depression which has been noticed during the second half of this year will now pass off. While it lasted it found expression in the beginning in cancellation of orders and later on in a practical cessation of new business. The company has been compelled to make reductions in the price of many of its principal lines, to bring these in conformity with the existing prices on the international markets. The supply of German coal is expected to continue small.

The Ostdeutsche Gummi Industrie Hermann Mattern, Koenigsberg in Prussia, has changed its name to Ostdeutsche Gummi Industrie Heinrich und Paul Winterberg.

The Hannoversche Gummiwerke Excelsior Akt. Ges. Hannover has increased its capital from 6,000,000 to 10,000,000 marks.

SOME EUROPEAN RUBBER MARKETS[1]

DENMARK

Only three plants in Denmark are engaged in the manufacture of rubber goods, and these concerns, according to 1914 statistics, employed 114 men and 115 women, and produced goods valued at 1,800,000 crowns (1 crown = $0.268), specified as follows: Bicycle tires, 810,000 crowns; tires for automobiles and motorcycles, 85,700; inner tubes, 38,000; general rubber goods, 567,600; finer grades of rubber manufactures, 110,000; rubber linen, 30,000; and rubber clothing, 113,000 crowns. As will be seen from the above, the main production is that of bicycle tires, as a large percentage of the population in Denmark uses the bicycle. Included under "general rubber goods" are elastic ribbon, rubber matting, rubber soles, etc., and by "finer manufactures" is meant special technical and hygienic articles. Rubber clothing includes principally caps and coats. Imports for domestic consumption in 1913 amounted to 6,289,000 crowns.

There is a good market for rubber goods in Denmark, and during the last two years the importation of tires has steadily increased, with American tires very much in demand. The reason is given that American are superior to English, French, or Italian makes. The general terms of payment are 3 months' credit or 2 per cent discount within 30 days. If an extensive trade is to be built up, credit terms should be granted or payment not made obligatory until delivery of goods in the Copenhagen free port.

SWITZERLAND

During 1919 the Swiss imports of raw and scrap rubber reached 4,477 quintals (984,940 pounds), valued 3,204,133 francs ($608,397), as compared with 1,362 quintals (299,640 pounds), valued 1,178,651 francs ($208,179), for the previous year.

According to the last military census, there are 15,000 automobiles and 2,000 motor trucks in Switzerland. Clincher tires are generally used, but owing to the importation of hundreds of

[1] From Commerce Reports No. 224, September 23, 1920.

American motor cars the demand for straight-side tires is constantly increasing. The sources of supply for rubber tires are France, Italy, England and the United States, in their relative order. Solid tires are manufactured in Switzerland and imported principally from France and Italy.

Swiss imports of rubber and rubber goods during 1919 as compared with 1913 and 1918, follow:

Classification	1913	1918	1919
Tubes, hose, pipes without internal layers of other materials	$30,967	$43,584	$147,793
Tubes, hose, pipes with internal layers of other materials	1,007,358	358,956	1,986,313
Strips, sheets, plates, plugs, etc., without layers of other materials	287,578	81,890	1,305,967
Plates, rings, strips, etc., with internal layers of metal or textile materials	203,657	119,086	716,280
Footwear	80,674	19,741	248,693
Fabrics combined with india rubber for industrial use	49,553	70,689	87,165
India rubber or gutta percha applied to fabrics or other materials; waterproof sheeting	60,795	12,146	60,092
Articles for india rubber or gutta percha n. e. s.	290,716	121,637	231,547

In the first four classes in the foregoing table France supplied the greater per cent of the shipments. Great Britain and Italy also figured in this trade, but the part played by the United States was small. However, in the rubber footwear trade the United States led, followed by Austria. The value of shipments from the United States amounted to $177,691.

Market for rubber boots is not favorable, but rubber shoes find a ready sale. These goods are imported from America, France, England, and Italy. This year a great many rubber shoes were supplied by Austria. These, although very cheap, are of excellent quality and of a style well liked by the people here. In pre-war days Russia and Germany were the principal sources of supply.

Electricity and motors have diminished the use of many mechanical goods; leather is easily obtainable here, and rubber belting is, therefore, little if ever used. There were no imports of rubber belting in 1918 and 1919. In 1913 the total value of imports reached $3,570. Metal is generally used here for packing purposes in preference to rubber.

Goods classed as "other rubber goods" are supplied by France, Italy, England, United States, Germany, and Austria, and the market conditions are good for most of them. These articles are distributed by jobbers, retailers, and commission agents. Payments are generally effected by consignment, f. o. b., or cash with order.

Gabardines and rainproof cloth, such as oilskins, etc., of special styles, are worn here; but as a rule rubber clothing is little used in Switzerland.

There are five factories in Switzerland manufacturing cables and rubber-insulated wire. Wire is greatly used, but this article has to be of a special construction, with insulation consisting chiefly of paper. The Italian firm of Pirelli makes the Swiss specification, and most of the wire sold here is obtained from this concern. The Swiss Government is the principal buyer of wire and cables, and bids must be submitted for contracts.

Regarding rubber soles and heels, as leather is cheap in Switzerland substitutes are in little demand, but soles to be nailed on are salable if cheap enough. As concerns round heels and leather center heels, very cheap qualities are mostly in use.

Cheap rubber toys are imported from England, France, and chiefly from Germany. During 1920 a great many toys have been imported from the latter country at very low prices. Toys imported from these countries appeal to the people because of their design. Imports from the United States are small.

Friction tape manufactured in Switzerland is of a poor quality. American tape is preferred, and would find a ready sale if deliveries could be made within a reasonable time.

As concerns druggists' sundries, market conditions are very favorable. Sponges, syringes, hot-water bottles, tubing, etc., are in good demand. These articles are imported mostly from England, America, France, Italy and Germany.

UNITED KINGDOM

The total number of rubber workers in the United Kingdom in January, 1920, was estimated at 71,000 (37,000 males and 34,000 females). In these figures are included a small proportion of rubber workers employed at establishments other than india rubber manufacturing plants.

In April, 1919, the number of firms engaged in all branches of the india rubber manufacturing industry, including the manufacture of rubber goods, was 464, according to the Ministry of Labor.

With reference to the marketing of belting, hose, packings and similar goods, the usual method of supplying is through the medium of rubber factors, or companies, selling engineering supplies. There is a substantial amount of business, especially rubber belting, which is done direct with the larger plants, and there is also a market for rubber goods with manufacturers of articles who use a certain amount of manufactured rubber goods as a component part of their production.

The total imports of rubber boots and shoes reach a large figure, but an increasing production in British plants is expected. British firms usually sell such goods, including canvas shoes with rubber soles, and plimsolls, on open account, and as a rule to the wholesalers, who in turn sell them at an agreed selling price to the retailer.

There is not a heavy demand for druggists' sundries in this market, but there is said to be a chance for the sale of American bathing caps. American rubber soles and heels are too expensive, and due to the difference in styles, rubber clothing is practically all of domestic make. However, there is a market for hard-rubber goods, since the bulk of the trade was formerly in German hands.

The imports of raw and manufactured rubber for the seven months ended July 31, 1920, as compared with like periods of 1919 and 1913, were as follows:

Kind of rubber	January-July 1913	1919a	1920
Crude	$66,627,392	$73,443,905	$76,934,241
Boots and shoes	323,889	400,673	2,494,144
Tires and tubes	8,444,837	4,109,905	15,061,257
Other manufactures of rubber	2,121,496	1,457,263	2,164,118

a Full statistics for 1919 have as yet not been published.

Of the imports of rubber manufactures, excluding tires, tubes, waterproofed apparel, and boots and shoes, the 1916 imports amounted to $4,714,137, of which total the United States supplied $4,334,382; the 1917 imports reached $2,299,445, with the share of the United States amounting to $2,048,810; and in 1918 the United States furnished this class of goods to the value of $1,126,910 out of a total import valued at $1,297,796.

CONDITIONS IN THE SCOTTISH RUBBER TRADE

The rubber manufacturing industry of the Glasgow consular district is of considerable importance, there being five concerns thus engaged, employing approximately 2,200 people. Their products are chiefly mechanical goods, such as packings, hose, belting, etc., although one concern produces tires and a second waterproof clothing.

With the exception of bicycle and motorcycle tires, all rubber tires used in the district are received from other districts in the United Kingdom or are imported from other countries. The imported tires are chiefly of American origin and are estimated to comprise about one-third of the total in use at the present time. Tires are distributed through agents of the manufacturers, jobbers in accessories, garages, etc., and the usual terms of payment are five per cent discount for payment in seven days, two and one-half per cent for monthly settlement or 30 days net.

There is not a large demand for rubber boots and shoes here, due to the fact that they are not as commonly worn as in the United States. Dealers as a rule carry only small stocks; in fact, some retail shoe dealers do not handle them at all. The majority of these goods are imported chiefly from the United States and are handled by agents in much the same manner as are tires.

Industrial rubber goods are produced in the district, much of the local consumption being of domestic origin. A considerable quantity of this class of manufactures is exported.

American rubber goods have a very satisfactory standing in the Glasgow market, but there is a tendency on the part of the consumer to buy domestic goods when they are obtainable, and at an equal price. American tires, rubber boots and shoes, and druggists' sundries are all well known and meet with a good demand. In other lines local competition is stronger, and foreign products meet with less success.

FOREIGN TARIFFS

COSTA RICA

La Gaceta, of Costa Rica, for July 8 contains a copy of a law dated July 6, 1920, whereby the Government is authorized to double the import duties on certain goods. Among these are listed rubber-bulbed scent sprayers, which formerly were taxed at 2 colones per kilogram, and elastics and garters, formerly taxed at 2 colones, 50 cents per kilogram.

AUSTRALIA

The Department of Trade and Customs, Australia, impose a general tariff of 15 per cent ad valorem on imports of flexible cotton-braided cable, containing rubber, or covered with rubber and cotton tape. British preferential tariff on this item admits these goods free.

BRAZIL

The Belgian Government will henceforth be granted a rebate of 20 per cent by Brazil on customs duties of seven Belgian staples including certain rubber manufactures noted in Article 1033 of customs tariff. On all these articles, including several others, the United States enjoys a similar rebate.

LATVIA

Recent additions to the Latvian import tariff (as cited by the British consul at Riga) include waterproof overcoats, taxable at 5 per cent ad valorem, and rubber footwear, on which a duty of 10 per cent ad valorem is levied.

SWITZERLAND

Further relaxations of the Swiss export restrictions authorize, by a decision of the Swiss Federal Department of Public Economy issued September 14, 1920, the exportation of certain articles under a General Export license. Item No. 529 on the list includes articles of rubber and gutta percha, not previously mentioned in the Swiss Customs Tariff.

IMPORTS OF RUBBER TIRES INTO SOUTH AFRICA

The value of all rubber tires, including inner tubes, imported into the Union of South Africa during the years 1918 and 1919, was as follows:

From—	1918	1919
United Kingdom	$1,090,066	$963,903
Canada	44,875	242,288
France	76,983	400,703
Italy	50,822	78,313
Japan	$10,873	$3,319
United States	548,562	714,719
Total	$1,822,181	$2,403,245

The customs duty on rubber tires imported into South Africa is 20 per cent ad valorem. A rebate of 3 per cent is granted on the products or manufactures of the United Kingdom and reciprocating British colonies. In 1919 there were 9,000 motor cars of all descriptions registered in the Cape Province, most of which were of American make, consisting of the lighter and medium-priced cars. There were also registered at that time 4,117 motor cycles.

A list of importers of automobiles and accessories in Cape Town can be obtained from the Bureau of Foreign and Domestic Commerce or its district or cooperative offices by referring to file No. BE-6004.—*Commerce Reports*, October 11, 1920.

JAPANESE RUBBER STATISTICS

Rubber and rubber goods appear for the first time among the list of principal exports from Japan to the United States in 1919; shipments were valued at $1,598,469, as against $14,569 in 1918 The following figures give the value of imports of crude rubber and gutta percha into Japan during 1919, and the leading countries of origin:

Articles and countries of origin.	Value.
India rubber and gutta-percha, crude	$8,656,050
British India	205,687
Straits Settlements	7,912,647
Dutch India	21,775
United Kingdom	356,729
United States	151,174
Other countries	8,038

RUBBER TRADE OF THE BELGIAN CONGO

Rubber has long been a standard export of the Congo, but the first cultivated plantations in the colony came of age to be profitably worked only in 1914. These new plantations should add greatly to the commercial value of Congo rubber exports, as the rubber trade gives preference to cultivated rubber over the wild products. The withdrawal of Russia from the rubber market and the diversion of native labor from the gathering of rubber to the gathering of oil products have hindered development in the field of rubber exports, as has also the lack of cultivated plantations in the Congo. In spite of these difficulties, the situation has begun to improve, and further increases in exportation can be expected for the future. The following figures show the exports of rubber since 1912:

Year		Value
1912	*long tons* 3,454	$6,712,182
1913	3,567	3,416,693
1914	2,213	2,052,279
1915	2,144	2,144,163
1916	2,969	3,373,090
1917	3,700	3,918,894

THE RUBBER INDUSTRY IN BRAZIL

By a Special Correspondent

It would seem that experience, resulting from previous disastrous attempts at valorization, is of no profit to those anxious for the welfare of rubber in Brazil. The *Revista Commercial, Industrial e Agricola do Pará*, the organ of the Associação Commercial do Pará, publishes a report by Amando Mendes of his trip to Rio de Janeiro, as delegate of the association, to lay before the authorities there a plan of intervention by the Government through the Bank of Brazil, in the aid of the local rubber market. The delegate was well received, but his plan was not thought much of and intervention was flatly refused. In an earlier issue of the *Revista*, R. C. M. da Costa very frankly said that the trouble with the Brazilian rubber industry was the aversion to any methodical undertaking; ignorance, lack of perseverance, unwillingness to get out of the rut; a tendency to take what nature gives without expending creative energy—all of which leads to that frame of mind where the people wish to improve their lot by cursing the scientific plantations in the East. From the same writer comes practically the only sound suggestion—to renew, by planting, the forests which have been exhausted first because of their accessibility.

IMPORTS OF AUTOMOBILE TIRES

During the last seven years pneumatic tires were imported to a value of 20,545 contos (one conto equals $546 United States currency) of reis. The amount for 1913 was 2,306 contos; for 1914, 1,617 contos; for 1915, 2,274 contos; for 1916, 3,164 contos; for 1917, 3,547 contos; for 1918, 2,549 contos; for 1919, 5,088 contos.

Before the war almost all of the tires came from France. In 1913, over 50 per cent came from France; 21 per cent came from Germany; Great Britain and Italy accounted for about 8 per cent each, while the United States sent only 3 per cent of the total value. However, during the war, the proportions under-

went a change and in 1919, the United States shipped 64 per cent of the total value of pneumatic automobile tires to Brazil, the figures for the different countries now being: United States, 3,287 contos; France, 888 contos; Great Britain and Italy, each 482 contos; other countries, 82 contos.

NEW COMPANIES

A company with a capital of 1,000 contos of reis, operating under the name Industria Brasileira de Borracha, "Berrogain Ltd.," has recently been formed at Rio de Janeiro. The Brazilian industrial Paul Berrogain and a group of Brazilian and Portuguese capitalists are at the head of this concern. In 1916 Mr. Berrogain founded the first factory for rubber goods in Brazil, himself doing the technical work in his factory until it became successful.

A new Belgian company has been formed to undertake the exploitation of various forest products in Brazil, the collection of balata, the cultivation of *Hevea*. The new company—the Société Générale de Culture et d'Industries Tropicales—has a capital of 2,000,000 francs and will be managed from Paramaribo, Dutch Guiana.

MASSARANDUBA AND BALATA

The Commercial Museum of Pará calls attention to the distinction which must be made between the different varieties of *Mimusops*. Both the massaranduba and the balata bearing tree (bullet tree) belong to *Mimusops*. However, the true balata tree is known as *Mimusops bidentada A. D. C.—Sapotaceas*, while the various massarandubas abounding in certain parts of Brazil belong to *Mimusops maparajuba Hub., M. paraensis Hub.*, and *M. Amazonica Hub.* These trees, unlike the bullet tree, yield a latex which is resinous and brittle, of little value commercially.

BRAZIL REGULATES FOREIGN EXCHANGE

Because of recent unfavorable conditions of foreign exchange (quotations on September 9 being 5 milreis 720 reis to the United States dollar), the Minister of Finance of the Republic of Brazil has ordered the bank controller to issue the following circular to all banks in Brazil:

> In accordance with decree No. 1811, of July 19, the strict observance of the provisions thereof is advised, no selling or buying operation of exchange to be effected without the previous authorization of this office, by demanding production of the documents considered indispensable for the proof of legitimate business. In case of offense, article 2 of said decree provides as a penalty the seizure of the values in question and a fine of 50 per cent of the sums.
>
> You are requested, when called upon to do so, to supply the inspector with all details connected with money-exchange operations, as well as to produce the books and documents of your office for examination; also to prove that the bank's capital has been paid up according to law and that you are strictly obeying the provisions to operate, in order to facilitate the general supervision of the banks by this office according to the provisions of the Brazilian laws, and especially of the decrees of August 15, 1891, and February 5, 1892, numbered, respectively, 493 and 727.

The local manufacture of rubber is being encouraged by the Government of Brazil, which proposes to advance the contractor a loan of 75 per cent of the expense of erecting factories in Pernambuco and Pará for the manufacture of tires and other articles of Brazilian rubber.

Venezuelan imports of tires and tubes during the period January-June, 1919, were 7,592 kilos, valued 116,562 bolivares (one bolivar equals $0.193 United States currency), as against 206 kilos, valued 2,546 bolivares, in the same period of 1918. Imports of other articles of manufactured rubber showed considerable decrease in the same periods, totaling 8,829 kilos, valued 110,654 bolivares, in 1919, as against 14,095 kilos, values 117,989 bolivares, in 1918.

SOME LATIN AMERICAN RUBBER MARKETS[1]

COLOMBIA

Importation of rubber tires into Colombia has been constantly gaining during the past few years, and due to the increasing arrivals of automobiles the demand for tires should become still greater. Practically all the tires are imported from the United States by hardware importers and automobile dealers. The greater number imported have been small sizes and of the clincher type. Solid rubber tires for coaches are assessed at the rate of $0.02 per kilo (1 kilo = 2.2 pounds) plus surtax of 2 and 5 per cent. Pneumatic tires are assessed at the same rate as solid tires. In 1913 coach tires were imported chiefly from the United States, with the United Kingdom a second source of supply, but in 1919 the United States monopolized this class of imports. In 1919, pneumatic tires were imported to the value of $23,355, the share of the United States being $22,241.

The market here is a small one for rubber boots, but a good one for rubber-soled shoes, especially rubber-soled canvas shoes. The United States furnishes the greater per cent of imports in this class. Import duties on rubbers are $1 per kilo; on leather shoes having rubber soles, $1.70 per kilo; and on canvas shoes with rubber soles, $1.50; all these plus surtaxes of 2 and 5 per cent. Of an import in cotton shoes with rubber soles in 1919 of $8,239, the United States supplied $7,539.

In the importations of rubber goods for industrial purposes there have been marked increases. Small supplies are kept on hand by the leading hardware dealers, and their terms are the usual one, two and three months' time. Rubber belting pays a duty of $0.01 per kilo; rubber hose, $0.01 per kilo; rubber washers, $0.20 per kilo; all of these plus surtaxes of 2 and 5 per cent.

The following table gives the imports of rubber belting, rubber hose, and rubber washers and packing for 1913, 1918 and 1919:

Articles and Sources of Supply	1913	1918	1919
Rubber belting:			
United States	$22	$481	$1,284
United Kingdom	267	...	...
Rubber hose:			
United States	1,408	775	1,678
United Kingdom	132	15	252
Germany	38	...	...
Rubber washers and packing:			
United States	276	2,241	2,025
United Kingdom	...	173	15
Panama	...	...	90

Small quantities of rubber clothing and druggists' sundries are imported. Great Britain supplies the few imports of clothing, and insulated wire and cables come from the United States, imports of the last named being on the increase. Cotton cloth, rubber-coated, pays a duty of $0.90; cotton cloth, rubber-coated, for ponchos, $1.10; woolen cloth, rubber-coated, $1.35; plus the usual 2 and 5 per cent surtaxes. Rubber, in bulk, purified or not, pays a duty of $0.30 per kilo; hard rubber, vulcanized, for dental uses, $1.30, plus the surtaxes; insulating wire and cables, $0.01; rubber soles and heels, $0.35; rubber toys, $0.60; rubber matting, $0.50; rubber friction tape, $0.02; and druggists' sundries pays a duty of $0.25. All plus surtaxes of 2 and 5 per cent.

DOMINICAN REPUBLIC

There are no factories producing rubber in this district, nor are statistics available showing the various classes of rubber goods imported, but the total imports of all manufactures of rubber into the Dominican Republic were valued in 1913 at $31,032; in 1917 at $84,266; and in 1918 at $143,976. It is estimated that this district would use about 30 per cent of the total import.

Imports consist, for the most part, of tires and tubes, a few rubber soles and heels, and a few druggists' sundries, with 95 per cent of these imports coming from the United States. The only import demand is for rubber tires and tubes. All merchants desire long credits, and business usually goes to the house that will grant the longest credits. Motor cars in this district are almost entirely of American make. There are a few motorcycles in use

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[1] From Commerce Reports, No. 229, September 29, 1920.

and many bicycles; also carriages in towns usually have rubber tires.

MEXICO

Two small rubber factories are in operation in the City of Mexico, both of which manufacture automobile tires and raincoats. The making of other articles than tires has not been developed beyond an experimental stage. It is estimated that to meet the demand of the entire Republic of Mexico there should be an output of 600 to 1,000 tires per day. Practically the entire consumption of manufactured rubber goods in Mexico is imported from the United States, though previous to the war some sundries were received from Germany and a very few Italian and French automobile tires. Some drug sundries were imported from Japan, but only in small quantities.

Local competition has considerably reduced the importation of tires from the United States, there being an import duty of 1 peso ($0.498 in United States currency) per kilo (2.2 pounds). The Mexican market is overcrowded with American tires, while the outlet is a restricted one. Practically all sizes are in use. Two American concerns maintain offices in Mexico City, and a few manufacturers cover portions of the field with traveling salesmen, while a few others have agencies with local dealers.

There is a strong demand for sport shoes. However, American firms are reluctant about extending terms of draft against delivery. On the other hand, the Mexican importer dislikes to be forced to advance cash with order when long delays under present transportation and manufacturing conditions are considered. The market possibilities will continue so as long as conditions remain unsettled.

The business of the mining and oil fields is almost entirely controlled by a few well-known brands of belting, packing, and hose.

In rubber clothing cheap grades are used in parts of the country where raincoats are needed.

In most cases small dealers lack financial ability to import direct and find it to advantage to purchase from Mexico City stocks. In the sole and heel trade most manufacturers have yearly contracts for direct importation, and it is impossible to ship direct to small dealers. American toys are too expensive for this market, the control being in the hands of the Japanese, who supply a cheap grade. Rubber matting is not in general use.

VENEZUELA

In 1918, the only year for which definite statistics are available, rubber tires were imported to the extent of 1,511 pounds, valued at $2,038. The best gage for the required imports is the fact that there are about 2,000 automobiles in this district, and the number of tires needed can be reckoned accordingly. The cars are practically all standard American makes, and quick detachable tires are preferable. These are imported from dealers in Caracas, the tires imported from countries other than the United States are so few as to be negligible. There are practically no imports of rubber boots and shoes, nor of rubber for industrial purposes. Other imports are confined to goods used by the drug trade, to insulated wire, and rubber heels and soles.

The present demand for tires in the Maracaibo district is small, but with the expected increase in the number of automobiles, the demand for rubber tires will be greater. Sizes generally in use are 30 by 3-inch, 30 by 3½-inch, 32 by 3½-inch, and 33 by 4-inch. The Venezuelan customs duty on tires is at the rate of 0.75 bolivar per kilo of gross weight.

There is very little demand for rubber boots and shoes. The customs duty on this class of goods is 2½ bolivares per kilo of gross weight.

The market for rubber belting is fairly good, particularly in small sizes of 4 or 5 inches. There is also a light demand for larger sizes by petroleum companies for drilling operations. Rubber hose finds its chief demand among concerns requiring steam hose, but this use is quite limited. There is a fair demand for industrial rubber goods, and practically all imports are supplied by the United States.

MEXICAN-MADE TIRES NOT COMPETITIVE

The only competition offered recently to American automobile exports has been through the manufacture of tires by two factories in Mexico City. This local product is placed on the market at prices 25 per cent lower than the prices of the tires imported from the United States. On account of a shortage of raw materials (chiefly of American origin) the output of the Mexican tire factories is small and at times negligible. These plants have been unable as yet to perfect their processes of manufacture, and their product is not so uniform as that of the American standard tire manufacturer. The Mexican-made tire has not, therefore, been a serious factor in competition. Tires for trucks are dutiable at $11.29 per 100 pounds, and tires for passenger cars at $22.59 per 100 pounds.

The Rubber Trade in the Far East

By a Special Correspondent

MALAYA

The heavy fall in prices of local products, including rubber, is said to be the cause of the present money stringency. Conditions are not so serious in Singapore and old-established British firms seem to have little trouble, although others have had to allow extensions of credit.

With regard to the rumor of serious trouble in Penang, investigation showed that, to the contrary, Penang is quite prosperous.

Recent reports from Kelantan, Kedah and Perlis, also indicate favorable conditions. Within the last ten years these states have developed wonderfully. In Kelantan there are now 152,739 acres under rubber, which in 1919 yielded 2,077 tons, against 1,745 tons in 1918. In the state of Kedah 112,192 acres are under rubber, and the exports amounted to 5,021 tons in 1919.

The Chief Secretary's report on the Federated Malay States shows that during 1919 the market for rubber was much more favorable than in 1918, although the demand at the end of the year had not equalled expectations, and price fluctuations were less noticeable than in previous years. Shortage of staff handicapped research work, but despite this, much information has been collected.

Mouldy rot is regarded as the most serious disease affecting the rubber tree in Malaya. While positive results have not yet been obtained, it has been shown that brown bast can be controlled by a change of the tapping system.

A correspondent of the *Malayan Tin and Rubber Journal* calls attention to a certain rule of the Singapore Chamber of Commerce Rubber Association which is unfair to the buyer of rubber. This rule governs the question of delivery and contains the following:

> Any objection as to quality, description or packing, etc., shall be lodged in writing with the sellers on the day following delivery. If any lots are found to be inferior to sample or to quality called for on contract, buyers shall accept this inferior rubber with allowance, to be fixed either mutually or by arbitration. In case the inferiority of a lot calls for an allowance of over three cents per pound, buyers shall have the option of rejecting the inferior rubber and sellers will have to replace within six days from the date of award.

It is contended that an allowance up to three cents a pound is too high and that buyers should have the privilege of refusing rubber even if the inferiority called for an allowance of only one cent per pound. Furthermore it is claimed that the rule encourages careless grading and packing.

On the other hand, the seller argues that he must be protected against trifling claims, which would be especially prevalent when rubber is low and the contract had been entered into when the price was much higher.

The fact of the matter seems to be that both sides are right and wrong and that the only real grievance is against the maximum of three cents, for if rubber is poor enough to warrant an allowance of three cents it can hardly be called a really fair tender.

RUBBER SEED OIL

In his report on the Agricultural Department of the Federated Malay States in 1919, L. Lewton-Brain, Director of Agriculture, states that the experimental hydraulic oil-expression plant of the department has been lent to the Malayan Oil Mills, Limited, a local company formed primarily to manufacture rubber seed oil. It has been ascertained that rubber seed on storage deteriorates and produces an oil containing up to about 25 per cent of free fatty acids, and that such oil is not generally suitable as a substitute for linseed oil. Further, this oil is not suitable for many purposes owing to its slower drying power, compared with linseed oil, and it is necessary to prepare a "boiled" oil for commercial purposes.

Considerable progress has been made in the work of refining the oil, but it is probable that the processes required can be carried out only in a factory under the supervision of a trained chemist. Experiments on the preparation of "boiled" oils have shown that a satisfactory product can be obtained from a raw oil free from fatty acids.

A further problem, namely, the prevention of the deterioration of seed in storage, remains to be solved. Freshly collected seed yields an oil with very low acid content.

CEYLON

According to the report of H. C. Pinching, A. R. C. S., the soil conditions, the growth of the trees, and the output per acre are surprisingly good in Ceylon. A field of trees, averaging 16 years of age, gave 450 pounds per acre on alternate-day tapping of a half spiral cut. The average general increase of yield per acre per year for the first few years is 50 pounds, as follows:

	Pounds Per Acre
6 years	150
8 years	300
10 years	400
12 years	500

From 12 years onward very little increase in yield is noted; growth and crops are practically stationary and the effect of seasonal peculiarities upon the yield appears to be very marked.

A report by Mr. Petch indicates that the number of trees attacked by brown bast is not so great in Ceylon as in some other rubber-producing countries. It is now held that brown bast is a physiological result of tapping, and is more common in daily tapping than in alternate-day tapping.

Experiments at Peradeniya with different manures showed the greatest increase in a tree which in July, 1916, measured 8.30 inches and in January, 1920, measured 23.42 inches. The same mixture was used for this tree and for another, which measuring 7.04, increased to 20.91 inches in the same time. The rates of increase of these two trees represent the highest and the lowest, respectively, of all the trees experimented on.

It is reported that Germany is planning to resume trade with Ceylon in all articles except machinery. German firms are offering samples of various articles, one firm having even sent a big consignment of goods. It further appears that German firms have proposed to local merchants to exchange rubber and other local products for German goods as yellow metal, bronze, etc. The drawback to this seems that some German firms are not prepared to negotiate business by bank credit.

THE NETHERLAND EAST INDIES

The local press is taking note of the fact that America and Japan are striving to increase their interest in the rubber cultivating industry in order to satisfy their home requirements. It is foreseen, however, that production from Java and Sumatra, which is mainly sent to the Netherlands, will eventually go to Germany and Austria.

America's desire to become independent as far as her supply of rubber is concerned, will not be realized owing to the fact that it will never find sufficient land to plant enough rubber for home consumption, they say.

It is further pointed out that at one time the local government refused a petroleum concession to a combination connected with the Standard Oil Company, but adds the belief that as far as rubber is concerned, the Netherland East Indies would stick to its liberal policy and continue to admit foreign capital.

The shareholders of the Indian Rubber Company have accepted an offer from a British concern for the sale of their Sumatra estates.

At a forthcoming meeting the shareholders of the "Ambalatoe" will be asked to consider the sale of 2,000 out of 4,500 bouws (one bouw equals 1.7537 acres) of rubber land to the Sumatra Rubbercultuurmaatschappij "Serbadjadi."

It is rumored that The Goodyear Tire & Rubber Co. is negotiating for the purchase of the estates belonging to the Rotterdam Deli Co., and to the Krapah Tobacco Co. If these negotiations succeed, this concern will control 30 estates, covering 100,000 acres, all in the East Coast of Sumatra.

A report from the division for agricultural economics indicates the various parts of Sumatra said to be suitable for different crops. Thus, Tapanoeli is favorable for rubber. In the newly opened district of Muaru Labuh, along the Liki river and on the northern slope of Mt. Korintji, rubber is being cultivated with success in parts, although on the whole the district is considered to be too wet for rubber.

The Djambi Highlands offer good opportunities for rubber. Vast areas are available for the purpose. The soil is good; the rainfall, though not heavy, is regular; but there is a lack of roads and population. The Muara Bungo district in these parts seems to be capable of development with least expense.

The area under rubber in the East Coast of Sumatra at the end of 1918 amounted to about 320,000 acres. The total cost of bringing to the bearing stage an estate opened up before 1919 is estimated to average 660 gilders per acre. This average is increased to 720 per acre for lands opened up after 1919.

At the end of 1918, 211,200,000 gilders were invested in rubber estates in this part of Sumatra.

SOUTH INDIA

The Secretary of the U. P. A. S. I. (United Planters' Association of South India), has compiled statistics relating to the production of rubber in South India. Figures of about 5,000 acres of rubber not belonging to the U. P. A. S. I. were also obtained.

Years of Planting

Year	Planted Acreage	Total at December 31
1904 and previously	912.79	912.79
1905	1,841.54	2,754.33
1906	5,709.39	8,463.72
1907	5,486.90	13,950.62
1908	5,812.25	19,762.87
1909	2,245.15	22,008.02
1910	5,836.68	27,844.70
1911	8,178.24	36,022.94
1912	4,260.57	40,283.51
1913	2,840.51	43,124.02
1914	1,095.26	44,219.28
1915	129.52	44,348.80
1916	114.08	44,462.88
1917	System changed.	44,463.10
1918	1,203.54	45,666.64

Geographical Distribution of Estates

	Acreage Planted	Acreage Tapped	Crops in 1918 Pounds
British India			
Wynaad	61.47	....	....
Nilgiris	134	52	6,615
Malabar	10,967.25	7,744.16	1,192,426
Anamallais	1,071	480	48,628
Totals	12,233.72	8,276.16	1,247,669
Coorg	779	590	21,013
Native States—			
Travancore—			
Mundakayam	12,164.97	10,378.56	2,132,944
Kanan Devans	819	549	73,485
Central Travancore	112	112	10,016
South Travancore	10,081.85	8,114.96	1,883,510
North Travancore	4,268.35	3,725.52	778,763
Totals	27,446.17	22,880.04	4,878,718
Mysore—North Mysore	180	80	8,632
Cochin State	5,027.75	4,245.61	723,251
Grand totals	45,666.64	36,071.81	6,879,283

The total number of laborers employed during 1918 was 27,381.

It is noted that the cultivation of both tea and rubber is being taken up by Indians. There are now about 20 rubber companies with estates aggregating some 14,000 acres under Indian management in Travancore.

At a recent meeting of the United Planters' Association of Southern India it was resolved that the Government be approached as regards its willingness to help to establish a factory in Southern India for the manufacture of rubber goods.

THE RUBBER INDUSTRY IN UGANDA

According to a recent Government report, the acreage under Pará rubber on European owned plantations is estimated at 11,255. The tappable area, however, is still small, owing to the great number of trees planted in recent years. For the year 1918-19, the exports of plantation rubber amounted to 253,063 pounds, value £12,893. This shows an increase of 108,336 pounds over the previous year, and an increase in value of £2,928. In certain districts, the natives are taking up rubber-planting with enthusiasm. It appears that a rubber planter with experience in Sumatra and Malaya declared that the prospects for rubber in the Baganda Province are good, provided the industry receives the proper assistance while yet in its infancy. This authority regards the soil as superior to that of the Federated Malay States, the configuration of the land as almost ideal, and the risk from disease small, since the areas under cultivation were originally grass and not forest land. As to rainfall, this is less, but alternate daily tapping will remedy this. He further considers that the growth of trees here will be as rapid as in Sumatra. Altogether this is quite a satisfactory opinion.

On the question of the appointment of an official adviser on rubber, the investigating commissioners are of opinion that this would not be practical, and recommend, instead, that planters join the Rubber Growers' Association, the Government bearing part of the expense of subscription. This association, it is understood, would then arrange for a competent rubber chemist, and, if possible, a mycologist should be sent out, the Government again sharing the expense with the planters. If Uganda is to get any benefit of technical advice, this should be done at once.

The commissioners also recommend the enforcement of the Plant Pests Ordinance, which would greatly benefit the estates.

At present the industry is a good deal hampered by the rates charged on the Uganda Railway; it has, therefore, been suggested to aid planters by reducing the rate, asking the railway to accept tare weight for rubber as is done in the Federated Malay States, and to reduce the very high rate of insurance now imposed.

As regards labor, it has been found that the local native is good at all work on rubber estates except the most important of all—tapping. It is, therefore, advised to subject prospective tappers to a term of apprenticeship, if possible, on expiration of which they should be given certificates by the Agricultural Department, according to their merits, and should then be engaged on contract. To encourage labor, the Sumatra custom of giving native labor a bonus on results is offered for consideration.

CURTAILMENT OF RUBBER PRODUCTION PROGRESSES

The commendations regarding a 25 per cent curtailment in the production of plantation rubber made by the Rubber Growers Association of London have been accepted by 80 per cent of the producing acreage owned by members domiciled in the United Kingdom.

Seventy-five out of 111 members of the Rubber Producers' Association of Malaya have agreed to restrictions to date, and the Japanese Planters' Association, representing 65,634 planted acres unanimously decided to restrict on similar lines. The local associations are endeavoring to bring the Chinese producers in Malaya into line, and the agents of the principal Shanghai companies are working to that end. It is assured that over 70 per cent of Ceylon local producers are willing to restrict output, and the members of the International Association at the Hague present at a recent general meeting were almost unanimous in favor of the restriction scheme, and their council has sent out a circular recommending a 25 per cent reduction, to which they are asking at least 70 per cent of their members to adhere.

Many companies are already carrying out a policy of restriction and others have cabled instructions to their estates to prepare for restriction becoming effective on November 1, 1920, and continuing until January 1, 1922.

BALATA PRODUCTION IN DUTCH GUIANA DECLINING

Exports of balata from Dutch Guiana in 1919 showed a decrease in value of $147,919 from the figures for 1918, which totaled $900,032. The total amount for 1919 was valued $752,113. Rubber showed a gain, from $2,577 in 1918 to $5,014 in 1919.

Declared exports invoiced at the consular agency at Paramaribo for shipment to the United States during 1918 and 1919 included balata and rubber as follows:

	1918		1919	
	Quantity	Value	Quantity	Value
Balata .... *pounds*	118,720	$106,127	338,750	$302,456
Rubber	4,095	2,913	....	....

The production of balata shows a steady decline, although the prices received were considered good. The industry is gradually falling into the hands of two or three large corporations, and this year saw the selling out of one of the oldest individual operators to one of the larger interests. This is mainly due to the fact that areas that pay to exploit are getting farther from the coast, and the transportation and cost of labor are therefore steadily increasing, so that only firms with large financial backing and organized forces of labor can continue in this business.

It is believed that from 75 to 90 per cent of the motor cars imported into China are of American make. Shanghai imports of motor cars have increased from 162 in 1913 to 961 in 1919. Most of these are four or five passenger cars, only 20 or 30 per cent being of the heavier seven-passenger type. The clincher tire is used on many of these cars, and for the trucks, which are of the lighter kinds, both solid rubber and pneumatic tires are used.

Recent Patents Relating to Rubber

THE UNITED STATES

GRANTED SEPTEMBER 21, 1920

No. 1,353,161 Disk wheel for pneumatic tires. R. C. Hoffmann, Argos, Ind.
1,353,215 Eraser attachment for pencils. W. J. Campbell, Indianapolis, Ind.
1,353,260 Mattress support with inflatable, fluid-containing members. F. I. Monks, Houston, Texas.
1,353,325 Cushion wheel. A. S. Duffies, Markesan, Wis., and F. Mead, Chicago, Ill.
1,353,326 Cushion wheel rim. A. S. Duffies, Markesan, Wis.
1,353,396 Closure with gasket for jars, bottles, etc. A. and H. Ingram, assignors to Ingrams, Inc.—all of Brooklyn, N. Y.
1,353,397 Closure with gasket for jars, bottles, etc. A. and H. Ingram, assignors to Ingrams, Inc.—all of Brooklyn, N. Y.
1,353,398 Closure with gasket for tumblers, jars, bottles, etc. A. and H. Ingram, assignors to Ingrams, Inc.—all of Brooklyn, N. Y.
1,353,399 Closure with gasket for jars, bottles, etc. A. and H. Ingram, assignors to Ingrams, Inc.—all of Brooklyn, N. Y.
1,353,400 Closure with gasket for jars, bottles, etc. A. and H. Ingram, assignors to Ingrams, Inc.—all of Brooklyn, N. Y.
1,353,415 Pneumatic tire valve with rubber gasket. J. N. Newsom, H. E. Harder, and W. F. Leschen, assignors to Newson Valve Co.—all of St. Louis, Mo. (See The India Rubber World, April 1, 1920, page 434.)
1,353,573 Demountable rim for pneumatic tires. G. Esmarian and K. Kafafian, Paterson, N. J.
1,353,592 Stocking supporter. F. E. Howard, Lamanda Park, Calif.
1,353,622 Reinforced insulating material. H. S. Ashenhurst, Chicago, Ill.
1,353,625 Pen-brush. A. F. Bradenburg, assignor of one-half to H. E. Palmer—both of Dayton, O.
1,353,627 Collapsible pail for filling automobile water tanks. D. H. Bucher, Louisville, Ky.
1,353,671 Stocking supporter. C. McD. Supple, Boston, Mass.
1,353,679 Fountain mucilage-brush with side lever to compress inner sac. P. J. Venard, Denver, Colo.
1,353,700 Cushion spring tire. W. N. Allen, San Antonio, Tex.
1,353,709 Easel for holding flowers, having collapsible water font. M. V. Bauer, Washington, D. C.
1,353,750 Rubber garment protector with ventilating side-openings. K. Heitler, New York City. (See The India Rubber World, November 1, 1920, page 110.)

GRANTED SEPTEMBER 28, 1920

1,353,857 Respirator. D. K. H. Schumann, Hamburg, Germany.
1,353,878 Cap for tire valve. W. H. West, Stockton, Cal.
1,353,896 Combined eraser-holder and pencil point-protector. V. B. Dawson, Bridgeton, N. J.
1,353,921 Solid rubber and spring tire. G. C. Lehr, St. Louis, Mo.
1,353,942 Dental vulcanizer, flask and charger. D. A. Akin, assignor of one-third to J. Meckay and one-third to E. F. Fuller—all of Spokane, Wash.
1,353,943 Demountable rim for tires. A. L. Anderson, assignor of one-fourth to I. F. Mazna and one-fourth to G. B. Shafer—all of Spokane, Wash.
1,353,988 Transversely-split demountable rim for tires. R. S. Bryant, assignor by mesne assignments to The Standard Parts Co.—both of Cleveland, O.
1,354,017 Pressure-gage for tires. J. A. Bowden, Los Angeles, Cal., assignor to A. Schrader's Son, Inc., New York City.
1,354,095 Garter stud attachment. D. C. Evans, Cincinnati, O., assignor to Pioneer Suspender Co., a corporation of Pennsylvania.
1,354,212 Apparatus and method for regulating breathing for singing and wind-instrument practise. J. B. Rigg, Oak Park, Ill.
1,354,221 Demountable rim vehicle wheel. A. H. Shoemaker, Seattle, Wash.
1,354,392 Resilient tire. M. A. Green, Rupert, Idaho.
1,354,411 Reinforced tire. E. Y. Malone, Mobile, Ala.
1,354,433 Lens clarifying device. C. De Felice, New York City.

GRANTED OCTOBER 5, 1920

1,354,468 Demountable rim for tires. W. E. Copithorn, Natick, Mass.
1,354,480 Hose coupling. F. Hachmann, St. Louis, assignor of one-eighth to D. M. Hutchinson, Ferguson—both in Missouri.
1,354,499 Interchangeable cushion heel. C. H. McLean, Boston, Mass.
1,354,504 Hose reel. B. H. Montgomery and J. B. Dingwall, said Dingwall assignor of his one-half to J. E. Dingwall—all of Toronto, Ontario, Canada.
1,354,520 Tire. B. P. Stedman, Peoria, Ill.
1,354,524 Telephone head set. J. S. Timmons, New York City.
1,354,643 Lock for air-hose couplings. R. W. Brower, Proctor, Minn.
1,354,666 Milking machine. F. A. Lane, assignor to D. H. Burrell & Co.—both of Little Falls, N. Y.
1,354,669 Hose clamp. A. Leverdahl, Aurora, assignor to Independent Pneumatic Tool Co., Chicago—both in Illinois.
1,354,680 Cabinet hose-rack. C. and R. Nuhring, Cincinnati, O.
1,354,684 Waterproof breast adjuster with elastic straps, for preparation of dead bodies. J. G. Purcell, New Orleans, La.
1,354,774 Display tire holder. M. Metzger, Chicago, Ill.
1,354,846 Repair patch for rubber footwear. J. Robertson, Jr., Weehawken, N. J.
1,354,905 Insulating splice cover. J. B. Hamilton assignor of one-half to J. C. Farr—both of Hoboken, N. J. (See The India Rubber World, March 1, 1920, page 366.)
1,354,938 Dental plate of hard and soft rubber. A. C. S. Angel, Copenhagen, Denmark.
1,354,984 Inner tire. T. J. McCaffrey, Seattle, Wash.
1,355,011 Resilient tire. J. D. Sullivan and H. L. Fry, New Castle, Pa., said Fry assignor to said Sullivan.
1,355,033 Rack for automobile tires. J. A. Cheape, Charlottesville, Va.
1,355,042 Tire shipping crate. W. F. Harwood, Richmond, Va.

GRANTED OCTOBER 12, 1920

1,355,166 Demountable rim for tires. K. B. Rice and R. E. Muffly, Canton, O., said Muffly assignor of one-third of his right to said Rice.
1,355,271 Inflated article. F. T. Roberts, Cleveland, O., assignor by mesne assignments to Paramount Rubber Consolidated, Inc., Philadelphia, Pa.
1,355,276 Ear drum protector. F. A. Schultz, Hasbrouck Heights, N. J.
1,355,359 Tire valve cap. F. Rasmussen, Blaine, Wash.
1,355,362 Metal and rubber shoe heel. S. G. Shapiro, New York City.
1,355,564 Aerial torpedo, with supporting gas bag. W. T. O'Connor, Jackson, Ky.
1,355,609 Pneumatic tire shoe. O. Larson, Chicago, Ill.
1,355,641 Demountable tire rim. W. G. Adams, East San Diego, Cal.
1,355,748 Resilient tire. D. S. Kennedy, New York City.
1,355,771 Means for fastening cushion tires to rims. F. L. Nienaber, assignor to Lambert Tire & Rubber Co., Inc.—both of Akron, O.
1,355,781 Repair inflating device for game balls. M. Rodgers, assignor of one-half to Alex. Taylor & Co., Inc.—both of New York City. (See description elsewhere in this issue.)
1,355,788 Pneumatic tire. C. W. Strauser, New York City.

GRANTED OCTOBER 19, 1920

1,355,827 Shoe sole of rubber with cleat held to sole by cohesion. P. J. Finneran, Boston, Mass.
1,355,846 Tampon. D. A. Rannells, Logan, O.
1,355,973 Elastic sprinkler cap. T. L. Hollingsworth, assignor by direct and mesne assignments to the Elyria Specialty Co.—both of Elyria, O. (See The India Rubber World, October 1, 1920, page 30.)
1,355,986 Semi-solid tire. J. T. Lister, Cleveland, O.
1,356,113 Rubber heel with embedded fabric reinforcement. G. J. Reuter, Atlanta, Ga.
1,356,115 Cushion tire. J. Saul, Jersey City, N. J.
1,356,126 Hose coupling. L. V. Claire, assignor of one-third to M. A. Wohlscheid, both of Grand Rapids, and one-third to N. Wohlscheid, Westphalia—all in Mich.
1,356,132 Method of and apparatus for making tires. H. J. Doughty, Providence, R. I., assignor to Doughty Tire Co., Portland, Me.
1,356,234 Sheet-rubber liner of chemically treated vegetable fiber. A. M. E. Streitjffert, Norristown, assignor to Diamond State Fibre Co., Bridgeport,—both in Pa.
1,356,392 Corset with elastic ventilating strips. S. J. Newman, assignor to I. Newman & Sons—both of New Haven, Conn.
1,356,476 Cap for tire valves. M. C. Schweinert, West Hoboken, N. J.

GRANTED OCTOBER 26, 1920

1,356,519 Surgical appliance. B. Douglas, Baltimore, Md.
1,356,537 Cushion tire. J. N. McFate, Phoenix, Ariz.
1,356,549 Rubber cushioned heel. F. Neubauer, Cleveland, O.
1,356,662 Rubber vulcanizing repair package. L. A. Sherman, assignor by direct and mesne assignments of one-fourth to H. E. Sherman and one-half to O. K. Herndon—all of Kansas City, Mo.
1,356,708 Resilient molded facial pad for supporting field-glasses, etc. E. T. P. Goodyear, Reigate Heath, England.
1,356,717 Waterproof shoe with removable heel and sole. L. Hoffmeister, Milwaukee, Wis.
1,356,783 Rubber fabric. J. McI. Ogilvie, Toronto, Ontario, Can.
1,356,817 Inflatable toy ball with valve closure. T. M. Gregory, Akron, O.
1,356,937 Catamenial belt. A. Miyamoto, San Francisco, Cal.
1,356,955 Invisible suspenders. M. H. Aved, Harvey, N. D.
1,356,961 Footwear and method of manufacture. H. Bullock, Andover, assignor to Converse Rubber Shoe Co., Malden—both in Mass.
1,357,006 Bath rubber or mitten. M. W. Schloss, assignor to Treo Co.—both of New York City.
1,357,009 Tire inflation signal. W. H. Thorpe, Mt. Vernon, N. Y.
1,357,068 Self-filling fountain pen. G. H. Macdonough, Boston, Mass.
1,357,074 Artificial foot with elastic cushion. H. J. Morris, Kansas City, Mo.
1,357,098 Cord tire. F. I. Kryder, Akron, O.
1,357,116 Tire boot fastener. W. M. Rapp, Marion, Ind.
1,357,144 Demountable rim for tires. J. R. Brown, Halls, Tenn.

THE DOMINION OF CANADA

GRANTED SEPTEMBER 21, 1920

204,037 Tire inflator. W. A. and G. W. Delahey, coinventors, Ottawa, Ontario.
204,045 Pneumatic tire. E. P. Altenberg, Columbiana, Ohio, U. S. A.
204,052 Exercising device with elastic cords. F. H. Blake, Toronto, Ont.
204,059 Resilient core for tires. J. H. Dalbey, Elgin, Ill., U. S. A.
204,093 Garden hose spray nozzle support. S. Joliff, Vancouver, B. C.
204,095 Tire having inner ribs formed integrally with the casing, the middle one being longer and having grooves to accommodate the others. G. I. Kavanagh, Montreal, Que.
204,101 Rubber tire reinforced with wire gauze plates embedded therein. I. Leo, Toronto, Ont.
204,105 Pneumatic tire reinforced with rawhide between layers of fabric. L. Loeb, New York City.
204,133 Pneumatic tire composed of casing containing separate inflatable cells with valves to prevent escape of air after inflation, etc. H. H. Richards, Knoxville, Tenn., U. S. A.
204,148 Armored inner tube. H. H. Schuster, Chicago, Ill., U. S. A.
204,157 Non-skid resilient tire slotted to engage separate tread blocks. H. H. Taylor, San Francisco, Calif., U. S. A.

Chemical Patents will be found on pages 172, 173. Machinery Patents on pages 180 and 181.

GRANTED SEPTEMBER 28, 1920

204,289 Demountable rims for tires. E. G. Gehrlich, Fountain City, Wis., U. S. A.
204,295 Anesthetizing machine. J. A. Heidbrink, Minneapolis, Minn., U. S. A.
204,366 Hose coupling. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of H. R. Gilson, New Rochelle, New York, U. S. A.
204,422 Adjustable closure for bottles. F. Cieszkowski and F. Janiszewski, assignee of a half-interest—both of Robyville, Ohio, U. S. A.

GRANTED OCTOBER 5, 1920

204,436 Aeronautic garment for personal wear, with inflatable pockets. J. Kropacz and J. Jakubicz, coinventors, both of Calgary, Alta.
204,440 Demountable split rim for tires. C. C. Hanch, Detroit, Mich., and R. A. Brannigan, New York City, coinventors—both in U. S. A.
204,443 Demountable rim for tires. L. U. Stenger, Detroit, Mich., and R. P. Summerfield, Alameda, Calif., coinventors—both in U. S. A.
204,485 Fountain pen cleaner with flexible tube for water faucet connection. C. W. Garver, Ashland, Ohio, U. S. A.
204,504 Demountable rim for tires. W. S. Krause, Childress, Tex. U. S. A.
204,549 Rubber overshoe with felt insole having fabric facing. J. R. C. Struthers, Winnipeg, Manitoba.
204,562 Pneumatic tire with sectional tread shoes of rubber-filled fabric facing, having vacuum cups, hooked on circumferential chain near rim. G. Valliquette, Montreal, Que.
204,584 Parachute. The E. R. Calthrop's Aerial Patents, Limited, assignee of E. R. Calthrop—both of London, England.

GRANTED OCTOBER 12, 1920

204,756 Parachute with launching device. The E. R. Calthrop's Aerial Patents, Limited, assignee of E. R. Calthrop—both of London, England.
204,757 Hard rubber battery jar. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of H. Weida, Highland Park, New Jersey, U. S. A.

GRANTED OCTOBER 19, 1920

204,843 Cap or bonnet formed by inserting elastic in casing of circular piece of material. J. G. Dupont, Chicago, Ill., U. S. A.
204,916 Rubber protector for soles and heels. H. T. Stephens, London, England.
204,939 Automobile wheel with wooden spokes and metal rim for pneumatic tires. The Baker Wheel & Rim Co., assignee of E. K. Baker—both of Chicago, Ill., U. S. A.

GRANTED OCTOBER 26, 1920

205,003 Pneumatic tire with inflatable inner tube and textile tube composed of hard-baked granulated cork in canvas casing, with sponge rubber between tubes and air-space, or solid rubber filling remaining space around tubes. J. A. Andrews, Liverpool, England.
205,004 Rubber heel with wearing plate. J. T. Ashton, Bristol, Rhode Island, U. S. A.
204,081 Garter. C. W. Noyes, Newton, administrator of the estate of R. Gorton, deceased, Brookline—both in Mass., U. S. A.
205,082 Garter. C. W. Noyes, Newton, administrator of the estate of R. Gorton, deceased, Brookline—both in Mass., U. S. A.
205,124 Dental suction plate with detachable suction cup. G. S. Whitaker, Gloversville, New York, U. S. A.

THE UNITED KINGDOM

PUBLISHED SEPTEMBER 22, 1920

146,632 Fountain pen. A. E. Wade, 65 Cavendish Drive, Rock Ferry, Cheshire.
146,717 Rubber heel or sole with central solid member and side stud members. H. Broomfield, Market street, Manchester.
146,720 Wound-drainage appliances. G. S. Thompson, Glenelg, Carr street, Randwick, near Sydney, Australia.
146,723 Pessary. G. J. Wallace (née Jamieson), 69 Hamilton Terrace, St. John's Wood, London.
146,728 Golf ball with solid core of semi-vulcanite and outer covering of solid rubber in elastic state. W. Millar, 47 Waterloo street, Glasgow.
146,742 Trouser-protectors of leather, rubber, etc. C. C. Hoggett, 8 High street, Leicester.
146,760 Infant's soother. J. T. Callaway, 10 Ladbroke Square, Notting Hill Gate, London.
146,776 Rectal plug. R. Kirchhoff, 14 Hohenzollern strasse, Stuttgart, Germany.
146,823 Respiratory appliance. A. B. Drager, trading as and assignee of Dragerwerk H. & B. Drager—both of Finkenberg, Lubeck, Germany. (Net yet accepted.)
146,842 Respiratory appliance. A. B. Drager, trading as and assignee of Dragerwerk H. & B. Drager—both of Finkenberg, Lubeck, Germany. (Not yet accepted.)
146,846 Respiratory appliance. A. B. Drager, trading as and assignee of Dragerwerk H. & B. Drager—both of Finkenberg, Lubeck, Germany. (Not yet accepted.)
146,850 Respiratory appliance. A. B. Drager, Finkenberg, Lubeck, Germany. (Not yet accepted.)
146,855 Respiratory appliance. A. B. Drager, trading as and assignee of Dragerwerk H. & B. Drager—both of Finkenberg, Lubeck, Germany. (Not yet accepted.)
146,862 Breathing apparatus. A. B. Drager, trading as and assignee of Dragerwerk H. & B. Drager—both of Finkenberg, Lubeck, Germany. (Not yet accepted.)
146,867 Coated rubber bags containing viscous material, laid between sheets of rubberized fabric, to seal exit aperture made by projectiles from tanks. E. Friant, 11 boulevard de Clichy, Paris. (Not yet accepted.)
146,875 Apparatus for detecting small punctures in tires. P. J. O'Sullivan, Boys' School, Kanturk, County Cork. (Not yet accepted.)

PUBLISHED SEPTEMBER 29, 1920

147,031 Respiratory appliance. A. B. Drager, Finkenberg, Lubeck, Germany. (Not yet accepted.)
147,039 Pneumatic tire. L. H. Ferguson, Ithaca, New York, U. S. A. (Not yet accepted.)
147,053 Tire valves. E. Bellan, 139 *bis* avenue Villiers, Paris. (Not yet accepted.)
147,122 Tire rim. L. Lewkowicz and L. Jouet—both of 2 Faubourg Poissonniere, Paris. (Not yet accepted.)
147,155 Inflating valve for pillows and mattresses. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of R. H. Henemier, 5000 Broadway, New York City—both in New York, U. S. A. (Not yet accepted.)
147,156 Tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of R. H. Henemier, 5000 Broadway, New York City—both in New York, U. S. A. (Not yet accepted.)
147,157 Pressure gage for tires. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of M. C. Schweinert, 42 Riverside Drive, New York City, and H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—all in U. S. A. (Not yet accepted.)
147,158 Tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of E. V. A. Myers, 82 Evergreen Place, East Orange, N. J.—both in U. S. A. (Not yet accepted.)
147,159 Pressure gage for tire. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of H. P. Kraft, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)
147,160 Rubberized fabric stays for aircraft, etc. The Goodyear Tire & Rubber Co., 1144 East Market street, assignee of R. H. Upson, 219 Shawnee Path—both of Akron, Ohio, U. S. A. (Not yet accepted.)
147,161 Sectional dirigible balloon, each section having ballonet. The Goodyear Tire & Rubber Co., 1144 East Market street, assignee of R. H. Upson, 219 Shawnee Path—both of Akron, Ohio, U. S. A. (Not yet accepted.)
147,162 Device for strengthening nose of dirigible or similar balloon. The Goodyear Tire & Rubber Co., 1144 East Market street, assignee of R. H. Upson, 219 Shawnee Path—both of Akron, Ohio, U. S. A. (Not yet accepted.)
147,163 Longitudinal compression members for strengthening the gas-bags of dirigibles, kite balloons, etc. The Goodyear Tire & Rubber Co., 1144 East Market street, assignee of R. H. Upson, 219 Shawnee Path—both of Akron, Ohio, U. S. A. (Not yet accepted.)
147,233 Hot-water bottle or ice-bag fitted with an inwardly-extending flange for holding a compress. T. Cotton, 5 Russell Road, Whalley Range, Manchester, England; J. W. Appleton, 353 Fifth avenue, New York City, U. S. A.
147,324 Inflating valve for units of sectional pneumatic tire. L. Hayden, 336 Romford Road, Forest Gate, London.

GERMANY

PATENTS ISSUED, WITH DATE OF ISSUE

328,460 (September 4, 1919.) Method for the manufacture of a rubber sucker with valve extension. Hermann Grimmelmann, Wallisellen, Zurich, Switzerland.
329,404 (July 29, 1919.) Rubber heel with metal supports. Bruno Schmidt, 19 Huttonstrasse, Dresden.

TRADE MARKS

THE UNITED STATES

No. 131,583 The word Money Babk—tube and casing patches and patch kits. Money Back Laboratories, Inc., Oklahoma, Okla.
131,584 Representation of comic figure carrying patched tire and can of patches and having patches on seat of trousers bearing the words Money Back Tube Patch, Money Back Casing Patch—tube and casing patches and patch kits. Money Back Laboratories, Inc., Oklahoma, Okla.
131,585 Representation of comic figure carrying patched tire and can of patches and having patches on seat of trousers bearing the words Money Back Tube Patch, Money Back Casing Patch, the head of the figure superimposed against the bottom of the words Money Back in large letters—tube and casing patches and patch kits. Money Back Laboratories, Inc., Oklahoma, Okla.
131,952 The word KohInooR—belts made of rubber reinforced with fabric. The B. F. Goodrich Co., New York City.
131,958 The word Elbon—hose made of rubber reinforced with fabric and sheet packing having rubber incorporated therein. The B. F. Goodrich Co., New York City.
131,959 The word Elevay—elevator belts made of fabric combined with rubber. The B. F. Goodrich Co., New York City.
131,964 The word Volunteer—sheet-packing made wholly or partly of rubber. The B. F. Goodrich Co., New York City.
132,282 A large letter Z containing the letters onta under top horizontal stroke—fabric and cord tire casings and inner tubes. Zonta Tire & Rubber Co., Sioux City, Ia.
132,?04 In white against a scallop-edged oval black background, the representation of an inner tube and the words Self Welding Weldo Patch, All Rubber, A Patch That Has No Match—patches for repairing tires, tubes, rubber boots, hot-water bags, etc. H. Greenburg, New York City.
132,675 Representation of a red diamond bearing the word Batteries within a horizontal oblong space superimposed above the word Arthur in staggered letters against the background—hard rubber storage battery jars, etc. Arthur Storage Battery Supply Co., Chicago, Ill.
132,859 The words Vulco-Cured-Tube—belting, hose and packing, and tires. The Gates Rubber Company, Denver, Colo.
133,403 The word Permapoint—automatic pencils and fountain pens. Crocker Pen Co., Boston, Mass.
133,617 The word Everlastik—elastic and non-elastic webs. Everlastik, Inc., Boston, Mass.

133,660 Representation of an oval within a diamond bearing the words Goodwill Antimony Heavy Red Tubes—inner tubes. Goodwill Rubber Co., Inc., New York City.

133,718 The words Sealtyte Leak Proof Tubes—pneumatic tires. Victory Rubber Manufacturing Co., Atlanta, Ga.

133,756 Representation of a fist radiating electricity within a circle beneath the word Amelectric, all within a border formed of two concentric circles containing the words American Electrical Works, Phillipsdale, R. I.—bare and insulated wire and cables, etc. American Electrical Works, Phillipsdale, R. I.

133,917 The words White Top—fountain pens. The Evans Dollar Pen Company, Waterloo, Ia.

134,003 The letter A within a spade-spot outline—hard rubber equipment for handling of corrosive chemical solutions, and hard rubber closet seats. American Hard Rubber Co., Hempstead and New York City, N. Y.

134,141 Representation of a circular label bearing Indian girl's head with hair in two braids above the words Pocahontas Braids—elastic and other findings. Pocahontas Braid Corporation, New York City.

134,468 The word Star—massage shower-bath sprays. (See The India Rubber World, September 1, 1920, page 818.) The Fitzgerald Manufacturing Co., Torrington, Conn.

134,488 The word Hickory above a representation of a tug-of-war over a garter between a boy and a dog, all within a double outlined oval—garters and hose-supporters. A. Stein & Co., Chicago, Ill.

134,822 Representation of a chevron—rubber tires. International India Rubber Corporation, South Bend, Ind.

134,823 Conventionalized black and white ellipses distorted to a point at one end, fitting into each other and both within a circle—belting, hose, packing, and tires. International India Rubber Corporation, South Bend, Ind.

135,165 The words Gorilla Clinch with the G extended in a flourish underneath and bearing the words Gorilla Clinch Patch—tire patch. E. J. O'Connell, Pittsfield, Massachusetts.

135,176 Representation of outline of a circular life-saver bearing the words Dress Saver, above the word Supreme—dress shields. J. Stein, New York City.

135,297 The word Pencraft—fountain pens. The Pencraft Co., Chicago, Ill.

135,329 The words Jiffy Junior—Infants' and children's waterproof underwear and baby-pants. I. B. Kleinert Rubber Company, New York City. (See also The India Rubber World, December 1, 1919, page 157.)

135,336 Representation of a Marathon runner dividing the word Marathon on a label—rubber supporting belts. The Marathon Tire & Rubber Company, Cuyahoga Falls, Ohio.

135,530 The words Tru-Matic—tires. True-Matic Tire and Tube Co., Wilmington, Del., and Wellington, O.

THE DOMINION OF CANADA

REGISTERED WEEK ENDED SEPTEMBER 14, 1920

27,118 The word Shamrock in combination with the representation of three shamrocks against a black background within a circle—pneumatic tires and tubes. G. M. Costello, Philadelphia, Pa., U. S. A.

27,119 The word Perfection—suspenders. The Montreal Suspender & Umbrella Manufacturing Co., Limited, Montreal, Que.

27,149 The word Meritas and a monogram of the letters S. T. P. Co.—waterproofed fabrics, substitutes for rubber or rubberized cloth, sheets, etc. The standard Textile Products Co., New York City, U. S. A.

27,155 Representation of oval frame bearing at the top the name: Canadian Consolidated Rubber Co., Limited, and at the bottom: And Associated Companies; in the center, the representation of a beaver gnawing a maple log; above, the words: Dominion Rubber System—rubber boots and shoes, tires and tubes, belting, hose, and packing, gaskets, valves, matting, water-bottles, tobacco pouches, gloves, raincoats, etc. Canadian Consolidated Rubber Co., Limited, Montreal, Que.

REGISTERED WEEK ENDED SEPTEMBER 21, 1920

27,166 The words Square Deal—rubber boots and shoes, bands, garden hose, bicycle tires, inner tubes for automobile tires, etc. Goodyear Rubber Co., New York City, U. S. A.

27,169 The word Scoop—rubber footwear and parts, including soles and heels. Gutta Percha and Rubber, Limited, Toronto, Ont. (See The India Rubber World, October 1, 1920, page 35.)

27,183 The word Crescent—fountain pens. The Conklin Pen Manufacturing Co., Toledo, Ohio, U. S. A.

27,184 The word Conklin—fountain pens. The Conklin Pen Manufacturing Co., Toledo, Ohio, U. S. A.

27,191 The word Falls and the representation of a waterfall, enclosed within a shield-shaped outline—rubber and rubber and fabric tires, inner tubes, casings, shoes, patches, etc. The Falls Rubber Co., Cuyahoga, Ohio, U. S. A.

REGISTERED WEEK ENDED SEPTEMBER 28, 1920

27,202 The word Gemco—automobile accessories, including tire display stands, valve tools, tire holders, brake bands, etc. Gemco Manufacturing Co., Milwaukee, Wis., U. S. A.

27,208 The word Elephant—tires, tubes, and other rubber motor accessories. Prudential Bond and Security Co., Toronto, Ont.

27,209 The representation of two elephants pulling in opposite directions on an automobile tire on which are inscribed the words: Lefant Tires Are Strong Tires—tires, tubes, and other rubber motor accessories. Prudential Bond and Security Co., Toronto, Ont.

27,214 The word Locktite—patches for pneumatic tires, water-bottles, boots, etc. Locktite Patch Co., Detroit, Mich., U. S. A.

THE UNITED KINGDOM

403,268 Representation of a label bearing figures of children playing with balloons and the words Sealed Sanitary Package, Reliance Seamless Safe Coloured Toy Balloons Make Everybody Happy—rubber toy balloons. Reliance Rubber Co., Limited, 212-213 Upper Thames street, London, E. C. 4.

403,525 The word Majestic—rubber and gutta percha goods, not included in classes other than No. 40. The Majestic Tire & Rubber Co., 28 South Cruse street, Indianapolis, Ind., U. S. A.; address for service in the United Kingdom, care of Haseltine, Lake & Co., 28 Southampton Buildings, London, W. C. 2.

403,560 The words Bow Bells above representation of three bells being rung, all above the words Trade Mark—rubber and gutta percha goods not included in classes other than No. 40. Copestake, Crampton & Co., 5 Bow Church Yard, London, E. C. 4.

403,564 The word Induna—articles of clothing. The South African Rubber Manufacturing Co., Limited, Howick, Natal, South Africa; address for service in the United Kingdom, care of J. P. O'Donnell & Co., 14-15 Conduit street, London, W. 1.

403,565 The word Induna—rubber and gutta percha goods not included in classes other than No. 40. The South African Rubber Manufacturing Co., Limited, Howick, Natal, South Africa; address for service in the United Kingdom, care of J. P. O'Donnell & Co., 14-15 Conduit street, London, W. 1.

403,566 The word Induna—games of all kinds and sporting goods not included in classes other than No. 49. The South African Rubber Manufacturing Co., Limited, Howick, Natal, South Africa; address for service in the United Kingdom, care of J. P. O'Donnell & Co., 14-15 Conduit street, London, W. 1.

403,622 Within the representation of a tire the figure of a man standing under a tree—crude, waste or reclaimed rubber. G. S. Moulton & Co., Limited, and Wood-Milne, Limited, 2 Central Buildings, Westminster, London, S. W. 1.

403,652 Representation of a tire divided into quarters and within each quarter, representations, respectively, of a boll of cotton, six bobbins of cotton, a roll of cotton warp, and a square of fabric warp and filling—rubber and gutta percha goods not included in classes other than No. 40. Federated Textiles, Limited, 2 Central Buildings, Westminster, London, S. W. 1.

403,807 The word Reco—rubber tires. H. C. W. Beeching, trading as Ripley, Strong & Co., Farnborough road, Farnborough, Hampshire.

403,843 Representation of head of an Indian chief and the letters B. A and T arranged around it in a triangle—rubber tobacco pouches. British-American Tobacco Co., Limited, Westminster House, 7 Millbank, London, S. W. 1.

403,997B The word International—motor tires, covers and inner tubes, all of rubber. International Tyres, Limited, 7 Lower Belgrave street, Victoria, London, S. W. 1.

404,231 The word Mustikon—puncture studs, valve seaters and solution. Mustikon, Limited, 20 New street, Cardiff.

404,374 The word Birsco—rubber and gutta percha goods not included in classes other than No. 40. A. Mallaby, trading as The British India-Rubber Sponge Company, 4 Mallow street, Manchester road, Bradford, Yorkshire.

DESIGNS.

THE UNITED STATES

No. 56,345 Rubber pad for shoe soles. Patented October 5, 1920. Term 7 years. D. H. Eley and T. H. Ryan, assignors to The Emory Rubber Sole Co., Inc.—all of Norfolk, Va.

56,358 Elastic fabric. Patented October 5, 1920. Term 14 years. V. Guinsburg, assignor to I. B. Kleinert Rubber Co.—both of New York City. (See also page 183 of this issue.)

56,389 Heel. Patented October 5, 1920. Term 14 years. J. H. Stedman, Braintree, Mass.

56,398 Rubber heel. Patented October 5, 1920. Term 14 years. G. C. Wood, Boston, Mass., assignor to Wids Co., St. Paul, Minn.

56,413 Tire. Patented October 26, 1920. Term 14 years. J. G. Bretson, assignor to The Phoenix Rubber Co.—both of Akron, O.

THE DOMINION OF CANADA

4,878 Rubber heel. Patented September 11, 1920. Canadian Consolidated Rubber Co., Limited, Montreal, Que.

4,888 Tire. Patented September 29, 1920. R. S. Smart, Ottawa, Ont.

4,889 Tire. Patented September 29, 1920. R. S. Smart, Ottawa, Ont.

4,890 Tire tread. Patented September 29, 1920. K. & S. Tire & Rubber Goods, Limited, Toronto, Ont.

4,899 Rubber mat. Patented October 11, 1920. R. S. Smart, Ottawa, Ont.

4,909 Suspender. Patented October 12, 1920. T. H. Paul, Toronto, Ont.

GERMANY

DESIGN PATENTS ISSUED, WITH DATE OF ISSUE

750,620 (August 17, 1920.) Exchangeable rubber heel. Hans Meyer, 23 Stoppenbergerstrasse, Essen-Ruhr.

751,316 (March 26, 1920.) Holder for rubber denture for artificial teeth during vulcanization. Hans Wetzler, 14 Geleitstrasse, Offenbach-on-the-Main.

751,553 (May 6, 1920.) Appliance for the manufacture of inlays of pneumatic tire covers. W. & A. Bates, Limited, and John Healey, Leicester, and Franz Shaw & Co., Limited, Manchester—both in England.

751,753 (August 18, 1920.) Rubber toy ball. Rheinische Gummi and Celluloidfabrik, Mannheim-Neckarau.

751 784 (March 12, 1919.) Automobile tire. Josef Planck, 8 Thielenstrasse, Bielefeld.

751,896 (August 13, 1920.) Appliance for the repair of broken garden hose. Artur Glodde, 17 Frobelstrasse, Berlin.

752,282 (April 19, 1919.) Protector for defective tire covers. Franz Laemmel, Gornsdorf, Erzgeb.

752,302 (June 22, 1920.) Appliance for repair of pneumatic tires. Georg Boeker and Julius Kullatkowsky, Leipzig.

752,321 (August 9, 1920.) Textile shoes with vulcanized leather or rubber sole. S. Stifelsen, 8 Hohenstaufenstrasse, Frankfort-on-the-Main.

752,374 (February 3, 1920.) Tire. Paul Marten, 127 Berlinerstrasse, Berlin-Friedrichsfelde.

752,521 (July 23, 1918.) Tire. Helmut Kuentzal, 49 Sonnbornstrasse, Duesseldorf-Gerresheim.

752,956 (August 5, 1920.) Vulcanizing apparatus. P. Neuburg, 17 Friedrichstrasse, Köln.

Review of the Crude Rubber Market

NEW YORK

DEPRESSION has been the dominant feature of the crude rubber market that continues to be obsessed by forced liquidation of speculative and weak financial traders. During the past three months there have occurred many such failures whose rubber commitments would have been thrown on the market with disastrous results but for the generous support of the large importers and dealers.

Pronounced weakness continued throughout the month, resulting in daily fractional declines that established the lowest prices on record for standard plantation rubber. First latex spot sold for 18 cents, and ribbed smoked sheets for 17 cents. Low records were made in futures. January-March deliveries of first latex were quoted at 22 cents and ribbed smoked sheets were 20½ cents for the same position. Parás were freely offered, but lacked demand. Upriver fine made a low record of 22 cents.

While buyers have been scarce and sellers rather shy, considerable factory business has been done in a small way in various future positions, and spot stocks were brought in at bargain prices and stored. The lower grades of crude rubber have been weak with the exception of guayule that was comparatively firm. Balata has shown strength due to the demand by golf ball manufacturers, and the holding of supplies in primary sources.

Until the manufacturers show a real buying interest in the market there is no reason to expect other conditions than the present. The change will come when tire manufacturing again becomes normal and the large stocks of rubber that are now on hand will be made into rubber goods. There are optimists who believe that the rubber industry will be in full swing by April 1.

The October, 1920, arrivals of 10,639 tons were the lowest monthly imports in two years, showing that shipments are being held at primary sources. It is estimated that 9,000 tons will arrive in November. The imports for October, 1919, were 28,888 tons. For the ten months ended October 31, 1920, 203,612 tons were imported compared with 185,684 tons for the same period in 1919.

Spot and future quotations in standard plantation and Brazilian sorts at the first and last of the past month were as follows:

PLANTATIONS. November 1, first latex crêpe, 21 to 22 cents; January-March, 24½ cents; April-June, 25 cents.

November 24, first latex crêpe, 19 cents; January-March, 22½ cents; April-June, 25½ cents.

November 1, ribbed smoked sheets, 19½ to 20 cents; January-March, 23 cents; April-June, 24 cents.

November 24, ribbed smoked sheets, 17½ cents; January-March, 21 cents; April-June, 24 cents.

November 1, No. 1, amber crêpe, 19 cents.

November 24, No. 1 amber crêpe, 16½ cents.

November 1, No. 1, rolled brown crêpe, 15 cents.

November 24, No. 1 rolled brown crêpe, 14 cents.

SOUTH AMERICAN PARÁS AND CAUCHO. November 1, upriver fine, 23½ to 24 cents; islands fine, 19 to 20 cents; upriver coarse, 15 to 16 cents; islands coarse, 15 to 16 cents; Cametá coarse, 13¾ to 14½ cents; caucho ball, 15 to 16 cents.

November 24, upriver fine, 21 cents; islands fine, 19½ cents; upriver coarse, 15½ cents; islands coarse, 14 cents; Cametá coarse, 14 cents; caucho ball 10 to 16 cents.

NEW YORK QUOTATIONS

Following are the New York spot quotations, for one year ago, one month ago, and November 24, the current date:

	December 1, 1919	November 1, 1920	November 24, 1920
PLANTATION HEVEA—			
First latex crêpe	$0.52 @	$0.21 @ .22	$0.19 @
Amber crêpe No. 1	.51 @	.19 @	.16½ @
Amber crêpe No. 2	.50 @	.18 @	.15½ @
Amber crêpe No. 3	.49 @	.17 @	.14½ @
Amber crêpe No. 4	.47 @	.16 @	.13½ @
Brown crêpe, thick and thin	.47 @	.18 @	.15 @
Brown crêpe, specky	.45 @	.15 @	.15 @ .14½
Brown crêpe, rolled	.43 @	.15 @	.14 @
Smoked sheet, ribbed, standard quality	.57¾ @	.19½ @ .20	.17½ @
Smoked sheet, plain standard quality	.54 @	.18½ @	.16 @
Unsmoked sheet, standard quality	.52 @	.17½ @	.15 @
Colombo scrap No. 1	.35 @	.16 @	.13 @
Colombo scrap No. 2	.34 @	.15 @	.12 @
EAST INDIAN—			
Assam crêpe	.49 @	@	@
Assam onions	.49 @	@	@
Penang black scrap	@	@	@
PONTIANAK—			
Banjermassin	.11½ @ .14	.09 @	.07½ @
Palembang	.13 @	@	.08 @
Pressed block	.24 @ .27	.18 @	.15½ @
Sarawak	.11 @	@	.07 @
SOUTH AMERICAN—			
PARAS—			
Upriver, fine	.49 @ .50	.23½ @ .24	.20 @ .21
Upriver, medium	@	.20 @	.17 @
Upriver, coarse	.36 @	.15 @ .16	.15½ @
Upriver, weak, fine	.40 @	.17 @	.15 @ .16
Islands, fine	.47½ @ .48	.19 @ .20	.19½ @
Islands, medium	.47 @ .48	.19 @	*.14 @
Islands, coarse	.22 @ .23	.15 @	.14 @ .14½
Cametá, coarse	.22 @	.14 @	.14 @
Madeira, fine	.51 @ .51½	.29 @	.24 @ .25
Acre Bolivian, fine	.51 @ .51½	.25 @	.20 @ .21½
Peruvian, fine	.50 @	.22 @	.18 @ .19
Tapajos, fine	.50 @	.21 @	.19 @
CAUCHO—			
Upper caucho ball	.34 @ .35	.16 @	.16 @ .16½
Lower caucho ball	.32 @ .34	.15 @	.10 @ .10½
MANICOBAS—			
Ceará negro heads	@	*.18 @	.14 @
Ceará scrap	@	*.10 @	.06 @
Manicoba, 30% guarantee	@	*.15 @	.11 @
Mangabeira thin sheet	@	*.20 @	.18 @

	December 1, 1919	November 1, 1920	November 24, 1920
CENTRALS—			
Corinto scrap	$0.34 @ $0.34½	@	$0.12 @
Esmeralda sausage	.34 @ .34½	@	.12 @
Central scrap	.33 @	@	.12 @
Central scrap and strip	.32 @ .32½	@	.10 @
Central wet sheet	.22 @ .23	@	.07 @
Guayule, 20% guarantee	.23 @	.25 @	*.20 @
Guayule, washed and dried	.38 @	.37 @	*.30 @
AFRICANS—			
Niger flake, prime	.18 @	@	@
Benguela, extra No. 1, 28%	@	@	@
Benguela, No. 2, 32½%	@	@	.09 @
Conakry niggers	@	@	@
Congo prime, black upper	.37 @	@	@
Congo, prime, red upper	@	@	@
Kassai, black	.37 @	@	@
red	@	@	@
Massai sheets and strings	@	@	@
Rio Nunez ball	@	@	@
Rio Nunez sheets and strings	@	@	@
GUTTA PERCHA—			
Gutta Siak	.25 @	.19 @	.17 @ .18
Red Macassar	2.85 @	2.90 @	2.25 @ 2.90
BALATA—			
Block, Ciudad Bolivar	.60 @ .64	.70 @	.70 @
Colombia	.53 @ .55	.46 @	.47 @ .48
Panama	.43 @ .45	.33 @	@
Surinam sheet	.88 @	.70 @	.72 @ .73
amber	.90 @	.76 @	.80 @

* Nominal.

RECLAIMED RUBBER

The continued depressed state of the rubber manufacturing industry generally, together with the unprecedented low levels ruling for crude rubber, has entirely eliminated the demand for reclaims and practically obliterated the market on all grades. Such reclaiming plants as are in operation are producing only an inconsiderable fraction of their normal output. A change for the better, it is thought, may come early in the approaching new year.

The following quotations are nominal and are the same as reported for September 27 and October 26:

NEW YORK QUOTATIONS

November 24, 1920

Prices subject to change without notice

STANDARD RECLAIMS

Floating	*$0.22	@	$0.24
Friction	* .25	@	.30
Mechanical	* .11	@	.12
Shoe	* .14¾	@	.15½
Tires, auto	* .14½	@	.15
truck	* .12½	@	.13½
White	* .20	@	.21

*Nominal

THE MARKET FOR COMMERCIAL PAPER

In regard to the financial situation, Albert B. Beers, broker in crude rubber and commercial paper, No. 1 Liberty street, New York City, advises as follows:

"During November the demand for paper has been light, about the same as October, and almost entirely from out-of town banks, ruling rates being 8½ to 9 per cent for the usual run of rubber names, and some going as high as 9½ per cent."

COMPARATIVE HIGH AND LOW NEW YORK SPOT RUBBER PRICES

	November								
	1920*			1919			1918		
PLANTATIONS—									
First latex crêpe	$0.21½	@	$0.18½	$0.54½	@	$0.53	$0,63	@	$0.41
Smoked sheet ribbed	.20	@	.17½	.54	@	.52	.61½	@	.46
PARAS—									
Upriver, fine	.23¾	@	.20½	.52	@	.49	.68	@	.57½
Upriver, coarse	.15½	@	.14¼	.35	@	.34½	.40	@	.31
Islands, fine	.20	@	.18½	.48½	@	.48	.59	@	.44
Islands, coarse	.14½	@	.14	.23½	@	.21½	.27	@	.21½
Cametá	.14½	@	.15	.23	@	.23	.28	@	.21

*Figured to November 26, 1920.

ANTWERP RUBBER MARKET

GRISAR & CO., Antwerp, report [November 5, 1920]:

The market tendency continues to be weak. After various fluctuations, the market closed with prices slightly higher. Spot, November, 1*s.* 2*d.*—1*s.* 4*d.*; December, 1*s.* 2*d.*; January-March, 1*s.* 3*d.*—1*s.* 4*d.*; January-June, 1*s.* 4*d.*; Pará, 1*s.* 4*d.*—1*s.* 5*d.*

Statistics for the week were as follows: Arrivals, 2,611 tons; sales, 694 tons; stocks, 41,751 tons against 25,353 tons in 1919. Statistics for the close of October: London—imports, 9,265 tons; sales, 3,028 tons; stocks, 41,748 tons against 24,978 tons in 1919. Arrivals, by the *Albertville*, 193,436 tons. Stock on hand this day: 1,478 tons.

Interest in the futures market remains nil; the rate of exchange is lower by 0.25 francs. Transactions amounted to 5,000 kilos. Closing quotations, each month: November-May, 8.75; June-October, 8.75. Tendency, quiet.

AMSTERDAM RUBBER MARKET

JOOSTEN & JANSSEN, Amsterdam, report [October 29, 1920]:

The dull tendency on the rubber market continued without interruption. Nevertheless, a good business was done here in spot parcels of various qualities.

Hevea standard crêpe brought f. .88½; sheets, f. .82. On the terminal market the turnover was very small, and prices remained unchanged and nominal.

The final prices were about f. .86 for *Hevea* standard crêpe and f. .80 for spot sheets, crêpe January-March f. .92, April-June, f. .98 rather sellers, with buyers at about 2 cents lower.

CEYLON RUBBER IMPORTS AND EXPORTS

IMPORTS.

	January 1 to October 18	
	1919	1920
Crude rubber:		
From Straits Settlements . . . *pounds*	2,172,183	2,139,185
India	1,231,016	1,211,833
Burma and other countries	......	26,259
Totals . . . *pounds*	3,403,199	3,377,277

EXPORTS

	1919	1920
Crude rubber:		
To United Kingdom . . . *pounds*	22,212,288	32,912,097
Belgium	29,120	169,550
France	383,400	613,334
Germany	......	300,592
Netherlands	......	22,730
Italy	......	224,000
Spain	13	......
Australia	......	56
Victoria	98,755	253,236
United States	47,779,583	29,188,164
New South Wales	154,212	400,092
Canada and Newfoundland	668,294	425,600
India	2,313	736
Straits Settlements	454	44,800
Japan	262,947	177,845
Totals . . . *pounds*	71,591,379	64,732,832

Compiled by the Ceylon Chamber of Commerce.

SINGAPORE RUBBER MARKET

GUTHRIE & CO., LIMITED, Singapore, report [October 14, 1920].

The weekly rubber auction held yesterday and today was marked by a steady demand and an improvement in prices. The sale opened quietly at crêpe 58½, sheet 51 cents, but owing to keen competition for standard grades, values improved later to crêpe 60½, sheet 54 cents, an advance of 3 cents on the week. Off quality lots of crêpe and sheet were in strong demand, and a large quantity of this grade was sold at reasonably good prices. Browns were scarce and steady round about last week's prices; dark and barky crepes improved slightly.

Of 997 tons catalogd, 545 tons were sold.

The following is the course of values

	In Singapore per Pound [1]			Sterling Equivalent per pound in London		
Sheet, fine ribbed smoked	51c	@	54c	1/ 4⅝	@	1/ 5½
Sheet, good ribbed smoked	38	@	50½	1/ 1	@	1/ 4½
Crêpe, fine pale	58½	@	60	1/ 7¼	@	1/ 7¾
Crêpe, good pale	43	@	58	1/ 2⅞	@	1/ 7⅛
Crêpe, fine brown	34½	@	42	1/ 0½	@	1/ 2⅝
Crêpe, good brown	27	@	34	—/10⅜	@	1/ 0⅜
Crêpe, dark	22½	@	30	—/ 9⅛	@	—/11¼
Crêpe, bark	18	@	27½	—/ 7⅞	@	—/10½

[1] Quoted in Straits Settlements, currency $1 = $0.567 United States currency.

PLANTATION RUBBER FROM THE FAR EAST

TOTAL EXPORTS FROM MALAYA

From January 1, 1920 to dates named, excluding all foreign transshipments. Reported by Barlow & Co., Singapore.

To—	From Singapore, August 31, 1920	Malaca, August 31, 1920	Penang, August 31, 1920	Port Swettenham, August 31, 1920	Totals
United Kingdom *lbs.*	36,884,082	2,142,507	20,609,467	17,769,218	77,405,274
The Continent	5,920,606	....	398,400	150,007	6,469,013
Japan	8,043,804	....	2,277	....	8,046,081
Ceylon	10,299	....	328,134	1,198,245	1,536,678
U. S. A. and Canada	186,719.529	42,214	16,353,857	....	203,115,600
Australia	438,294	....	....	....	438,294
Other countries	123,200	....	400	....	123,600
Totals	238,139,814	2,184,721	37,692,535	19,117,470	297,134,540
For the year 1919	352,338,000	17,849,500	25,779,500	30,805,166	426,772,166
For the year 1918	225,100,000	837,600	12,479,200	......	238,416,800
For the year 1917	177,901,200	15,113,200	23,402,000	......	216,416,400
For the year 1916	135,535,954	7,167,346	30,643,565	3,660,840	177,007,705
For the year 1915	86,067,657	7,898,984	28,580,663	821,445	123,368,749
For the year 1914	43,534,177	5,218,379	21,912,567	2,052,620	72,717,743

STRAITS SETTLEMENTS RUBBER EXPORTS

An official report from Singapore states that the exports of rubber from Straits Settlements ports in the month of Sepember amounted to 9,791 tons (transhipments, 1,416 tons) as compared with 6,673 tons in August and 10,476 tons in the corresponding month last year. The total export to the end of September was 100,720 tons, as against 109,952 tons last year, and 51,616 tons in 1918. Appended are the comparative statistics:

	1918	1919	1920
January . . . *tons*	4,302	14,404	13,125
February	2,334	15,661	17,379
March	8,858	20,908	5,931
April	6,584	10,848	9,768
May	13,587	15,845	15,617
June	6,515	5,059	11,663
July	1,978	7,818	10,773
August	1,249	8,933	6,673
September	6,209	10,476	9,791
Totals . . . *tons*	51,616	109,952	100,720

FEDERATED MALAY STATES RUBBER EXPORTS

An official report from Kuala Lumpur gives the exports of rubber from the Federated Malay States during the month of September as 7,604 tons compared with 9,140 tons in August, and 9,841 tons in the corresponding month last year. The total exports for nine months of the current year amount to 80,262 tons against 79,824 tons in 1919 and 58,142 tons in 1918. Appended are the comparative statistics:

	1918	1919	1920
January . . . *tons*	7,588	7,163	11,119
February	6,820	10,809	9,781
March	7,709	10,679	9,524
April	7,428	7,664	8,375
May	5,851	7,308	7,627
June	5,161	7,094	9,049
July	5,706	8,640	8,043
August	5,291	10,626	9,140
September	6,588	9,841	7,604
Total . . . *tons*	58,142	79,824	80,262

RUBBER EXPORTS FROM PENANG

	January 1 to September 21	
	1919	1920
To Great Britain . . . *piculs*[1]	192,703	182,703
Europe	3,574	3,578
United States	132,262	132,262
Totals . . . *piculs*	328,539	318,543

[1] One picul equals 133⅓ pounds.

PLANTATION RUBBER EXPORTS FROM JAVA

	August		Eight Months Ended August 31	
	1919	1920	1919	1920
To Netherlands ....kilos	*	524,000	*	3,133,000
Great Britain	177,000	392,000	4,781,000	5,106,000
Germany	*	10,000	*	70,000
France	*	....	*	11,000
Belgium	*	17,000	*	31,000
Other European destinations	567,000**	....	1,158,000**	....
United States	1,013,000	400,000	11,578,000	9,505,000
Singapore	494,000	299,000	3,580,000	2,970,000
Japan	....	....	180,000	184,000
Australia	*	27,000	*	190,000
Other countries	76,000**	....	278,000**	....
Totals .... kilos	2,327,000	1,669,000	21,555,000	21,200,000
Ports of origin:				
Tandjong Priok	1,583,000	738,000	11,700,000	9,936,000
Samarang	27,000	23,000	345,000	303,000
Soerabaya	682,000	785,000	8,751,000	10,249,000

* Details not given in 1919.
** Not specified in 1919.

CRUDE RUBBER ARRIVALS AT ATLANTIC AND PACIFIC PORTS AS STATED BY SHIPS' MANIFESTS

PARAS AND CAUCHO AT NEW YORK

	Fine	Medium	Coarse	Caucho	Totals Pounds
October 25. By the S. S. *Gregory*, from Iquitos.					
Ultramares Corp.	....	....	....	....	8,016
W. R. Grace & Co..........	....	....	....	....	9,898
October 25. By the S. S. *Gregory*, from Bolivia.					
William Schall & Co........	26,815	....	....	....	26,815
October 25. By the S. S. *Gregory*, from Manáos.					
General Rubber Co..........	....	....	....	....	6,174
Poel & Kelly..............	....	....	....	....	3,234
W. R. Grace & Co..........	....	....	....	....	7,448
Meyer & Brown, Inc.........	235,200	....	....	....	235,200
October 25. By the S. S. *Gregory*, from Pará.					
Poel & Kelly..............	....	....	....	....	4,704
William Schall & Co........	....	....	....	....	19,600
Various	....	....	....	....	88,886
October 25. By the S. S. *Floridian*, from Montevideo.					
Neuss, Hesslein & Co.......	....	....	....	....	20,580
October 25. By the S. S. *Archimedes*, from Montevideo.					
Poel & Kelly..............	6,468	196	1,656	....	8,320
Various	9,310	588	10,290	....	20,188
November 8. By the S. S. *Benevente*, from Rio de Janeiro.					
Various	38,906	98	5,586	21,268	65,858
November 8 By the S. S. *Aidan*, from Pará.					
General Rubber Co..........	....	....	....	....	41,964
Poel & Kelly..............	....	....	....	....	19,600
William Schall & Co........	42,445	....	....	....	42,445
Amsinck & Co., Inc.........	....	....	....	....	26,656
Paul Bertuch	....	....	12,368	17,460	29,828
November 8. By the S. S. *Aidan*, from Manáos.					
Poel & Kelly..............	....	....	....	....	7,646
Various	....	....	....	....	203.154
November 16. By the S. S. *Nasmyth*, from Pará.					
General Rubber Co..........	....	....	5,490	....	5,490
Poel & Kelly..............	....	294	3,920	....	4,214
Various	....	....	5,488	....	5,488

PLANTATIONS

(Figured 180 pounds to the bale or case)

	Shipment from:	Shipped to:	Pounds.	Totals.
October 22. By the S. S. *Tatsuna Maru*, at New York.				
Chas. T. Wilson Co., Inc.	Colombo	New York	20,160	
Thornett & Fehr, Inc...	Colombo	New York	14,580	
Aldens' Successors, Inc.	Colombo	New York	10,440	
Poel & Kelly...........	Colombo	New York	72,360	
L. Littlejohn & Co., Inc.	Colombo	New York	112,000	
Hood Rubber Co........	Colombo	Watertown	11,390	
Various	Colombo	New York	30,400	271,330
October 23. By the S. S. *Lowther Castle*, at New York.				
Hood Rubber Co.......	Singapore	Watertown	246,400	246,400
October 27. By the S. S. *Saxonia*, at New York.				
Various	London	New York	87,840	87,840
October 28. By the S. S. *Sydic*, at New York.				
Hood Rubber Co.......	Colombo	Watertown	37,170	
Pacific Trading Corp. of America	Colombo	New York	113,400	
Thornett & Fehr, Inc....	Colombo	New York	72,600	
Chas. T. Wilson Co., Inc.	Colombo	New York	59,400	
Various	Colombo	New York	19,260	301,230
October 29. By the S. S. *West Conob* at New York.				
The Goodyear Tire & Rubber Co.	Colombo	Akron	51,680	51,680
October 29. By the S. S. *Rotterdam*, at New York.				
Meyer & Brown, Inc....	Rotterdam	New York	14,560	14,560
October 29. By the S. S. *City of Oran*, at New York.				
Boston Insulated Wire & Cable Co.	Singapore	Dorchester	6,300	
Thornett & Fehr, Inc...	Siogapore	New York	20,160	
Irwin-Harrisons & Crosfield, Inc.	Singapore	New York	20,700	
William H. Stiles & Co..	Singapore	New York	100,000	
Edward Boustead & Co..	Penang	New York	28,800	
Thornett & Fehr, Inc..	Penang	New York	9,000	
The Goodyear Tire & Rubber Co.	Penang	Akron	66,600	
F. R. Henderson & Co...	Penang	New York	59,760	
L. Littlejohn & Co., Inc.	Singapore	New York	403,200	
Hood Rubber Co........	Singapore	Watertown	61,700	
General Rubber Co......	Telok Neboeng	New York	924,840	
Irwin-Harrisons Crosfield, Inc.	Telok Neboeng	New York	23,400	
Baird Rubber & Trading Co.	Singapore	New York	201,600	
F. R. Henderson & Co..	Port Dickson	New York	11,880	
Poel & Kelly..........	Port Dickson	New York	23,940	
Various	Port Dickson	New York	24,300	
Hadden & Co...........	Medan	New York	267,120	
Irwin-Harrisons Crosfield, Inc.	Medan	New York	97,380	
Meyer & Brown, Inc....	Singapore	New York	294,560	
Aldens' Successors, Inc..	Medan	New York	21,780	
East Asiatic Co., Inc...	Medan	New York	29,700	
J. T. Johnstone & Co., Inc.	Singapore	New York	170,800	
Fred Stern & Co........	Singapore	New York	399,840	
Various	Singapore	New York	4,600,600	7,867,960
October 30. By the S. S. *Celtic*, at New York.				
Dunlop Tire & Rubber Corporation of America.	Liverpool	Buffalo	360	360
October 30. By the S. S. *Iltai Maru*, at New York.				
Hood Rubber Co........	Singapore	Watertown	336,316	336,316
November 3. By the S. S. *Enggano*, at New York.				
Various	Soerabaya	New York	70,560	70,560
November 4. By the S. S. *Kentucky*, at New York.				
Chas. T. Wilson Co., Inc.	Colombo	New York	66,160	
Whitehall & Co.........	Colombo	New York	78,300	
Baring Bros.	Colombo	New York	223,200	
Poel & Kelly...........	Colombo	New York	42,660	
Meyer & Brown, Inc....	Colombo	New York	224,000	
Baird Rubber & Trading Co.	Calcutta	New York	56,000	
Fred Stern & Co........	Colombo	New York	22,400	
Various	Colombo	New York	226,260	938,980
November 4. By the S. S. *Djember*, at New York.				
The United Malaysian Rubber Co.	Borneo	New York	2,104	
Meyer & Brown, Inc....	Far East	New York	16,800	
Baird Rubber & Trading Co.	Batavia	New York	13,440	
Fred Stern & Co........	Soerabaya	New York	6,720	
The Fisk Rubber Co....	Singapore	Chicopee Falls	13,655	52,719
November 5. By the S. S. *Helekon*, at New York.				
Ultramares Corp.	Pu'to Colombo	New York	15,300	15,300
November 8. By the S. S. *Patroclus*, at New York.				
Hagemeyer Trading Co..	Batavia	New York	69,120	
Peninsular Trading Agency, Inc.	Batavia	New York	14,920	
Fred Stern & Co........	Belawan-Deli	New York	38,139	
Various	Batavia	New York	55,101	177,280
November 8. By the S. S. *Akron*, at New York.				
Baring Bros.	Singapore	New York	137,880	
W. R. Grace & Co......	Singapore	New York	716,040	
Eastern Rubber Co......	Singapore	New York	282,500	
Poel & Kelly...........	Singapore	New York	119,700	
William H. Stiles & Co..	Singapore	New York	180,000	
Aldens' Successors, Inc..	Soerabaya	New York	4,320	
L. Littlejohn & Co., Inc.	Colombo	New York	204,600	
General Rubber Co......	Belawan	New York	80,460	
Various	Penang	New York	4,860	
Winter, Ross & Co......	Batavia	New York	21,960	
F. R. Henderson & Co..	Batavia	New York	9,720	
Aldens' Successors, Inc..	Batavia	New York	33,480	
Fred Stern & Co.........	Batavia	New York	123,200	
Various	Batavia	New York	46,260	
Meyer & Brown, Inc...	Singapore	New York	84,000	
Baird Rubber & Trading Co.	Singapore	New York	56,000	
Various	Singapore	New York	405,000	2,509,980
November 8. By the S. S. *Ningchow*, at New York.				
J. T. Johnstone & Co., Inc.	Singapore	New York	168,000	
East Asiatic Co., Inc....	Port Said	New York	28,800	
Goldman, Sachs & Co...	Port Said	New York	89,100	
Various	Port Said	New York	226,800	
W. R. Grace & Co......	Penang	New York	69,480	
The Goodyear Tire & Rubber Co.	Penang	Akron	86,400	
Meyer & Brown, Inc....	Singapore	New York	483,840	
Aldens' Successors, Inc..	Singapore	New York	61,560	
Balfour, Williamson & Co.	Singapore	New York	89,640	
A. C. Fox & Co........	Sineapore	New York	67,680	
Thos. A. Desmond & Co.	Singapore	New York	305,280	

PLANTATIONS—Continued

	Shipment from:	Shipped to:	Pounds.	Totals.
Ajax Rubber Co., Inc. ..	Singapore	New Brunsw'k	28,800	
Eastern Rubber Co......	Singapore	New York	99,360	
Poel & Kelly...........	Singapore	New York	41,940	
Mitsui & Co., Limited...	Singapore	New York	103,860	
W. R. Grace & Co......	Singapore	New York	87,660	
The Fisk Rubber Co....	Singapore	Chicopee Falls	412,160	
William H. Stiles & Co..	Singapore	New York	120,000	
Hood Rubber Co........	Singapore	Watertown	252,000	
Various	Singapore	Toronto	100,800	
Baird Rubber & Trading Co.	Singapore	New York	239,680	
L. Littlejohn & Co., Inc.	Singapore	New York	168,000	
Fred Stern & Co........	Singapore	New York	11,200	
Various	Singapore	New York	2,012,000	5,354,040
November 10. By the S. S. *West Calera*, at New York.				
Alfred Kramer & Co....	Colombo	New York	35,640	
Various	Colombo	New York	21,600	57,240
November 10. By the S. S. *Eastern Cross*, at New York.				
Thornett & Fehr, Inc...	Colombo	New York	10,080	
Poel & Kelly...........	Colombo	New York	47,700	
Various	Colombo	New York	118,440	176,220
November 16. By the S. S. *Kandahar*, at Boston.				
Hood Rubber Co.......	Colombo	Watertown	100,800	100,800
November 16. By the S. S. *Eastern Knight*, at New York.				
Thornett & Fehr, Inc...	Colombo	New York	57,600	
L. Littlejohn & Co., Inc.	Colombo	New York	78,600	
W. R. Grace & Co......	Colombo	New York	164,520	
Various	Colombo	New York	238,200	538,920
November 17. By the S. S. *Lakeville*, at New York.				
Various	Lisbon	New York	126,000	126,000
November 19. By the S. S. *Grace Dollar*, at New York.				
W. R. Grace & Co......	Singapore	New York	443,340	
Aldens' Successors, Inc..	Singapore	New York	20,340	
L. Littlejohn & Co., Inc.	Singapore	New York	459,400	
Chas. T. Wilson Co., Inc.	Singapore	New York	695,260	
Hood Rubber Co........	Singapore	Watertown	90,000	
Rubber Importers & Dealers Co., Inc.	Singapore	New York	104,400	
Rogers-Pyatt Shellac Co.	Singapore	New York	217,620	
H. A. Astlett & Co.....	Singapore	New York	81,820	
Various	Singapore	New York	374,920	
Balfour, Williamson & Co.	Penang	New York	332,820	
Various	Penang	New York	369,360	3,189,280
November 20. By the S. S. *Tasari*, at New York.				
L. Littlejohn & Co., Inc.	Java	New York	11,270	
Various	Soerabaya	New York	64,600	
Manhattan Rubber Mfg. Co.	Batavia	New York	31,500	
Fred Stern & Co........	Batavia	New York	568,960	
Various	Batavia	New York	218,520	
Various	Tandj'g Priok	New York	24,480	
Various	Belawan-Deli	New York	458,960	1,378,290
November 20. By the S. S. *Kandahar*, at New York.				
Hood Rubber Co........	Colombo	Watertown	90,720	
W. R. Grace & Co......	Colombo	New York	9,720	
I. Aron & Co...........	Colombo	New York	12,960	
Whittall & Co. of Ceylon.	Colombo	New York	57,780	
Edward Maurer Co., Inc.	Colombo	New York	55,440	
Chas. T. Wilson Co., Inc.	Colombo	New York	80,640	
L. Littlejohn & Co., Inc.	Colombo	New York	26,100	
Thornett & Fehr, Inc....	Colombo	New York	57,600	
J. H. Rayner & Co......	Colombo	New York	63,720	
Fred Stern & Co........	Colombo	New York	11,200	
Various	Colombo	New York	454,440	920,320

CENTRALS

October 23. By the S. S. *Quilloto*, at New York.				
J. S. Sembrada & Co....	Guayaquil	New York	4,650	4,650
October 25. By the S. S. *Grove*, at New York.				
Ultramares Corp.	Puerto Cabello	New York	3,750	
Various	Puerto Cabello	New York	955	4,705
October 27. By the S. S. *Colon*, at New York.				
Various	Cristobal	New York	450	450
October 28. By the S. S. *Sagua*, at New York.				
Various	Central American Ports	New York	1,650	1,650
Various				
November 5. By the S. S. *Ruby*, at New York.				
The Steiger Trading Co.	Matanzas	New York	1,200	
Harburger & Stack......	Matanzas	New York	6,300	7,500
November 12. By the S. S. *Philadelphia*, at New York.				
Scholz & Co............	Venezuelan Ports	New York	5,250	5,250
November 12. By the S. S. *Turrialba*, at New York.				
G. Amsinck & Co., Inc..	Cartagena	New York	1,800	1,800

JELUTONG

October 29. By the S. S. City of *Oran*, at New York.				
Paterson, Simmons & Co.	Singapore	New York	20,700	
Various	Singapore	New York	352,800	373,500
November 8. By the S. S. *Migchow*, at New York.				
Various	Singapore	New York	117,000	117,000
November 20. By the S. S. *Tosari*, at New York.				
E. Everett Carlton & Co.	Soerabaya	New York	61,500	61,500

GUAYULE

	Shipment from:	Shipped to:	Pounds.	Totals.
October 20. By rail at Eagle Pass, Texas.				
Continental-Mexican Rubber Co.	Mexico	New York	55,000	55,000
November 1. By rail at Eagle Pass, Texas.				
Continental-Mexican Rubber Co.	Mexico	New York	70,000	70,000
November 6. By rail at Eagle Pass, Texas.				
Continental-Mexican Rubber Co.	Mexico	New York	55,000	55,000

AFRICANS

November 1. By the S. S. *Rotterdam*, at New York.				
Various	Rotterdam	New York	88,205	88,205
November 8. By the S. S. *La Lorraine*, at New York.				
Various	Havre	New York	575	575
November 12. By the S. S. *Baltic*, at New York.				
Meyer & Brown, Inc....	Liverpool	New York	11,200	11,200
November 17. By the S. S. *Nieuw Amsterdam*, at New York.				
Various	Rotterdam	New York	1,495	1,495
November 19. By the S. S. *La Touraine*, at New York.				
American Hard Rubber Co.	Havre	New York	115	115
November 20. By the S. S. *Westerdyk*, at New York.				
Julius Schmid, Inc......	Rotterdam	New York	115	115

GUTTA PERCHA

October 29. By the S. S. *City of Oran*, at New York.				
Various	Singapore	New York	127,500	127,500
November 8. By the S. S. *Migchow*, at New York.				
L. Littlejohn & Co., Inc.	Port Said	New York	12,000	12,000
November 8. By the S. S. *Akron*, at New York.				
Various	Singapore	New York	72,600	72,600
November 4. By the S. S. *Djember*, at New York.				
The United Malaysian Rubber Co., Limited..	Borneo	New York	45,897	45,897
November 22. By the S. S. *Tosari*, at New York.				
The United Malaysian Rubber Co., Limited..	Borneo	New York	22,240	22,240

GUTTA SIAK

November 20. By the S. S. *Tosari*, at New York.				
Various	Belawan-Deli	New York	7,200	7,200

BALATA

October 27. By the S. S. *Colon*, at New York.				
G. Amsinck & Co., Inc..	Cristobal	New York	3,105	3,105
October 28. By the S. S. *Berenice*, at New York.				
Wm. Schall & Co......	Dutch Guiana	New York	19,448	19,448
October 29. By the S. S. *Achilles*, at New York.				
Wm. Schall & Co......	West Indies	New York	3,450	3,450
November 5. By the S. S. *Mavaro*, at New York.				
G. Amsinck & Co., Inc..	Port of Spain	New York	13,950	13,950
November 20. By the S. S. *Stavorgaren*, at New York.				
G. Amsinck & Co., Inc..	Bolivar	New York	24,120	
Various	Bolivar	New York	12,600	36,720

ANTWERP RUBBER ARRIVALS

October 29. By the S. S. *Albertville*, from the Congo.

Société Anonyme Bungé (Cie. du Congo belge)............... *kilos*	10,860
Société Anonyme Bungé (Grands Lacs)........................	16,560
Crédit Colonial & Commercial—	
(Anc. L. & W. Van de Velde), (Comfina).....................	29,493
(Anc. L. & W. Van de Velde)................................	73,458
Société Coloniale Anversoise (Lomami)......................	1,500
Various	61,565
Total .... *kilos*	193,436

Compiled by Grisar & Co., Antwerp.

CUSTOM HOUSE STATISTICS

PORT OF NEW ORLEANS

IMPORTS

Manufactured—*free:*				
Crude rubber:				
From Nicaragua	6,500	$1,703	2,390	$423
Totals	6,500	$1,703	2,390	$423
Chicle	536	$315	3,893	$4,297

EXPORTS

Manufactured:				
Automobile tires..........	......	$1,299	......	$209,875
Inner tubes	......	......	......	47,256
Solid tires	......	......	......	14,130
All other tires...........	......	36	......	805
Belting	......	5,132	......	12,120
Hose	......	......	......	12,706
Packing	......	......	......	2,487
Rubber boots.........*pairs*	321	1,002	......	......
Rubber shoes.........*pairs*	5,206	5,171	......	43,530
Soles and heels...........	......	......	......	22,146
Druggists' sundries.......	......	1,146	......	353
Other rubber manufactures..	......	2,149	......	12,407
Totals	5,527	$15,935	......	$377,815
Insulated wire	.....	$2,324	......	$14,019
Fountain pens......*number*	120	127	......	42
Suspenders	.....	......	......	27,003
Chewing gum...............	......	4,331	......	2,855

PORT OF NEW YORK

IMPORTS

	September 1919 Pounds	September 1919 Value	September 1920 Pounds	September 1920 Value
UNMANUFACTURED—*free:*				
Crude rubber:				
From Belgium	4,939	$1,770	......	......
France	46,086	31,576	......	......
Netherlands	......	......	307,383	$141,036
Canada	30,837	14,718	......	......
England	2,923,810	1,237,056	947,073	338,454
Guatemala	112	23	......	......
Nicaragua	14,751	4,210	1,584	432
Honduras	454	136	......	......
Panama	24,381	8,816	150	46
Argentina	32,746	16,806	3,010	1,241
Mexico	39,253	12,222	......	......
British West Indies	1,235	375	......	......
Bolivia	73,860	36,930	......	......
Brazil	8,147,297	2,495,311	1,509,440	410,832
Chile	357	72	......	......
Colombia	84,406	31,194	10,169	3,704
Uruguay	32,650	14,693	24,613	6,923
Ecuador	18,875	4,809	2,700	886
Peru	79,177	32,108	233,993	60,835
Venezuela	44,393	25,453	94,841	24,236
British India	11,200	5,304	67,200	25,290
British Guiana	4,002	3,491	......	......
Straits Settlements	6,206,256	2,437,947	11,956,859	4,584,403
British East Indies	2,854,147	1,062,419	2,218,726	725,342
Dutch East Indies	4,228,191	1,686,973	5,253,661	2,122,969
Hongkong	......	......	11,200	6,000
China	......	......	197,527	167,110
Japan	......	......	238,042	85,957
British West Africa	456,519	48,762	......	......
Philippine Islands	......	......	12,500	5,000
Australia	......	......	36,707	15,784
Belgian Congo	......	......	103,518	23,809
British E. Africa	......	......	3,174	696
Totals	25,359,934	$9,213,174	23,234,370	$8,750,985
Jelutong (Pontianak):				
From England	6,720	$1,431	......	......
Straits Settlements	1,192,809	135,327	397,559	$61,485
Dutch East Indies	......	......	68,921	10,670
Brazil	52,381	5,409	......	......
Totals	1,251,910	$142,167	466,480	$72,155
Gutta percha:				
From Straits Settlements	56,666	$14,160	248,867	$40,149
Dutch East Indies	......	......	59,522	11,058
Totals	56,666	$14,160	308,389	$51,207
Balata:				
From England	24,596	$24,061	743,579	$302,102
Guatemala	......	......	2,382	732
Colombia	19,157	9,545	26,127	11,030
Panama	14,793	5,600	......	......
Brazil	2,637	196	......	......
Venezuela	30,580	19,684	4,594	3,039
Straits Settlements	......	......	33,600	20,439
British East Indies	......	......	45,260	15,353
British Guiana	2,524	2,019	23,106	17,720
Dutch Guiana	86,048	60,785	15,467	9,728
Totals	180,335	$121,890	894,115	$380,143
Reclaimed and scrap rubber	382,477	30,161	497,303	25,266
Totals, unmanufactured	27,231,322	$9,521,552	25,400,657	$9,279,756
Manufactures of rubber and gutta percha	......	$80,494	......	$90,664
Rubber substitutes...*dutiable*	112	98	......	......
Chicle ....*dutiable*	345,317	215,759	241,994	162,007
Totals	345,429	$296,351	241,994	$252,671

EXPORTS

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
MANUFACTURED:				
Automobile tires	......	$1,765,239	......	$2,530,935
Inner tubes	......	......	......	274,333
Solid tires	......	......	......	170,665
All other tires	......	106,177	......	48,887
Belting	......	324,703	......	124,115
Hose	......	......	......	162,831
Packing	......	......	......	78,941
Rubber boots ....*pairs*	6,189	14,002	5,594	21,382
Rubber shoes ....*pairs*	558,707	518,681	540,388	530,834
Soles and heels	......	......	......	34,503
Druggists' sundries	......	69,551	......	89,711
Other mfrs. of rubber	......	295,555	......	273,937
Totals, manufactured	564,896	$3,093,908	545,982	$4,341,074
Insulated wire	......	$213,212	......	$515,831
Fountain pens.......*number*	28,877	33,730	15,112	23,434
Suspenders and garters	......	177,462	......	326,066
Chewing gum	......	......	......	159,865
Totals	28,877	$424,404	15,112	$1,025,196
UNMANUFACTURED—*free:*				
Reclaimed and scrap rubber	827,520	$99,617	219,941	$32,843

FOREIGN EXPORTS

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
Crude rubber	193,551	$84,709	803,250	$284,717
Balata	2,792	2,385	17,920	13,762
Rubber scrap	......	......	......	425
Rubber manufactures	......	4,557	......	2,017

PORT OF BOSTON

IMPORTS

	September 1919 Pounds	September 1919 Value	September 1920 Pounds	September 1920 Value
UNMANUFACTURED—*free:*				
Crude rubber:				
From British India	......	......	12,640	2,600
Straits Settlements	......	......	14,000	5,649
British East Indies	......	......	140,120	36,433
Totals	......	......	166,760	$44,682
Rubber scrap and reclaimed	8,731	$295	21,274	$1,082
Rubber manufactures, *dutiable*	......	5,734	......	2,087

EXPORTS

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
MANUFACTURED:				
Automobile tires	......	$1,765	......	$1,413
Inner tubes	......	......	......	618
Other tires	......	......	......	50
Belting	......	773	......	4,257
Hose	......	......	......	319
Packing	......	......	......	350
Rubber boots..........*pairs*	11,745	31,810	11,331	33,164
Rubber shoes..........*pairs*	83,728	56,674	188,422	167,829
Soles and heels	......	......	......	2,006
Druggists' sundries	......	2,127	......	4,178
Other rubber manufactures	......	25,993	......	35,243
Totals	95,473	$119,142	199,753	$249,427
Insulated wire	......	$1,303	......	$8,416
Fountain pens.......*number*	25	30	......	......
Suspenders and garters	......	31,506	......	10,379
Rubber scrap and reclaimed	57,775	6,081	......	......

PORT OF SEATTLE

IMPORTS

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
UNMANUFACTURED—*free:*				
Crude rubber:				
From Straits Settlements	1,376,810	$506,087	134,400	$39,071
British East Indies	18,000	6,773	......	......
Hongkong	217,490	76,122	......	......
Japan	......	......	380,800	122,528
Totals	1,612,300	$588,982	515,200	$161,599
Rubber manufactures	......	$4	......	$13,381

EXPORTS

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
MANUFACTURED:				
Automobile tires	......	$9,767	......	$122,414
Inner tubes	......	......	......	4,166
Solid tires	......	......	......	1,415
All other tires	......	3,284	......	5
Belting	......	2,713	......	8,544
Hose	......	......	......	5,533
Packing	......	......	......	67
Rubber boots..........*pairs*	1,490	4,980	552	2,123
Rubber shoes..........*pairs*	6,017	6,002	1,955	1,751
Druggists' sundries	......	576	......	399
Other rubber manufactures	......	4,527	......	3,947
Totals	7,507	$31,849	2,507	$150,364
Insulated wire	......	699	......	565
Fountain pens......*number*	74	82	......	......
Suspenders	......	532	......	......
Chewing gum	......	210	......	......
Reclaimed rubber	176,246	7,056	......	......

PORT OF SAN FRANCISCO

IMPORTS

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
UNMANUFACTURED—*free:*				
Crude rubber:				
From Mexico	100	$10	......	......
British India	......	......	22,440	$5,838
Straits Settlements	3,303,142	1,453,968	56,462	18,329
Dutch East Indies	131,165	52,466	664,826	271,905
French East Indies	......	......	3,000	3,000
Hongkong	46,065	18,426	11,200	360
Japan	......	......	212,576	63,442
Totals	3,480,472	$1,524,870	970,504	$362,874
Jelutong (Pontianak)	23,789	$2,998	......	......
Rubber manufactures	......	867	......	$420
Chicle	......	38,173	......	......

EXPORTS

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
MANUFACTURED:				
Automobile tires	......	$58,666	......	$265,647
Inner tubes	......	......	......	15,317
Solid tires	......	......	......	33,216
All other tires	......	1,391	......	11,417
Belting	......	10,799	......	70,851
Hose	......	......	......	28,830
Packing	......	......	......	26,188
Rubber boots..........*pairs*	15	65	1,013	3,993
Rubber shoes..........*pairs*	2,941	2,506	2,533	3,651
Soles and heels	......	......	......	11,947
Druggists' sundries	......	1,930	......	4,776
Other rubber manufactures	......	38,210	......	37,914
Total	2,956	$113,567	3,546	$513,747
Insulated wire	......	$29,302	......	$9,621
Fountain pens......*number*	735	1,971	222	418
Suspenders	......	5,311	......	7,582
Chewing gum	......	3,416	......	1,232
UNMANUFACTURED—*free:*				
Reclaimed and scrap rubber	22,184	$1,117	......	......

EXPORTS OF INDIA RUBBER MANUFACTURES AND INSULATED WIRE AND CABLE FROM THE UNITED STATES BY COUNTRIES, DURING THE MONTH OF SEPTEMBER, 1920

				Boots		Shoes			Automobile Tires							
EXPORTED TO—	Belting Value	Hose Value	Packing Value	Pairs	Value	Pairs	Value	Soles and Heels Value	Casings Value	Inner Tubes Value	Solid Tires Value	All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
Europe:																
Austria	....	....	....	....	....	....	....	....	$1,169	....	....	....	....	....	....	$1,169
Belgium	$1,000	$8,802	$21	....	....	2,836	$3,638	....	56,780	$2,913	....	$160	$5,218	....	$1,573	80,105
Denmark	40	291	369	....	....	19,070	29,783	....	63,386	3,009	....	....	2,227	....	152	99,257
Finland	6,853	1,070	246	....	....	37,624	41,605	....	5,577	512	$5,608	500	188	$67	....	62,226
France	8,918	....	6,330	....	....	23,398	22,921	....	172,237	241	5,135	80	8,217	273	15,028	239,380
Germany	998	....	63	....	....	....	....	....	11,668	1,635	....	6	143	....	653	15,166
Greece	....	....	....	....	....	....	....	....	9,632	14,308	....	97	....	....	46	24,083
Italy	14	....	....	....	....	14,412	17,250	....	2,852	382	....	....	....	295	217	21,010
Malta, Gozo and Cyprus Islands	....	....	....	....	....	....	....	....	....	....	....	....	....	4	83	87
Netherlands	4,018	14,826	1,693	....	....	....	....	....	130,097	13,773	7,300	54	4,377	292	8,207	184,637
Norway	28	2,164	90	....	....	79,142	65,735	$1,705	68,478	5,825	3,595	....	2,821	47	115	150,603
Poland and Danzig	....	....	....	....	....	....	....	....	29,640	6,159	....	....	....	....	....	35,799
Portugal	....	....	....	....	....	....	....	....	8,861	64	....	....	200	....	....	9,125
Rumania	....	....	....	....	....	....	....	....	138	36	....	....	....	....	....	174
Spain	2,000	286	....	....	....	4,090	4,400	878	46,677	2,932	....	....	9,197	1,048	6,877	74,295
Sweden	3,035	4,483	387	1,108	$4,978	2,402	3,117	....	327,185	22,822	205	8,518	14,172	835	6,240	395,977
Switzerland	7,038	177	77	376	1,026	71,713	55,295	2,049	24,606	2,472	....	1,480	6,639	1,393	3,715	105,967
Turkey in Europe	....	....	....	....	....	16,632	20,506	....	2,866	241	....	....	....	....	....	23,613
England	14,828	72,900	17,588	5,184	16,362	159,245	123,695	2,886	216,774	22,193	8,842	6,691	5,105	10,915	83,772	602,551
Scotland	....	....	....	1,548	3,369	6,444	5,376	....	4,893	600	....	....	....	....	....	14,238
Yugoslavia, Albania, etc	....	....	....	....	....	....	....	1,000	....	....	....	....	....	....	....	1,000
Totals, Europe	$48,770	$104,999	$26,864	8,216	$25,735	437,008	$393,321	$8,518	$1,183,516	$100,117	$30,685	$17,586	$58,504	$15,169	$126,678	$2,140,462
North America:																
Bermuda	....	$230	$102	....	....	142	$216	$173	....	....	....	....	$154	$235	$329	$1,439
British Honduras	....	45	....	....	....	2,150	1,760	....	$158	$56	....	$53	....	....	51	2,123
Canada	$21,285	9,781	6,250	9,612	$37,588	13,734	17,018	172	105,360	16,053	$28,153	2,305	18,515	28,197	176,633	467,310
Costa Rica	350	288	....	....	....	676	1,136	21	300	....	....	....	1,308	365	243	4,011
Guatemala	3,210	43	....	....	....	144	280	371	2,429	193	58	....	46	38	455	7,123
Honduras	219	1,727	317	....	....	643	798	345	285	....	....	....	666	60	112	4,529
Nicaragua	988	406	11	....	....	2,400	2,862	....	1,496	158	124	....	1,199	229	366	7,839
Panama	8,964	12,042	871	....	....	7,364	12,069	1,441	13,891	2,739	....	....	52,915	213	977	106,122
Salvador	29	58	....	....	....	....	....	294	5,697	223	....	....	235	84	495	7,115
Mexico	33,163	74,814	30,332	97	495	19,132	21,775	3,589	118,947	26,463	3,160	6,169	46,284	11,269	28,494	404,954
Miquelon, Langley, etc	....	....	....	....	....	....	....	....	....	....	....	....	43	....	....	43
Newfoundland and Labrador	1,453	290	598	2,827	9,490	306	404	1,584	856	656	....	55	935	107	1,915	18,343
Barbados	....	....	37	....	....	720	1,097	....	....	....	52	131	....	30	167	1,514
Jamaica	....	56	158	....	....	24	40	930	8,550	365	52	....	2,826	159	1,879	15,015
Trinidad and Tobago	34	1,077	749	....	....	5,608	6,659	589	5,357	1,074	515	3,785	559	50	791	21,239
Other British West Indies	34	62	....	....	....	1,091	1,492	147	2,998	1,324	55	65	185	2	921	7,285
Cuba	2,975	35,097	20,567	8	57	193,825	189,574	14,452	382,007	55,561	24,465	9,722	107,503	24,686	29,538	896,204
Virgin Islands of U. S.	....	....	....	....	....	1,097	1,822	....	1,295	....	....	....	....	8	....	3,125
Dutch West Indies	....	....	....	....	....	2,727	3,377	10	1,223	24	63	....	....	10	6	4,713
French West Indies	....	....	....	....	....	....	....	....	1,691	167	800	....	29	....	4	2,691
Haiti	....	398	....	....	....	....	....	....	2,639	2,050	326	....	....	29	51	5,493
Dominican Republic	....	1,890	1,740	....	....	1,070	1,316	2,538	20,039	3,110	2,703	1,372	4,086	374	4,696	43,864
Totals, North America	$72,704	$138,304	$61,732	12,544	$47,630	252,853	$263,695	$26,656	$675,218	$110,216	$60,526	$23,657	$237,488	$66,145	$248,123	$2,032,094
Oceania:																
Australia	$24,331	$13,319	$5,120	14	$64	19,806	$5,170	$304	$150,188	$7,965	$12,080	$8,453	$2,023	$3,026	$24,989	$257,032
New Zealand	8,129	3,884	3,179	363	1,737	2,912	3,359	114	216,883	9,088	41,872	5,031	14,816	472	13,404	321,968
Other British Oceania	....	....	....	....	....	260	442	....	2,747	345	....	35	....	....	7	3,576
French Oceania	....	226	159	....	....	1,261	2,108	35	2,573	376	....	298	320	117	349	6,561
Other Oceania	....	....	....	24	96	60	134	....	197	70	190	....	....	....	....	687
Philippine Islands	15,228	8,527	3,245	....	....	92,621	105,675	11,623	235,678	35,745	27,807	956	37,691	1,968	23,786	507,929
Totals Oceania	$47,688	$25,956	$11,703	401	$1,897	116,920	$116,888	$12,076	$608,266	$53,589	$81,949	$14,773	$54,850	$5,583	$62,535	$1,097,753
South America:																
Argentina	$13,638	$7,536	$6,911	....	....	10,186	$10,248	$5,044	$428,582	$40,109	$4,158	$4,918	$63,176	$12,541	$54,117	$650,978
Bolivia	2,504	....	....	....	....	....	....	....	90	....	....	....	721	....	64	3,379
Brazil	9,961	2,105	754	....	....	6,266	6,049	18,344	111,795	36,372	5,550	2,456	81,126	7,668	13,252	295,432
Chile	3,948	8,382	683	434	$2,130	648	619	153	8,561	919	562	2,548	2,277	1,062	35,183	67,027
Colombia	421	739	1,056	....	....	....	....	156	8,859	1,795	20	248	5,058	2,716	2,278	23,346
Ecuador	....	32	....	....	....	606	704	....	255	44	....	....	428	686	1 057	3,206
British Guiana	....	170	200	....	....	83	133	2	805	935	....	....	396	....	49	2,690
Dutch Guiana	....	....	....	....	....	24	23	....	120	....	....	....	....	....	153	296
Paraguay	....	....	....	....	....	....	....	....	....	....	....	....	72	....	....	72
Peru	8,579	5,948	339	264	2,199	42	50	46	10,351	1,998	2,639	....	987	975	1,010	35,121
Uruguay	4,987	2,746	366	....	....	2,337	1,924	69	110,421	13,960	....	638	7,341	7,412	8,436	158,300
Venezuela	982	98	1,055	....	....	....	....	431	20,757	3,189	54	160	2,252	4,277	3,946	37,201
Totals, South America	$45,020	$27,756	$11,364	698	$4,329	20,192	$19,750	$24,245	$700,596	$99,321	$12,983	$10,968	$163,834	$37,337	$119,545	$1,277,048

EXPORTED TO—	Belting Value	Hose Value	Packing Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Soles and Heels Value	Automobile Tires: Casings Value	Inner Tubes Value	Solid Tires Value	All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
ASIA:																
Aden	......	......	......	......	......	......	......	......	......	$3,158	$349	......	......	......	......	$3,507
China	$28,724	$6,283	$5,650	5	$16	1,695	$1,841	$904	$28,145	2,232	146	$246	$75,135	$7,092	$24,365	180,779
Kwantung, leased territory	......	......	......	......	......	......	......	......	248	......	......	......	......	......	......	248
Chosen	......	61	......	......	......	552	597	......	......	663	......	......	......	......	......	1,321
British India	......	1,383	588	95	189	3,282	5,263	......	56,148	8,533	4,170	......	36,832	3,148	3,161	119,415
Straits Settlements	......	......	156	......	......	2,892	3,054	......	139,283	3,195	14,664	......	374	183	2,149	163,058
Dutch East Indies	3,617	5	......	......	......	......	......	......	137,035	5,575	64,100	1,498	4,524	936	2,011	219,301
French Indo China	......	......	......	......	......	......	......	......	......	......	......	......	53	......	95	148
Hongkong	......	......	671	......	......	3,081	3,370	......	905	......	......	......	610	339	2,128	8,023
Japan	7,920	5,539	16,198	4,518	12,322	7,041	7,462	31	36,369	4,527	1,600	4,249	2,998	359	19,986	119,560
Persia	......	......	......	......	......	......	......	......	912	1,461	......	......	......	......	......	2,373
Russia in Asia	......	......	......	12	98	......	......	......	......	......	......	......	......	......	22	120
Siam	......	......	36	......	......	......	......	......	......	......	290	......	......	46	......	372
Turkey in Asia	......	......	......	......	......	......	......	......	3,721	3,656	......	......	......	......	23	7,400
TOTALS, ASIA	$40,261	$13,271	$23,299	4,630	$12,625	18,543	$21,587	$935	$402,766	$33,000	$85,319	$5,993	$120,526	$12,103	$53,940	$825,625
AFRICA:																
British West Africa	......	......	......	......	......	269	$359	......	$56,702	$13,031	......	......	......	......	......	$70,092
British South Africa	$3,622	$6,574	$1,413	......	......	5,404	4,249	$4,503	237,139	39,673	$459	$5,620	$439	$1,063	$1,784	306,538
British East Africa	......	......	......	......	......	......	......	561	105	20	......	......	......	......	295	981
French Africa	......	......	......	......	......	......	......	......	9,386	......	......	......	......	......	27	9,413
Kamerun, etc.	......	......	......	......	......	......	......	......	329	50	......	......	......	......	......	379
Morocco	......	......	......	......	......	......	......	......	225	......	......	......	......	......	......	225
Portuguese Africa	......	2,585	......	......	......	......	......	......	......	......	......	......	......	......	40	2,625
Egypt	......	......	......	......	......	2	4	......	6,517	144	......	......	......	......	954	7,619
TOTALS, AFRICA	$3,622	$9,159	$1,413	......	......	5,675	$4,612	$5,064	$310,403	$52,918	$459	$5,620	$439	$1,063	$3,100	$397,872
TOTALS	$258,065	$319,445	$136,375	26,489	$92,216	851,191	$819,853	$77,494	$3,883,923	$446,352	$271,572	$78,597	$635,641	$137,400	$613,921	$7,770,854

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORY OF THE UNITED STATES

	Belting, Hose and Packing Value	Boots and Shoes: Pairs	Boots and Shoes: Value	Tires: Automobile Value	Tires: All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All other Manufactures of Rubber Value	Totals Value
Hawaii	$10,262	......	......	$88,807	$3,742	......	......	$12,992	$115,803
Porto Rico	7,400	......	......	75,107	2,358	......	......	31,251	116,116
TOTALS	$17,662	......	......	$163,914	$6,100	......	......	$44,243	$231,919

Compiled by the Bureau of Foreign Commerce, Department of Commerce, Washington, D. C.

OFFICIAL INDIA RUBBER STATISTICS FOR THE UNITED STATES

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

August	1919 Pounds	1919 Value	1920 Pounds	1920 Value
UNMANUFACTURED—*free:*				
India rubber:				
From France	129,960	$32,268	....	....
Netherlands	....	....	122,932	$50,526
Portugal	....	....	69,237	25,859
United Kingdom	1,760,940	739,862	1,959,770	793,204
Canada	52,321	15,218	152	67
Central America	9,487	4,568	30,143	12,578
Mexico	5,466	1,576	145,523	29,927
Brazil	2,598,977	741,892	1,317,139	325,547
Peru	244,438	104,489	114,405	25,095
Other S. America	179,514	87,749	279,805	79,096
British E. Indies	17,108,838	6,918,405	34,649,711	16,480,846
Dutch E. Indies	44,850	16,893	4,226,814	1,801,010
Other countries	325,042	123,021	1,131,633	473,512
Totals	22,459,833	$8,785,941	44,047,264	$20,097,267
Balata	139,103	$93,142	41,222	$25,978
Guayule	....	....	234,953	44,113
Jelutong (Pontianak)	885,234	87,436	2,874,901	540,107
Gutta percha	316,575	65,798	1,410,791	369,448
Rubber scrap	649,421	54,026	1,281,110	105,638
Totals, unmanufactured	24,450,166	$9,086,343	49,890,241	$21,182,551
Chicle (dutiable)	377,187	$229,748	521,738	$354,374
MANUFACTURED—*dutiable:*				
India rubber and gutta percha	....	$46,284	....	$282,946
India rubber substitutes	130,816	7,142	....	....

EXPORTS OF DOMESTIC MERCHANDISE

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
MANUFACTURED—				
India rubber:				
Scrap and old	1,007,037	$90,118	282,655	$24,644
Reclaimed	334,413	50,675	429,603	74,652
Belting[1]	....	518,310	....	322,613
Hose[1]	....		....	251,807
Packing[1]	....		....	103,727
Boots[1] ... *pairs*	30,881	78,745	14,255	49,396
Shoes[1] ... *pairs*	640,921	459,142	488,638	481,460
Soles and heels[1]	....	....	....	65,964
Tires:				
For automobiles[1]	....	2,350,901	....	....
Casings[1]	....		....	3,121,530
Inner tubes[1]	....		....	327,009
Solid tires[1]	....		....	265,549
All other tires	....	110,736	....	59,931
Druggists' rubber sundries[1]	....	95,938	....	129,838
Suspenders and garters	....	245,663	....	291,852
Other rubber manufactures	....	789,177	....	600,955
Totals, manufactured	....	$4,789,405	....	$6,170,927
Fountain pens ... *number*	27,334	$23,103	21,079	$25,907
Insulated wire and cables[1]	....	741,443	....	420,208

EXPORTS OF FOREIGN MERCHANDISE

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
UNMANUFACTURED—				
India rubber	254,263	$105,065	684,322	$241,238
Balata	5,900	2,065	99,778	50,640
Jelutong (Pontianak)	2,672	481	....	....
Rubber scrap	422	12	224,330	44,831
Totals, unmanufactured	....	$107,623	....	$336,709
MANUFACTURED—				
Gutta percha	....	$317	....	....
Totals, manufactured	....	$317	....	....
India rubber substitutes	305	$155	....	....
Chicle	....	....	309	$270

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
MANUFACTURED—				
To Alaska:				
Belting, hose and packing	....	$9,194	....	$6,030
Boots and shoes ... *pairs*	8,921	22,045	10,531	37,904
Other rubber goods	....	5,621	....	8,522
Totals	....	$36,860	....	$52,456
To Hawaii:				
Belting, hose and packing	....	$8,284	....	$13,254
Automobile tires	....	80,186	....	167,451
Other tires	....	2,073	....	3,834
Other rubber goods	....	8,651	....	30,364
Totals	....	$99,194	....	$214,903
To Porto Rico:				
Belting, hose and packing	....	$4,819	....	$9,108
Automobile tires	....	87,704	....	158,253
Other tires	....	667	....	1,211
Other rubber goods	....	16,528	....	52,967
Totals	....	$109,718	....	$221,539

To Philippine Islands—treated as foreign commerce.

[1] Details of exports of domestic merchandise by countries during August, 1920, were given on pages 142-143 of THE INDIA RUBBER WORLD, November 1, 1920.

RUBBER STATISTICS FOR THE DOMINION OF CANADA

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	July			
	1919		1920	
	Pounds	Value	Pounds	Value
Unmanufactured—*free*:				
Rubber, gutta percha, etc.:				
From United Kingdom	242,991	$108,856	519,666	$267,454
United States	579,034	226,144	233,669	70,665
British East Indies:				
India	....	....	5,000	1,776
Straits Settlements	1,195,633	520,046	256,487	102,502
Other countries	....	....	5,352	2,166
Totals	2,017,658	$855,046	1,020,174	$444,563
Balata	....	....	25	$46
Rubber recovered	492,265	$72,195	202,148	32,347
Rubber, powdered, and rubber or gutta percha scrap	24,305	856	67,868	3,336
Rubber substitutes	26,437	4,315	154,244	23,326
Totals, unmanufactured	2,560,665	$932,412	1,444,459	$503,618
Partly Manufactured—				
Hard rubber sheets and rods	14,375	$5,547	39,866	$29,248
Hard rubber tubes	....	1,995	....	5,979
Rubber thread, not covered	3,253	4,553	14,089	17,315
Totals, partly manufactured	17,628	$12,095	53,955	$52,542
Manufactured—				
Belting	....	$18,739	....	$13,038
Hose	....	10,124	....	11,288
Packing	....	7,809	....	7,511
Boots and shoes	....	12,696	....	10,020
Clothing, including waterproofed	....	19,004	....	21,525
Gloves	....	1,313	....	1,891
Hot water bottles	....	1,395	....	1,866
Tires, solid	....	16,038	....	15,968
Tires, pneumatic	....	135,072	....	67,612
Tires, inner tubes	....	11,542	....	10,832
Other manufactures	....	184,072	....	318,288
Totals, manufactured	....	$417,904	....	$479,839
Total, rubber imports	....	$1,362,411	....	$1,035,999
Insulated wire and cables:				
Wire and cables covered with cotton, linen, silk, rubber, etc.	....	$13,163	....	$24,847
Copper wire and cables, covered as above	....	9,267	....	16,492
Chicle	109,955	75,452	42,749	32,818

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS

	July			
	1919		1920	
	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
Unmanufactured—				
Crude and waste rubber	$37,790	$191	$26,438	....
Manufactured—				
Belting	$2,085	....	$3,982	....
Hose	7,823	....	25,559	....
Boots and shoes	169,462	$222	116,214	....
Clothing, including waterproofed	538	186	4,839	....
Tires, pneumatic	655,696	8,824	906,498	$16
Tires, other kinds	11,109	....	1,962	....
Other manufactures	18,930	1,631	25,408	2,702
Totals, manufactured	$865,643	$10,863	$1,084,462	$2,718
Total rubber exports	$903,433	$11,054	$1,110,900	$2,718
Insulated wire and cable:				
Copper wires and cable	$117,203	....	$25,876	....
Chicle	73,484	....	86	....

UNITED KINGDOM RUBBER STATISTICS.

IMPORTS

	August			
	1919		1920	
	Pounds	Value	Pounds	Value
Unmanufactured—				
Crude rubber:				
From—				
Straits Settlements	4,595,700	£460,442	5,962,200	£587,976
Federated Malay States	2,779,800	260,110	5,926,000	588,726
British India	716,200	69,045	725,400	70,884
Ceylon and dependencies	1,054,300	104,060	5,691,800	546,559
Other Dutch possessions in Indian seas	886,500	85,566	671,900	67,352
Dutch East Indies (except other Dutch possessions in Indian seas)	270,400	25,727	3,089,900	309,586
Other countries in the East Indies and Pacific not elsewhere specified	225,100	21,534	209,100	20,890
Brazil	677,300	73,257	1,567,700	131,413
Peru	70,200	6,973	....	....
South and Central America (except Brazil and Peru)	113,200	10,650	....	....
West Africa:				
French West Africa	....	....	9,000	862
Gold Coast	12,200	1,174	5,300	586
Other parts of West Africa	20,400	2,094	56,800	4,549
East Africa (including Madagascar)	34,500	2,890	110,000	9,460
Other countries	16,300	1,576	313,600	27,630
Totals	11,472,100	£1,125,098	24,338,700	£2,366,473
Waste and reclaimed rubber	253,200	6,989	605,000	6,646
Totals, unmanufactured	11,725,300	£1,132,087	24,943,700	£2,373,119
Gutta percha and balata	1,109,600	£174,005	714,700	£169,419
Rubber substitutes	....	....	232,900	13,787
Manufactured—				
Boots and shoes...*dozen pairs*	32,904	£52,474	15,824	£49,519
Waterproof clothing	....	1,392	....	1,202
Tires and tubes	....	257,682	....	570,293
Other rubber manufactures	....	51,489	....	93,171
Insulated wire	....	901	....	8,814

EXPORTS

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
Unmanufactured—				
Waste and reclaimed rubber	1,086,800	£24,074	901,900	£25,829
*Rubber substitutes	....	....	76,500	3,870
Totals	1,086,800	£24,074	978,400	£29,699
Manufactured—				
Boots and shoes..*dozen pairs*	16,608	£34,442	7,830	£16,047
Waterproof clothing	....	213,245	....	236,554
Insulated wire	....	102,511	....	148,077
Submarine cables	....	73,983	....	70,393
Tires and tubes	....	478,228	....	601,537
Other rubber manufactures	....	272,410	....	394,113
Totals	16,608	£1,174,819	7,830	£1,466,721

EXPORTS—COLONIAL AND FOREIGN

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
Unmanufactured—				
Crude rubber:				
To Russia	....	....	7,200	£775
Sweden, Norway and Denmark	430,300	£41,712	29,300	3,005
Germany	941,900	98,766	850,300	80,765
Belgium	2,506,500	189,465	226,400	23,742
France	2,070,900	195,419	2,389,100	237,926
Spain	91,100	10,681	36,000	4,568
Italy	1,511,800	164,033	697,000	65,157
Austria-Hungary	80,700	8,270	2,200	195
Other European countries	1,953,200	184,715	145,000	13,047
United States	771,700	65,227	2,804,000	328,298
Canada	540,700	49,018	268,700	26,835
Other countries	69,600	8,724	347,900	39,374
Totals, rubber	10,968,400	£1,016,030	7,803,100	£823,687
Waste and reclaimed rubber	45,000	2,022	31,400	953
Gutta percha and balata	101,400	16,592	135,900	23,495
*Rubber substitutes	....	....	21,400	830

* Included in "Other Articles," Class III, T, prior to 1920.

UNITED STATES CRUDE RUBBER IMPORTS FOR 1920 (BY MONTHS)

1920	Plantations	Parás	Africans	Centrals	Guayule	Maniçoba and Matto Grosso	Balata	Miscellaneous Gum	Waste	Totals 1920	Totals 1919
January ... *tons*	17,799	2,620	821	111	....	....	....	....	....	21,351	7,235
February	29,681	2,456	558	265	34	....	....	....	....	32,994	17,456
March	28,533	2,463	514	23	114	3	113	983	1,252	33,998	28,223
April	21,036	1,893	628	29	79	10	22	812	448	24,957	28,146
May	24,443	2,025	662	95	113	....	45	1,059	224	28,666	16,348
June	12,911	1,352	427	27	164	....	7	552	164	15,604	16,319
July	14,695	1,115	34	40	....	....	8	1,283	312	17,487	17,965
August	12,730	590	13	75	156	....	67	1,135	300	15,066	11,067
September	10,974	459	99	8	74	22	44	516	218	12,414	14,036
October	8,759	1,613	27	17	223	....	33	498	425	11,595	28,888
Totals, 10 months, 1920	181,561	16,586	3,783	690	957	35	339	6,838	3,343	214,132	....
Totals, 10 months, 1919	137,336	22,650	2,544	1,244	1,478	431	....	....	....	....	185,683

Compiled by The Rubber Association of America, Inc.

	August			
	1919		1920	
	Pounds	Value	Pounds	Value
Manufactured—				
Boots and shoes...*dozen pairs*	643	£1,462	576	£1,424
Waterproof clothing	....	5	....	316
Tires and tubes.............	....	8,414	....	98,822
Insulated wire	....	42	....	41
Other manufactures	....	5,239	....	4,432
Totals, manufactured....	643	£15,162	576	£105,035

*Included in "Other Articles," Class III, T., prior to 1920.

	September			
	1919		1920	
Unmanufactured—*free*: Crude rubber:	Pounds	Value	Pounds	Value
Manufactured—				
Boots and shoes..*dozen pairs*	2	£10	1,185	£4,218
Waterproof clothing	....	113	....	20
Tires and tubes.............	....	1,508	....	16,197
Insulated wire	....	....	....	1,142
Other manufactures	....	2,813	....	2,101
Totals manufactured..	....	£4,444	....	£23,678

*Included in "Other Articles," Class III, T., prior to 1920.

UNITED KINGDOM RUBBER STATISTICS

IMPORTS

	September			
	1919		1920	
	Pounds	Value	Pounds	Value
Unmanufactured—				
Crude rubber:				
From—				
Straits Settlements	5,893,800	£597,163	7,537,400	£703,073
Federated Malay States....	2,055,000	204,081	4,659,400	460,194
British India	297,000	30,349	582,800	54,089
Ceylon and dependencies..	1,551,100	150,133	4,095,200	383,202
Other Dutch possessions in Indian Seas	211,200	22,561	590,400	58,974
Dutch East Indies (except other Dutch possessions in Indian seas).........	2,050,400	206,682	649,400	53,665
Other countries in the East Indies and Pacific not elsewhere specified	40,900	4,090	142,300	13,978
Brazil	1,479,900	159,426	801,200	63,322
Peru	158,700	15,452	8,900	896
South and Central America (except Brazil and Peru)	1,700	170	12,400	1,174
West Africa:				
French West Africa.....	6,700	560	300	25
Gold Coast	7,200	717	11,900	995
Other parts of West Africa	62,300	5,563	18,200	1,877
East Africa (including Madagascar)	70,300	5,947	122,000	9,819
Other countries	98,200	9,668	1,105,700	91,674
Totals	13,984,400	£1,412,562	20,337,500	£1,896,957
Waste and reclaimed rubber..	391,700	10,054	497,200	7,779
Totals, unmanufactured.	14,376,100	£1,422,616	20,834,700	£1,904,736
Gutta percha and balata......	669,400	£116,084	900,800	£179,755
*Rubber substitutes	....	....	8,700	658
Manufactured—				
Boots and shoes...*dozen pairs*	31,260	£58,744	5,112	£14,975
Waterproof clothing	....	37	....	484
Insulated wire	....	70	....	3,342
Tires and tubes....	....	280,328	....	581,946
Other rubber manufactures...	....	44,982	....	45,737

EXPORTS

Unmanufactured—				
Waste and reclaimed rubber..	1,086,200	£22,510	1,808,900	£51,479
*Rubber substitutes.........	....	....	166,000	8,188
Totals	1,086,200	£22,510	1,974,900	£59,667
Manufactured—				
Boots and shoes...*dozen pairs*	5,813	£13,146	8,336	£22,478
Waterproof clothing	....	151,527	....	306,793
Insulated wire	....	74,207	....	164,837
Submarine cables	....	24,380	....	72,992
Tires and tubes.............	....	420,079	....	514,486
Other rubber manufactures..	....	215,595	....	389,704

EXPORTS—COLONIAL AND FOREIGN

Unmanufactured—				
Crude rubber:				
To Russia	....	....	23,400	£3,200
Sweden, Norway and Denmark	1,272,900	£122,664	440,100	37,979
Germany	1,660,500	156,400	736,600	59,981
Belgium	757,300	64,251	147,700	14,591
France	1,069,200	115,077	1,323,400	126,727
Spain	27,600	3,026	46,400	4,202
Italy	133,300	13,517	129,600	11,218
Austria-Hungary	66,900	7,098	6,700	650
Other European countries	1,676,800	159,249	272,800	24,055
United States	2,917,800	283,005	274,100	26,589
Canada	1,192,200	106,141	683,200	68,810
Other countries	....	....	184,600	19,482
Totals, rubber.........	10,774,500	£1,030,428	4,268,600	£397,484
Waste and reclaimed rubber.	....	....	....	£830
Gutta percha and balata.....	129,200	£15,713	48,400	5,881

RUBBER STATISTICS FOR ITALY

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	Three Months Ended March			
	1919		1920	
Unmanufactured—	Quintals[1]	Lire[2]	Quintals	Lire
Crude rubber and gutta percha—raw and reclaimed:				
From Great Britain.........	97		28	
French Colonies in Asia	97		1,475	
British India and Ceylon	17,365		1,486	
Straits Settlements..	8,770	38,074,050	1,162	7,023,450
French African Colonies	1,007		381	
Belgian Congo	......		245	
Brazil	8,789		1,777	
Other countries.......	136		135	
Totals	36,261	38,074,050	6,689	7,023,450
Rubber scrap	......	......	111	19,980
Totals, unmanufactured..	36,261	38,074,050	6,800	7,043,430
Manufactured—				
India rubber and gutta percha—				
Threads	90	234,000	98	254,800
Sheets, including hard rubber	81	130,500	23	37,700
Tubes	29	36,000	21	29,700
Belting	81	113,400	249	348,600
Rubber-coated fabrics in pieces.	79	126,200	119	185,100
Boots and shoes.........*pairs*	6,772	101,580	31,381	470,715
Elastic webbing	86	240,800	83	232,400
Clothing and articles for travel.	......	......	57	182,400
Tires and tubes:				
From France	1,471		845	
Great Britain.........	2	3,537,600	1,206	6,446,400
Other countries.......	1		635	
Other rubber goods...........	4,335	6,641,000	3,801	5,025,500
Totals, manufactured...	......	11,161,080	......	13,213,315
Total imports..........	......	49,235,130	......	20,256,745

EXPORTS OF CRUDE AND MANUFACTURED RUBBER

	Three Months Ended March			
	1919		1920	
Unmanufactured—	Quintals[1]	Lire[2]	Quintals	Lire
India rubber and gutta percha—raw and reclaimed:				
To Austria	......		300	
Spain	1,632		284	
United States	234	746,400	671	520,000
Other countries.........	......		45	
Totals	1,866	746,400	1,300	520,000
Waste	......	......	1,409	169,080
Totals, unmanufactured.	1,866	746,400	2,709	689,080
Manufactured—				
India rubber and gutta percha—				
Threads	84	226,800	119	321,300
Sheets, including hard rubber	35	72,000	81	119,100
Tubes	193	225,400	422	482,300
Belting	94	150,400	......	......
Rubber-coated fabrics in pieces	21	25,200	59	71,600
Boots and shoes..........*pairs*	......	......	446	10,175
Elastic webbing	220	660,000	359	1,077,000
Clothing and articles for travel.	......	......	94	451,200
Tires and tubes:				
To Austria	......		333	
Belgium	633		225	
Czecho-Slovakia	......		373	
France	80		337	
Great Britain..........	704		3,006	
Spain	2		104	
Switzerland	1	5,272,500	131	19,036,100
British India and Ceylon	100		1,056	
Dutch East Indies......	......		673	
Straits Settlements......	130		391	
Australia	241		231	
Argentina	274		654	
Brazil	291		687	
Other countries.........	319		1,818	
Other rubber goods...........	472	698,600	2,377	3,481,400
Totals, manufactured....	......	7,330,900	......	25,050,175
Total exports...........	......	8,077,300	......	25,739,255

[1]One quintal equals 220.46 pounds.
[2] One lira equals $0.193 (normal).

RUBBER STATISTICS FOR ITALY

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	Four Months Ended April			
	1919		1920	
	Quintals[1]	Lire[2]	Quintals	Lire
Unmanufactured—				
Crude rubber and gutta percha—raw and reclaimed:				
From Great Britain	....		146	
India and Ceylon	17,856		2,672	
Straits Settlements	12,219		2,562	
French African Colonies	1,007	45,854,550	565	11,745,300
Belgian Congo	94		466	
Brazil	11,580		2,803	
Other countries	915		1,972	
Totals	43,671	45,854,550	11,186	11,745,300
Rubber scrap	12	2,160	111	19,980
Totals, unmanufactured	43,683	45,856,710	11,297	11,765,280
Manufactured—				
India rubber and gutta percha—				
Threads	123	319,800	98	254,800
Sheets, including hard rubber	84	136,200	43	67,900
Tubes	51	64,600	41	77,800
Belting	84	117,600	251	351,400
Rubber coated fabrics....*pieces*	117	186,300	181	279,900
Boots and shoes..........*pairs*	9,526	142,890	37,164	557,460
Elastic webbing	88	246,400	104	291,200
Clothing and articles for travel	....	....	75	240,000
Tires and tubes—				
From France	1,859		1,140	
Great Britain	269	5,107,200	1,841	9,571,200
Other countries	....		1,007	
Other manufactures	7,167	10,968,400	4,971	7,831,800
Totals, manufactured	....	17,289,390	....	19,523,460
Total imports	....	63,146,100	....	31,288,740

EXPORTS OF CRUDE AND MANUFACTURED RUBBER

	1919 Quintals	1919 Lire	1920 Quintals	1920 Lire
Unmanufactured—				
India rubber and gutta percha—raw and reclaimed:				
To Austria	....		300	
Spain	1,726	1,046,400	468	913,600
United States	890		1,339	
Other countries	....		177	
Totals	2,616	1,046,400	2,284	913,600
Rubber scrap	....	....	2,884	346,080
Totals, unmanufactured	2,616	1,046,400	5,168	1,259,680
Manufactured—				
India rubber and gutta percha—				
Threads	126	340,200	147	396,900
Sheets, including hard rubber	52	112,800	110	174,600
Tubes	249	305,100	556	633,700
Belting	94	150,400	....	....
Rubber coated fabrics....*pieces*	42	50,400	89	110,000
Boots and shoes..........*pairs*	....	....	445	6,675
Other footwear	....	....	1	3,500
Elastic webbing	272	816,000	478	1,434,000
Clothing and articles for travel	....	4,800	156	748,800
Tires and tubes:				
To Austria	50		377	
Belgium	655		277	
Czecho-Slovakia	....		428	
France	83		643	
Great Britain	1,493		3,622	
Spain	2		134	
Switzerland	4		138	
India and Ceylon	100	7,087,000	1,945	26,155,400
Dutch East Indies	....		791	
Straits Settlements	130		716	
Australia	....		231	
Argentina	274		1,222	
Brazil	303		954	
Other countries	636		2,288	
Other rubber goods	575	867,800	3,569	5,208,400
Totals, manufactured	....	9,734,500	....	34,871,975
Total exports	....	10,780,900	....	36,131,655

[1]One quintal equals 220.46 pounds.
[2]One lira equals $0.193 (normal).

THE MARKET FOR RUBBER SCRAP

NEW YORK

The rubber scrap business has been described as virtually suspended. Reclaimed rubber plants when not shut down completely are not averaging to produce over 10 per cent of their normal capacity. Under these circumstances, reclaimers are not interested to purchase scrap of any grade, even at present prices, which are so low that they scarcely permit the collectors to continue operations. The following quotations are nominal:

QUOTATIONS FOR CARLOAD LOTS DELIVERED

Prices subject to change without notice

November 24, 1920

BOOTS AND SHOES:			
Arctic tops	*lb*	*$0.075 @	
Boots and shoes	*lb*	*.05½ @	.05¾
Trimmed arctics	*lb.*	*.05¼ @	.05¾
Untrimmed arctics	*lb.*	*.04¼ @	.04¾
HARD RUBBER:			
Battery jars, black compound	*lb*	*.01 @	.01¼
No. 1, bright fracture	*lb.*	*.23 @	.24
INNER TUBES:			
No. 1	*lb.*	*.11½ @	.12
Compounded	*lb.*	*.06 @	.07
Red	*lb.*	*.05½ @	.06
MECHANICALS:			
Black scrap, mixed, No. 1	*lb*	*.03½ @	.04
No. 2	*lb.*	*.02½ @	.02¾
Car springs	*lb.*	*.03½ @	.04
Heels	*lb.*	*.03 @	.03½
Horse-shoe pads	*lb.*	*.03 @	.03½
Hose, air brake	*lb.*	*.03½ @	.03¾
fire, cotton lined	*lb*	*.01½ @	.01¾
garden	*lb.*	*.01½ @	.01¾
Insulated wire stripping, free from fiber	*lb.*	*.03½ @	.04
Matting	*lb.*	*.01¼ @	.01½
Red packing	*lb.*	*.05½ @	.06
Red scrap, No. 1	*lb.*	*.09 @	.10
No. 2	*lb.*	*.06¾ @	.07¼
White scrap, No. 2	*lb.*	*.08 @	.09
No. 1	*lb*	*.10 @	.11
TIRES:			
PNEUMATIC—			
Auto peelings	*lb.*	*.03¾ @	.04¼
Bicycle	*lb.*	*.02¼ @	.02¾
Standard white auto	*lb.*	*.03 @	.03½
Mixed auto	*lb*	*.01¾ @	.02¼
Stripped, unguaranteed	*lb.*	*01 @	.02½
White, G. & G., M. & W., and U. S.	*lb.*	*.03½ @	.04
SOLID—			
Carriage	*lb.*	*.03 @	.03¼
Irony	*lb.*	@	
Truck	*lb.*	*.02½ @	.02¾

*Nominal.

THE MARKET FOR COTTON AND OTHER FABRICS

NEW YORK

The unprecedented decline in the consumption of American cotton and the accumulation of finished goods in the hands of manufacturers is the fundamental reason for the present market weakness. Middlings uplands spot cotton was quoted at 22.50 cents on November 1, and with minor fluctuations steadily declined, when, on November 24 this grade of cotton was quoted at 17.30 cents. Considering the generally unsatisfactory conditions surrounding this market it is unsafe to predict that the low level for the present year has been reached.

Arizona Pima Cotton is apparently not in urgent need of marketing at present, owing possibly to the fact that some of the large tire companies made contracts with farmers in the Salt River Valley and are taking cotton against these contracts at 60 cents and better. It is believed, however, that a firm offer of 50 cents would buy extra Pima. It is very probable that the crop will not be as large as anticipated, and it will be surprising if the crop reaches 75,000 bales, although the weather has been ideal and a good top crop will, of course, increase the yield.

Egyptian Cotton appears to have declined more than other staples, and good grade uppers can be bought today for 25 and 27 cents, although this growth has stiffened in value since last week. Sakel cotton, however, continues to decline and prices

range from 35 to 45 cents, according to grade. The last estimate of the Alexandria General Produce Association forecasts a crop of 6,175,000 cantars, which is considerably below earlier figures.

Sea Island Cotton is quoted nominally at 70 cents for average extra choice, although there is little doubt but that a firm bid considerably below this figure would be accepted. The ginnings thus far are very small, and as the cotton is closely held it will probably be the last of the staples to meet the demand for lower prices. Carolina Island cotton is just coming in but the so-called "crop lots" are few and far between.

Ducks, Drills and Osnaburgs. The market has been stagnant during the past month and the only business done was by second hands. Prices have been marked down in the entire list.

Raincoat Fabrics. Despite very substantial price reductions in this market, business has been quiet and very little goods have been sold.

Tire Fabrics. Technically the market for tire fabrics does not exist, as there are no quotations representing a trading basis. Only distressed lots of fabric are being sold at prices that are not representative of values. The fabric mills will be practically out of the market until normal trading is resumed. The prices quoted in the following list are those ruling August 1, 1920:

NEW YORK QUOTATIONS

November 24, 1920

Prices subject to change without notice

ASBESTOS CLOTH:				
Brake lining, 2½ lbs. sq. yd., brass or copper insertion	lb.		@	
2¼ lbs. sq. yd., brass or copper insertion	lb.		@	
BURLAPS:				
32—7-ounce	100 yards	$5.50	@	
32—8-ounce		5.50	@	
40—7½-ounce			@	
40—8-ounce		6.00	@	
40—10-ounce		7.50	@	
40—10½-ounce		7.75	@	
45—7½-ounce		8.00	@	
45—8-ounce		8.25	@	
48—10-ounce		10.00	@	
DRILLS:				
38-inch 2.00-yard	yard	.22½	@	.23½
40-inch 2.47-yard		.18¾	@	.19
52-inch 1.90-yard		.23¾	@	.24¼
52-inch 1.95-yard		.23	@	.24⅛
60-inch 1.52-yard		.29⅝	@	.30⅞
DUCK:				
CARRIAGE CLOTH:				
38-inch 2.00 yard enameling duck	yard	.23½	@	
48-inch 1.74-yard		.27	@	
72-inch 16.66-ounce		.63½	@	
72-inch 17.21-ounce		.66⅝	@	
MECHANICAL:				
Hose	pound	.43	@	
Belting		.43	@	
HOLLANDS, 40-INCH:				
Acme	yard	*.27¼	@	
Endurance		*.26¼	@	
Penn		*.26⅞	@	
OSNABURGS:				
40-inch 2.35-yard	yard		@	
40-inch 2.48-yard			@	
37½-inch 2.42-yard			@	
RAINCOAT FABRICS:				
COTTON:				
Bombazine 64 x 60	yard	.13½	@	
60 x 48		.12½	@	
Cashmeres, cotton and wool, 36-inch, tan		.85	@	
Twills 64 x 72		.20	@	
64 x 102		.23	@	.24
Twill, mercerized, 36-inch, blue and black		.35	@	
tan and olive		.32½	@	
Tweed		.40	@	1.00
printed		.22½	@	
Plaids 60 x 48		.13½	@	
56 x 44		.13	@	
Repp		.30	@	.35
Prints 60 x 48		.14	@	
64 x 60		.15	@	

IMPORTED WOOLEN FABRICS SPECIALLY PREPARED FOR RUBBERIZING—PLAIN AND FANCIES:				
63-inch, 3¼ to 7½ ounces	yard	$0.81	@	$2.22
36-inch, 2¾ to 5 ounces		.63	@	1.62
IMPORTED PLAID LINING (UNION AND COTTON):				
63-inch, 2 to 4 ounces	yard	.71	@	1.57
36-inch, 2 to 4 ounces		.44	@	.84
SHEETINGS, 40-INCH:				
48 x 48, 2.35-yard	yard	*.19½	@	
48 x 48, 2.50-yard		*.18½	@	
48 x 48, 2.85-yard		*.15	@	
64 x 68, 3.15-yard		*.18¼	@	
56 x 60, 3.60-yard		*.14¼	@	
48 x 44, 3.75-yard		*.14	@	
SILKS:				
Canton, 38-inch	yard	.40	@	
Schappe, 36-inch		.50	@	
STOCKINETTES:				
SINGLE THREAD:				
3½ Peeler, carded	pound		@	
4½ Peeler, carded		.75	@	
6½ Peeler, combed		1.00	@	
DOUBLE THREAD:				
Zero Peeler, carded	pound	.56	@	
3½ Peeler, carded			@	
6½ Peeler, combed			@	
TIRE FABRICS:				
BUILDING:				
17¼-ounce Sakellarides, combed	pound	*2.35	@	
17¼-ounce Egyptian, combed		*2.15	@	
17¼-ounce Egyptian, carded		*2.05	@	
17¼-ounce Peelers, combed		*2.25	@	
17¼-ounce Peelers, carded		*1.47	@	

CORD:			
15-ounce Egyptian	*pound*	*$2.40	@
BICYCLE:			
8-ounce American	*pound*	*1.50	@
10-ounce American		*1.48	@
CHAFER:			
9¼-ounce Sea Island	*pound*		@
9¼-ounce Egyptian, carded		*2.29	@
9¼-ounce Peeler, carded		*1.71	@

*Nominal.

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS

NEW YORK

The absence of indications of an early resumption of production by the tire manufacturing companies and of a marked demand for rubber goods in other important lines continues to effectively curtail demand for zinc oxide, lithopone, carbon black and other commonly used compounding ingredients. Surplus stocks held by second hands have been absorbed.

Prices in general are considered as being now at bed-rock and a decided reaction and firmer tone is predicted with the first evidence of buying activity.

All calcined magnesia refined in the East comes from mines in California. With one exception, these have been closed down owing to the fact that they have been losing money due to the advance in mining costs. They also require large expenditures of money for repairs and development work.

Future expansion of the domestic magnesia business is said to depend largely on more favorable tariff conditions

Aniline Oil. Stocks are ample. Spot price early in the month was 26 cents per pound, declining to 25 cents toward the close.

Barytes. The demand has been steady, but less urgent, affording the producers to get better control of the situation as regard filling old orders.

Benzol. Prices have remained firm at 36 to 38 cents per gallon for 90 per cent test and two cents higher for the chemically pure grade.

Blacks. Curtailment of tire production has markedly reduced the demand for carbon black.

Carbon Bisulphide. Supplies have been moderate and the price firm at 8 to 9 cents per pound.

Carbon Tetrachloride. The market is described as inactive with prices declining. Spot 13½ cents.

Dry Colors. Market featured by general inactivity.

Litharge. Prices have fallen with a decline in the lead market.

Lithopone. The demand has been mostly confined to the paint trade. Tire makers are not in the market at present.

Sublimed Lead. This lead product has declined in sympathy with the lowering in price of pig lead.

Sulphur. Prices are firm and demand moderate.

Whiting. Stocks of chalk whiting are low, due to shortage of chalk importations. Rubber makers, however, are dependent more on by-product whiting than on chalk whiting and consequently are not inconvenienced.

Zinc Oxide. Falling off in demand due to the greatly reduced demands from the automobile tire industry has caused a slump in the production of zinc oxide.

NEW YORK QUOTATIONS

November 24, 1920

Prices subject to change without notice

ACCELERATORS, ORGANIC				
Accelerene (New York)	*lb.*	$4.75	@	
Accelemat	*lb.*	.60	@	.65
Aldehyde ammonia crystals	*lb.*	1.75	@	1.85
Aniline oil	*lb.*	.25½	@	.30
Excellerex	*lb.*	.70	@	
Hexamethylene tetramine (powdered)	*lb.*	1.60	@	1.70
N. C. C.	*lb.*	*.50	@	
No. 999	*lb.*	$0.17½	@	
Paraphenylenediamine	*lb.*	*2.60	@	2.70
Thiocarbanilide	*lb.*	.55	@	.60
Velosan	*lb.*	*3.70	@	
Vul-Ko-Cene	*lb.*	.35	@	
Virol	*lb.*	.80	@	
ACCELERATORS, INORGANIC				
Lead, dry red (bbls.)	*lb.*	.11	@	.11¼
sublimed blue (bbls.)	*lb.*	.09¾	@	
sublimed white (bbls.)	*lb.*	.09¾	@	
white, basic carbonate (bbls.)	*lb.*	.09¼	@	.09½
Lime, flour	*lb.*	.03	@	
Litharge, domestic	*lb.*	.11¾	@	
imported	*lb.*	.17	@	
sublimed	*lb.*	.12	@	
Magnesium, carbonate, light	*lb.*	.10½	@	.15
calcined extra light	*lb.*	.60	@	
calcined light	*lb.*	.30	@	.60
calcined medium light	*lb.*	.25	@	
calcined heavy	*lb.*	.07	@	.09
calcined commercial (magnesite)	*lb.*	.05	@	
oxide, extra light	*lb.*	.60	@	
light technical	*lb.*	.35	@	
light, imported	*lb.*	.55	@	
imported	*lb.*	.55	@	
ACIDS				
Acetic, 28 per cent	*lb.*	.10½	@	
glacial, 99 per cent	*lb.*	.22¾	@	
Aqua fortis	*cwt.*	7.40	@	
Cresylic (97% straw color) (bbl.)	*gal.*	1.20	@	1.30
(95% dark) (bbl.)	*gal.*	1.10	@	1.20
Muriatic, 20 degrees	*lb.*	.06	@	
Nitric, 36 degrees	*cwt.*	7.28	@	
Sulphuric, 66 degrees	*lb.*	.03½	@	
ALKALIES				
Caustic soda, 76 per cent (bbls.)	*lb.*	.05½	@	
Soda ash (bbls.)	*lb.*	.05	@	
COLORS				
Black:				
Bone, powdered	*lb.*	.06	@	
granulated	*lb.*	.11	@	.15
Carbon black (sacks, factory)	*lb.*	.12	@	.20
pressed	*lb.*	.18	@	
Dipped goods	*lb.*	1.50	@	
Drop	*lb.*	.07½	@	.18
Ivory black	*lb.*	.18	@	.30
Lampblack	*lb.*	.18	@	.45
Oil soluble aniline	*lb.*	1.00	@	
Rubber black	*lb.*	.08½	@	
Rubber makers' black	*lb.*	.20	@	.30
Blue:				
Cobalt	*lb.*	.30	@	.35
Dipped goods	*lb.*	1.50	@	
Prussian	*lb.*	.90	@	
Ultramarine	*lb.*	.18	@	.40
Rubber makers' blue	*lb.*	3.50	@	
Brown:				
Iron oxide	*lb.*	.04½	@	.06½
Sienna, Italian, raw and burnt	*lb.*	.06½	@	.15
Umber, Turkey, raw and burnt	*lb.*	.05½	@	.09½
Vandyke	*lb.*	.06	@	.08
Maroon oxide	*lb.*	.14	@	.15
Green:				
Chrome, light	*lb.*	.42	@	.70
medium	*lb.*	.42	@	.70
dark	*lb.*	.50	@	.70
commercial	*lb.*	.07	@	.15
tile	*lb.*	.15	@	.20
Dipped goods	*lb.*	1.50	@	
Oxide T. R.	*lb.*	.85	@	
Oxide of chromium (casks)	*lb.*	1.25	@	
Rubber makers' green	*lb.*	3.50	@	
Red:				
Antimony, crimson, sulphuret of (casks)	*lb.*	.45	@	.49
crimson, "Mephisto" (casks)	*lb.*	.60	@	
crimson, "R. M. P."	*lb.*	.58	@	
Antimony, golden sulphuret of (casks)	*lb.*	.29	@	.30
golden, "Mephisto" (casks)	*lb.*	.35	@	
golden, "R. M. P."	*lb.*	.30	@	
vermilion sulphuret	*lb.*	.60	@	
red sulphuret	*lb.*	.25	@	.27
Arsenic, red sulphide	*lb.*	.14	@	.15
Dipped goods, red	*lb.*	1.75	@	
purple	*lb*	1.75	@	
Indian	*lb.*	.14	@	.15
Para toner	*lb.*	2.00	@	
Red excelsior	*lb.*	*.19	@	.22
Toluidine toner	*lb.*	4.25	@	

Iron oxide, reduced grades	lb.	$0.05½ @ $0.12
pure bright	lb.	.15 @ .17
Spanish neutral	lb.	.05½ @ .06
Venetian	lb.	.03 @ .09
Oil soluble aniline, red	lb.	2.00 @
orange	lb.	1.65 @
Oximony	lb.	.18 @
Vermilion, American	lb.	.25 @ .30
permanent	lb.	.37 @
English quicksilver	lb.	1.45 @ 1.55
Rubber makers' red	lb.	3.50 @ 4.00
purple	lb.	2.50 @
White:		
Albalith	lb.	.07¾ @ .08¼
Aluminum bronze, extra brilliant	lb.	.65 @
extra fine	lb.	.75 @
Lithopone, Beckton white	lb.	.08½ @ .08¾
Lithopone	lb.	.07¾ @ .08¼
Ponolith (carloads, factory)	lb.	@
Rubber-makers' white	lb.	@
Zinc oxide. American (factory):		C. L. L. C. L.
Special	lb.	.10 @ .10½
XX red	lb.	.09½ @ .10¼
French process (factory):		
White seal	lb.	.13 @ .13¼
Green seal	lb.	.11¾ @ .12¼
Red seal	lb.	.10¾ @ .13
White seal, imported	lb.	1.17 @
Azo factory:		
ZZZ (lead free)	lb.	.09½ @ .10
ZZ (under 5% leaded)	lb.	.08½ @ .09
Z (8-10% leaded)	lb.	.35 @
Yellow:		
Cadmium, sulphide, yellow, light, orange	lb.	2.10 @
red	lb.	2.10 @
Chrome, light and medium	lb.	.35 @
Dipped goods	lb.	1.75 @
Ochre, domestic	lb.	.02½ @ .05½
imported	lb.	.04¼ @ .08
Rubber makers'	lb.	3.50 @
Zinc chromate	lb.	.50 @
Oil soluble aniline	lb.	1.75 @

COMPOUNDING INGREDIENTS

Aluminum flake (carload)	ton	45.00 @
hydrate	lb.	.25 @
silicate	ton	28.00 @ 40.00
Ammonium carbonate (powdered)	lb.	.17¾ @
Asbestine (carloads)	ton	30.00 @ 40.00
Barium, carbonate, precipitated	ton	100.00 @
dust	ton	110.00 @
Barytes, pure white (f. o. b. works)	ton	40.00 @
off color	ton	30.00 @
uniform floated	ton	28.00 @
German "Cream"	ton	50.00 @
Basofor	lb.	06 @
Blanc fixe (dry, bbls.)	lb.	.06 @ .06¼
Bone ash	lb.	.12 @
Carrara filler	lb.	.02 @
Chalk, precipitated, extra light	lb.	.05 @ .05½
heavy	lb.	.04 @ .04½
China clay, Dixie	ton	22.00 @
Blue Ridge	ton	22.00 @
domestic	ton	10.00 @ 20.00
imported	ton	40.00 @
Cotton linters, clean mill run, f. o. b. factory	lb.	.02 @ .03
Fossil flour (powdered)	ton	60.00 @
(bolted)	ton	65.00 @
Diatomite	lb.	.03 @
Glue, high grade	lb.	.35 @ .45
medium	lb.	.30 @ .35
low grade	lb.	.20 @ .25
Graphite, flake (400-pound bbl.)	lb.	.10 @ .25
amorphous	lb.	.04 @ .08
Ground glass FF. (bbls.)	lb.	.05 @
Infusorial earth (powdered)	ton	60.00 @
(bolted)	ton	65.00 @
Liquid rubber	lb.	.18 @
Mica, powdered	lb.	.15 @
Pumice stone, powdered (bbl.)	lb.	.04 @ .06
Rotten stone, powdered	lb.	.02½ @ .04½
Rubber paste	lb.	*.19 @ .22
Silica, gold bond	ton	32.50 @
silver bond	ton	22.50 @
Soap bark	lb.	.24 @
Soapstone, powdered gray (carload)	ton	12.00 @
Starch, powdered corn	cwt.	3.18 @
Talc, powdered soapstone	ton	18.00 @ 25.00
Terra blanche	ton	24.00 @ 32.00
Tripoli earth, air-floated, cream or rose (factory)	ton	50.00 @
white (factory)	ton	52.50 @
Tyre-lith	ton	110.00 @
Whiting, Alba (carloads)	cwt.	.80 @ .90
Columbia	cwt.	.95 @
commercial	ton	30.00 @
Danish	ton	22.00 @
English cliffstone	ton	42.50 @
gilders	ton	40.00 @
Paris, white, American	ton	27.00 @
Quaker	ton	13.00 @ 15.00
Super	ton	30.00 @ 32.50
Wood pulp, imported	lb.	.03¾ @
XXX	ton	60.00 @
X	ton	60.00 @
Wood flour, American	ton	50.00 @

MINERAL RUBBER

Elateron (c. l. factory)	ton	55.00 @
(l. c. l. factory)	ton	58.00 @
Gilsonite	ton	75.00 @
Genasco (c. l. factory)	ton	69.00 @
(l. c. l. factory)	ton	71.00 @
Hard hydrocarbon	ton	$42.00 @
Soft hydrocarbon	ton	40.00 @
K-X	ton	@
K. M. R.	ton	@
M. R. X	ton	@
Pioneer (c. l. factory)	ton	60.00 @
(l. c. l. factory)	ton	65.00 @
Raven M. R.	ton	60.00 @ 65.00
Refined Elaterite	ton	@
Richmond (car load)	ton	75.00 @
No. 64 (car load)	ton	45.00 @
318/320 M. P. hydrocarbon (c. l. factory)	ton	60.00 @
(l. c. l. factory)	ton	62.50 @
300/310 M. P. hydrocarbon (c. l. factory)	ton	45.00 @
(l. c. l. factory)	ton	47.50 @
Robertson, M. R. pulverized (c. l. factory)	ton	95.00 @
M. R. pulverized (l. c. l. factory)	ton	97.50 @
M. R. (c. l. factory)	ton	72.50 @
M. R. (l. c. l. factory)	ton	75.00 @
Rubrax (factory)	ton	50.00 @
Synpro, granulated	ton	97.50 @
Walpole rubber flux (factory)	lb.	@

OILS

Avoilas compound	lb.	@
Castor, No. 1, U. S. P.	lb.	.15 @ .17
No. 3, U. S. P.	lb.	.14 @
Corn	lb.	.13 @ .17¼
Corn, refined Argo	cwt.	*17.25 @
Cotton	lb.	.11 @
Glycerine (98 per cent)	lb.	.29 @
Linseed, raw (carloads)	gal.	1.00 @
Linseed compound	gal.	@
Palmoline	lb.	.14 @ .16
Palm niger	lb.	.11 @
Palm "Lagos"	lb.	.11½ @
Palm special	lb.	.17 @
Peanut	lb.	.14 @
Petrolatum	lb.	.08 @ .11
Petrolatum, sticky	lb.	.10 @ .14
Petroleum grease	lb.	.07½ @ .09
Pine, steam distilled	gal.	1.50 @ 1.65
Rapeseed, refined	lb.	.19 @
blown	lb.	.20 @
Rosin	gal.	.50 @ .75
Synpro	gal.	.59 @ .90
Soya bean	lb.	.11½ @
Tar	gal.	.37 @ .41

RESINS AND PITCHES

Balsam, fir	gal.	2.00 @
Cantella gum	lb.	.50 @
Cumar resin, hard	lb.	.12 @ .16
soft	lb.	.09 @ .13
Tar, retort	bbl.	15.50 @ 15.75
kiln	bbl.	15.00 @ 15.75
Pitch, Burgundy	lb.	.07 @
coal tar	lb.	.01½ @
pine tar	lb.	.04 @
ponto	lb.	.14 @
Rosin, K	bbl.	11.90 @
strained	bbl.	*12.90 @
Shellac, fine orange	lb.	1.05 @

SOLVENTS

Acetone (98.99 per cent drums)	lb.	.20 @
methyl (drums)	gal.	*1.50 @
Benzol (water white, 90%)	gal.	.36 @ .38
Beta-naphthol	lb.	.47 @ .48
Carbon bisulphide (drums)	lb.	.08½ @ .09½
tetrachloride (drums)	lb.	.13 @ .14
Naphtha, motor gasoline (steel bbls.)	gal.	.31 @
73 @ 76 degrees (steel bbls.)	gal.	.41 @
70 @ 72 (steel bbls.)	gal.	.39 @
68 @ 70 degrees (steel bbls.)	gal.	.38 @
V. M. & P. (steel bbls.)	gal.	.30 @
solvent	gal.	.30 @
Toluol, pure	gal.	.35 @ .40½
Turpentine, spirits	gal.	1.03 @
wood	gal.	.98 @
Osmaco reducer	gal.	*.65 @
Xylol, pure	gal.	.45 @ .50½
commercial	gal.	.30 @ .35½

SUBSTITUTES

Black	lb.	.10 @ .18½
White	lb.	.11 @ .21½
Brown	lb.	.14 @ .20½
Brown factice	lb.	.08¾ @ .18
White factice	lb.	.10 @ .20
Paragol, soft and medium (carloads)	cwt.	15.81 @
hard	cwt.	15.81 @

VULCANIZING INGREDIENTS

Lead, black hyposulphite (Black Hypo)	lb.	@
Orange mineral, domestic	lb.	.15¼ @
Sulphur chloride (jugs)	lb.	.20 @
(drums)	lb.	.08 @
Sulphur, flour, Brooklyn brand (carloads)	cwt.	2.90 @ 3.15
Bergenport, soft (c. l. factory)	cwt.	3.15 @
Bergenport, soft (l. c. l. factory)	cwt.	3.45 @
superfine (carloads, factory)	cwt.	@

(See also Colors—Antimony.)

WAXES

Wax, beeswax, white	lb.	.52 @ .54
ceresin, white	lb.	.16 @
carnauba	lb.	.23 @ .38
ozokerite, black	lb.	.45 @ .50
green	lb.	*.65 @
Montan	lb.	*.20 @
paraffine, 115° m. p.	lb.	.12½ @
120° m. p.	lb.	.12¾ @
125° m. p.	lb.	.13½ @
130° m. p.	lb.	.14½ @
Sweet wax	lb.	.15 @

* Nominal.

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The New Year

AGAIN comes a New Year with its opportunities, ambitions and promise. Our good wishes would further them all. Looking forward, the coming year bids fair to be the most notable in accomplishment that the rubber industry has ever enjoyed.

ACCURATE TIRE STATISTICS IMPERATIVE

One question which profoundly concerns all tire manufacturers, and urgently seeks solution, is: How may the industry fairly determine what is over-production, and how shall it settle with reasonable certainty what is underconsumption? In other words, is it possible for the leaders by acting in concert to strike the golden mean, and to so stabilize the industry that tire making will easily, elastically, and in a sense automatically adapt itself to the ever-varying conditions of supply and demand?

One of the most practical steps taken thus far in the direction of reaching this consummation is that of assembling statistics of the production, shipment, and inventory of pneumatic tires, tubes and solid tires, as well as the amount in pounds of cotton fabric and crude rubber consumed in such production each month. In the opinion of the Tire Manufacturers' Division of The Rubber Association of America, which has begun to collect such valuable data from its members, this information will be of vital benefit to every tire manufacturing concern in estimating how the demand for tires already made and unsold will be taken care of, and will go a long way in guiding it toward normal production of tires at any time.

Inasmuch as other great industries reap a considerable advantage from similar statistical service, why should not rubber manufacturers, methodical enough in the conduct of their own separate affairs, pursue a like course, and thereby save themselves many missteps and much lost motion?

Most tire manufacturers will be found very willing to supply all the desired facts, for they are assured that the utmost pains will be taken to prevent the misuse of this confidential information. Each one will be given a code number to insure secrecy, no names whatever being used in the reports. The data supplied will be so well guarded that even the smallest manufacturer need have no timidity about supplying his share. In this way an aggregate will be obtained that will be of great value to the trade. Indeed, such an important undertaking is only possible when conducted under the auspices of a great organization which has no "ax to grind" and no ulterior purpose to serve, but seeks only the utmost welfare for every division of the rubber industry.

SEASONAL RUBBER GOODS

The very excellent brief submitted to the Federal Trade Commission by George H. Mayo, John Kearns and Charles Neave, for The Rubber Association of America on price protection for seasonable rubber goods, specifically footwear and tires, is an exceedingly able and convincing document.

As one reviews the world's rubber products, the arguments in this brief apply to many goods other than the two lines mentioned. For example, in the mechanical rubber goods line, there are garden hose, jar rings, thresher belts, and a great variety of lesser rubber appliances that go toward agricultural machinery and that enter into the canning and packing industries.

In rubber clothing, there are also surface coats, mackintoshes, camping blankets, auto tops, bathing caps and suits, and a variety of lesser articles.

When one turns to sporting goods, there are golf balls, football bladders, and a vast variety of lesser sporting articles.

The insulated wire industry is also interested through the wiring used in automobiles. So, also, the hard rubber industry, in the great volume of battery jars that are made for automobiles.

With still finer analysis, one might suggest that hot-water bottles, inasmuch as they are used for foot warming, are seasonal goods.

In other words, the vast majority of rubber goods, probably 90 per cent, go directly into this category, which is why the brief has such sweeping application, and why the trade should congratulate itself that it was so well prepared.

WILL $3 RUBBER COME AGAIN?

The long-impending restriction in rubber production by the owners of the great plantations of the Far East is an accomplished fact, the proprietors of fully 80 per cent of the 3,000,000 planted acreage having accepted the recommendation of the council of the Rubber Growers' Association, of London, to curtail by 25 per cent the estimated normal monthly output, either by leaving untouched one-quarter of the tapping area or by tapping the trees in the entire tapping area only on alternate days. Planters are free to choose either method to limit the total output. The "Covenant of the League" provides that the repression period shall extend from November 1, 1920, to January 1, 1922; but the time and terms of the restriction may be modified by mutual agreement whenever improved economic conditions, such as a considerable reduction in excess stocks, warrant such action.

Rubber planters feel amply justified in taking this course toward stabilizing the market for raw gum, which has been severely jolted by a combination of adverse conditions, among them being drastic credit regulations by leading banking institutions of the world to check inflation, labor troubles, demoralization of European trade, and the chaotic condition of the world's exchanges. All this came instead of the predicted post-war boom in rubber, and to mock the predictions of the too optimistic. Yet even the most conservative planters never dreamed of the price dropping to 10 pence (normal exchange), as it did recently in the London market, and which figure, while not below cost of production, does not show much profit.

Naturally, students of the rubber industry cannot help but speculate on the probable outcome of the decision of the plantation owners to curtail their output. Will not history repeat itself in this case as it has in so many others? Very likely a diminished production of crude rubber will raise the price before long in accord with the workings of the law of supply and demand, but at best this benefit can only be temporary. Attracted by the enhancing prices, and willing to take a chance where the profits are promising, enterprising capitalists are likely to go heavily into raising rubber, and there is still a vast available territory to be exploited. Hence, with much crude gum pressing for sale, the inevitable will happen, just as it did following the excessive production on the advent of the tire industry, and prices will drop sharply.

Rubber may some day again approximate the $3 mark; but concerted curbing of production will not bring it about, nor will artificial restriction of sales do it, as the woeful collapse of famous rubber "corners" has well proved. Nor is another sudden and extraordinary demand for rubber, with swift price enhancement, such as came with the inception of the tire industry, at present in sight. Wherein then lies the planter's opportunity to get higher prices with a ready market? He may reach such a goal by producing a type of rubber better than that of his competitors, always homogeneous and up to sample; by accepting the low prices, but producing a good grade of gum at reduced cost with improved methods; or by finding some wholly new use for rubber on a considerable and increasing scale.

TIRE VALUES VASTLY INCREASED

Estimated in terms of miles per dollar of cost, the rubber tire of today is cheaper by 50 per cent than the tire of ten years ago, which is but another way of saying that the tire buyer gets more for his money now than ever before. Indeed, no other manufactured commodity in America has undergone as great an improvement in quality and workmanship as the pneumatic tire. Five years ago the maximum mileage guaranty was 3,500, and that was on the more expensive tires. Today, even on low-priced tires a 7,000-mile guaranty is commonly given. Yet, while tires have gradually declined in price, tire fabrics have, in the past ten years, fairly quadrupled in value. Crude rubber took an opposite course, falling in 1920 to a quarter of the 1910 price. The leading tire makers, however, are constantly experimenting, and are doing their utmost to build more miles into their tires so that any loss to buyers will be relative rather than absolute.

RUBBER AND WHISKEY

A correspondent to the *Financial Times*, London, pointing to the low price of crude rubber, says: "In 1913 a pound of rubber would pay for a bottle of whiskey (a quart); today it would take nine pounds of rubber to buy a bottle of whiskey." A very clever presentment but not particularly valuable as an asset in comparative statistics, particularly in the United States, where whiskey and rubber conditions run thus: In 1913 a pound of rubber would buy a bottle of whiskey (a pint). Today the Bootleggers' Union would exact twenty-two pounds of rubber for a pint of whiskey, and both buyer and seller would be taking chances at that.

What is now required is courage and respect for fundamental economic principles. Artificial palliatives to obviate the difficulties of adjustment—particularly proposals involving further inflation and cheapening of credit—must be avoided.

A Glossary of Words and Terms Used in the Rubber Industry

By Henry C. Pearson

That a great industry, the most individual in existence, should create its own technical terms and constantly coin new ones is inevitable. That such terms should demand classification, definition and standardization is evident. Up to the present time, however, the exact definition of words, terms, and phrases in common use in rubber manufacture has been lacking. The few attempts that have been made towards such definitions have perhaps pointed the way, but were abandoned before completion.

With a certain reluctance, but in response to many requests, the Editor of The India Rubber World has assumed the task of rubber dictionary making. The purpose of publishing the definitions in instalments in the pages of this magazine is to invite criticism, additions and suggestions. In other words, all who are interested are invited to become collaborators in this important work. It should be noted that the plan is not to explain words with encyclopedic completeness, but rather to furnish brief and accurate descriptive definitions that will perhaps in time become standard.

Words and terms in general use will be given, and certain obsolete words as well, provided they have an explanatory or historic value. It is planned to cover in this work not only words relating to crude rubber, but those used in the various lines of manufacture into which the rubber industry is divided.

India Rubber ($C_{10}H_{16}$). An elastic gum produced—

(a) By the coagulation of the milk or latex of various trees, vines, shrubs and plants.
(b) By extraction from the tissues of certain non-lactiferous vines and shrubs.
(c) Chemically from various bases, as isoprene.

Called india rubber (indian rubber) by Priestley in 1772, because pieces of the gum from India were found excellent for rubbing out pencil marks.

India rubber is called in French, cacoutchouc; in Italian, cautschouc; in German, kautschuk or gummi; in Spanish, caucho; in Portuguese, xirringa or borracha; in Latin, gummi elasticum.

There are about a hundred species of plants belonging to numerous families from which india rubber is obtained commercially. In most of these rubber is found in the milk or latex (numerous globules suspended in a watery fluid) occurring in small tubes located chiefly in the bark. This latex is obtained by cutting incisions in the bark. The change from the liquid to the solid caoutchouc, called coagulation, is without much alteration of the composition other than the elimination of water. It is accomplished mainly by smoking, by acids, by alkaline or astringent plant juices or by air drying. Rubber from non-lactiferous plants is extracted by simple mechanical means or by the destruction of the wood fiber by chemicals.

SYNONYMS AND GENERAL TERMS

Rubber. A common term for india rubber, but lacking in exactness as the same word has various other meanings.

African Rubber. Crude rubber from the continent of Africa and the island of Madagascar.

Allied Gums. See Pseudo rubbers.

American Rubber. Crude rubber produced in any part of North, South or Central America or the islands adjacent thereto.

Artificial Rubber. Applied strictly, refers to synthetic rubber, Is widely used, however, in describing products termed rubber substitutes.

Asiatic Rubber. (East Indian Rubber.) Crude rubber from Malaya, India, the Netherland East Indies, Borneo and the Philippine Islands.

Australian Rubber. Wild crude rubber from New Caledonia and Oceanica.

Blended Rubber. A term used by Huber to designate rubber made from a mixture of latices as *Hevea* and *Sapium*. In manufacturers' parlance, a mixture of different grades by massing on heated rolls.

Caoutchouc. Probably derived from the South American Indian word cahuca, generally used by the French and to a degree by the English writers.

Central American Rubber. Crude rubber from the *Castilloa* (not including caucho), produced in Mexico, Central America, and some of the northern states of South America.

Ceylon Rubber. A term formerly applied to plantation rubber of Asiatic origin. Now confined to the rubber produced on the Island of Ceylon.

Coagulated Rubber. Rubber derived from the milk or latex of plants.

Commercial Rubber. See Crude Rubber.

Crude Rubber. A trade term for all grades of uncompounded rubber.

Deresinated Rubber. In highly resinous rubbers the resin and the rubber are separated, the two crude products being marketed, one as rubber resin, the other as deresinated rubber.

Dry Rubber. A selling term that means comparatively dry, and refers to old, wild rubber.

East India Rubber. See Asiatic Rubber.

Elastic Resin. A common term for rubber among the early investigators.

Extracted Rubber. Rubber extracted from the bark or tissues of plants, not latex producers.

Gum Elastic. An excellent descriptive name used by Charles Goodyear.

Indian Rubber. See India Rubber.

Java Rubber. At one time the term under which East Indian rubber from the *Ficus elastica* was generally known—also called Assam rubber.

Lard Rubber. An obsolete term for Central American rubber.

Liquid Rubber. Hancock's designation of rubber latex. Also used as descriptive of certain fluxes used in compounding.

Natural Rubber. The product of trees, vines, shrubs, and plants only.

New Rubber. Rubber that has been recently coagulated.

Old Rubber. Rubber that has been long in storage or transit. Used also to designate vulcanized scrap.

Plantation Rubber. Rubber produced by cultivation, chiefly from the *Hevea* species, but also includes the product of planted *Castilloa, Manihot, Ficus, Funtumia,* etc.

Polyphrene. A descriptive name suggested by the late Dr. Carl Otto Weber.

Pseudo Rubbers. (Allied gums.) Resinous gums that contain neither rubber nor gutta percha, but are used in compounding.

Pure Gum. See Pure Rubber.

Pure Rubber. (Pure gum.) Commercially; rubber that contains no admixtures other than ingredients anecessary for vulcanization or for solution and vulcanization. Chemically; rubber from which all moisture, resins, proteids, etc., have been removed.

Raw Rubber. See Crude Rubber.

Resin Rubber. An obsolete term for jelutong or Pontianak.

Rubber Latex. (Rubber milk.) A watery fluid varying in color from white to amber, contained in the bark, leaves and to a degree in the cellular tissue of plants. In density it varies from that of a thin fluid like skim milk to thick cream. Its specific gravity varies from 1.02 to 1.41. A typical analysis of *Hevea* latex is: water 56 per cent; albuminoid extracts, etc., 12 per cent; india rubber 32 per cent.

Rubber Resin. See Deresinated rubber.

South American Rubber. Crude rubber produced in South America. The name was first applied to Pará rubber, but later extended to embrace caucho, Ceará and mangabeira sorts.

Synthetic Rubber. An artificial rubber or rubber-like substance produced from isoprene, homologous hydrocarbons, or the like.

Washed Rubber. Grades of crude rubber wholly or partially cleansed by washing with water.

West Indian Rubber. See Central American Rubber.

West Indian Rubber. *Castilloa* rubber from Central or South America, shipped from ports in the West Indies.

Wild Rubber. A commercial term descriptive of rubber collected from uncultivated plants by native methods. The product is received in a variety of shapes, is not uniform and often contains bark, sand and adulterants.

The forms in which wild rubber comes to market are:

Balls. Irregular, round or oval shaped masses of rubber, running from half an inch in diameter to two feet or more. Small flattened balls are also called buttons. Balls from half an inch to two inches in diameter are often designated as marbles. Large balls, as smoked-cured Pará are known as pelles, biscuits, hams. Large balls of air-cured rubber, as coarse Pará, are called heads, or negro heads.

Biscuits. Another name for pelles, also applied to oblong cakes cut from lumps.

Bottles. Fine or medium Pará made up in bottle-shaped pelles. Not practiced at present.

Buttons. Balls of a small size, slightly flattened.

Cakes. Irregularly, round, flat disks.

Clusters. Small balls adhering in masses of varying size and shape.

Flakes. Thin irregular sheets.

Heads. Large balls made by compressing masses of rubber together, forming an adhesive mass. (Negro heads.)

Lumps. Large pieces, varying in size and of irregular shapes, weighing from 20 to 100 pounds. Before shipment, lumps are often cut up into buttons and strips.

Marbles. Similar to balls, but of a diminutive size.

Niggers. Balls which have been kneaded into different sized masses so that the original shape has disappeared.

Nuts. Another name for thimbles.

Oysters. Irregular, thin sheets hanging together like the two halves of an oyster.

Paste. Masses of soft, semi-fluid rubber.

Sausage. Rubber which has been rolled or wound into finger or sausage shapes.

Scraps. Small pieces of rubber of a variety of shapes, usually lumped together into large balls.

Sheets. Thin, flat, rectangular plates.

Slabs. Very thick, rectangular sheets.

Spindles. Threads of rubber which have been wound about a stick which is later removed by cutting open the mass.

Strips. Long, narrow thongs of rubber of varying length and thickness.

Thimbles. Cubes about an inch for each dimension.

Tongues. Small, oval sheets.

Twists. Threads of rubber wound into balls.

To be continued

The Manufacture of Balata Belting

Balata belting was first manufactured by R. & J. Dick, of Glasgow, Scotland, about 1884 and patented by them in the following year. Since that time it has been demonstrated to be of special value under certain exacting conditions of service in power transmission.

The foundation of balata belting is heavy cotton duck impregnated with balata gum and plied together. The processes of working balata have some resemblance to those used in rubber manufacture, the chief difference perhaps being the omission of vulcanization, for balata is not vulcanizable but, like gutta percha, is plastic at the temperature of boiling water and at ordinary temperatures is firm and possessed of great tensile strength but not much elasticity. These characteristics necessitate special departures in the methods of working balata.

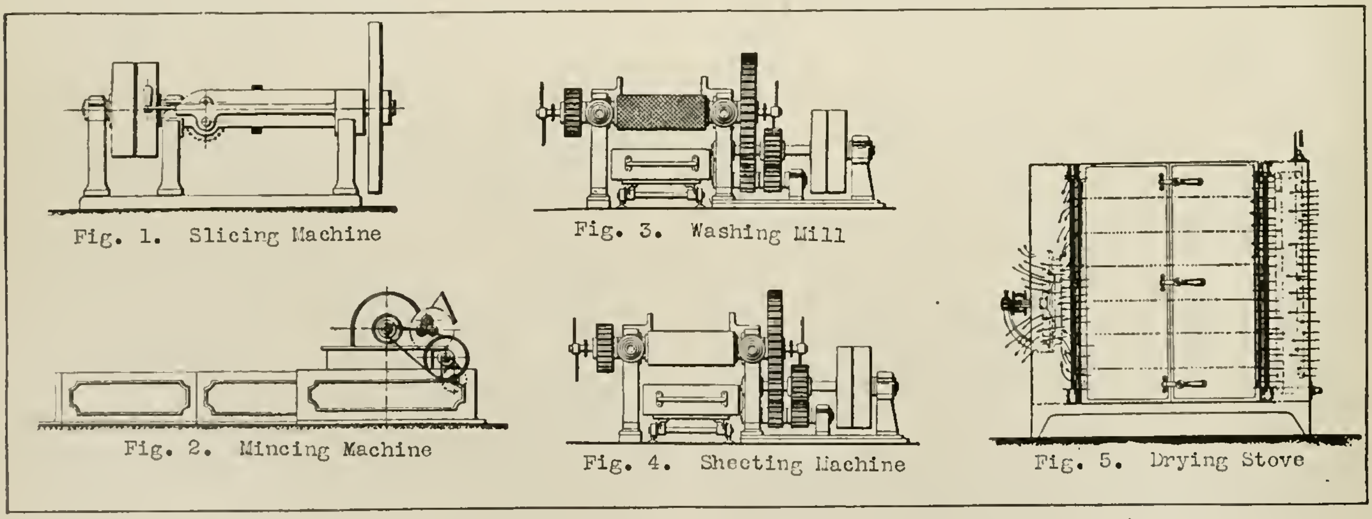

Fig. 1. Slicing Machine

Fig. 2. Mincing Machine

Fig. 3. Washing Mill

Fig. 4. Sheeting Machine

Fig. 5. Drying Stove

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PREPARATION OF BELTING DUCK

The duck employed in balata belting may be of the weights used in ordinary rubber belting, namely, from 28 to 32 ounces per square yard. Before treatment with balata composition, however, it is necessary that all oily matters and sizing contained in it be wholly removed. For this purpose it is placed in a dyer's vat with a solution of soda crystals and boiled a couple of hours by the injection of steam. To facilitate the extraction of foreign matter the duck is reeled through the bath by a hand-operated reel mounted on the vat.

On this reel it is allowed to drip previous to subsequent drying in a dry loft and final drying on a triple-cylinder power dryer, from which it is delivered bone dry, ready for impregnation with balata.

PREPARATION OF BALATA

Balata is a non-vulcanizable gum of the gutta variety derived from the "bully" or "bullet" tree, *Mimusops balata.* It is found in several South American countries, particularly in the Guianas and Venezuela. Crude balata as received comes in the form of blocks or sheets. Both forms contain such impurities as wood, sand and moisture which must be removed by washing. Balata sheets contain 10 to 15 per cent of moisture and the blocks from 30 to 35 per cent. The removal of the impurities is effected by a method resembling that used in cleaning wild rubber.

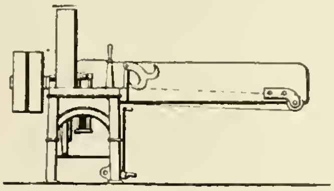

Fig. 6. Strip Cutting Machine

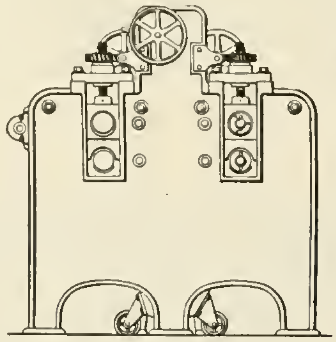

Fig. 8. Impregnating Machine

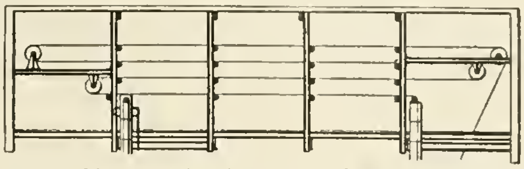

Fig. 10. Overhead Open Drying and Cooling Apparatus

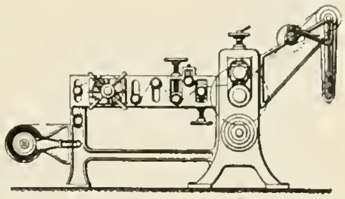

Fig. 11. Cloth Slitting Machine

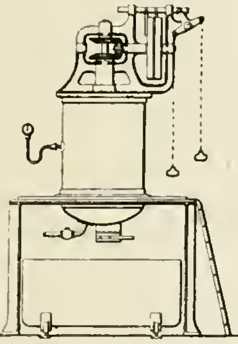

Fig. 7. Solution Mixing Machine

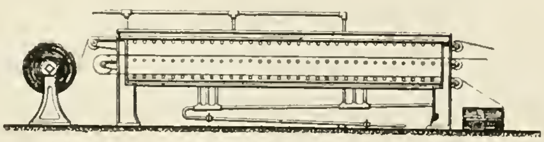

Fig. 9. Horizontal Drying Machine

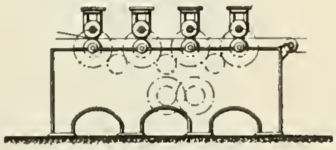

Fig. 12. Rolling Machine

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The stiff crude gum is first put through a slicing machine, Fig. 1, which reduces it to convenient form for the next operation of softening it in tanks of boiling water heated by steam. Under this treatment the gum becomes very soft and plastic, permitting the inclosed foreign matters to be readily brought to the surface and removed by the subsequent cleaning operations.

The first of these is washing in a specially adapted machine, substantially in effect a Hollander or so-called paper engine, Fig. 2. This consists of a large tank with a central vertical portion and at the side, on one end, a heavy revolving cylinder provided with knife edges working shear-like with a fixed cutting edge under water, past which the softened balata passes with the current of water set in motion by the wheel mentioned

The balata is mechanically fed to the revolving cutters of this machine by a special roller feed and after cutting it is delivered into the tank below, where it is subjected to agitation in warm water, so that the wood and other impurities are separated. The light-gravity material floats away on the surface while the sand and earth sink to the bottom.

The partly cleaned gum is taken next to a washing mill, Fig. 3, resembling that commonly used for crude rubber. It differs by having under it instead of a screen or mill pan a portable tank-like pan mounted on a truck that runs on a track. This affords a bath of warm water for retaining the balata in a workable state of plasticity. The washer mill rolls are corrugated and have a differential speed for tearing apart the gum, while an overhead supply of water descends and washes out the impurities brought to the surface by the milling.

Having been thoroughly freed of foreign matters in the washing mill the balata passes next to a sheeting machine, Fig. 4, with rolls of equal speed, in which it is rolled out into thin sheets preparatory to the next operation. In the illustration it will be seen that the sheeting mill, like the washer, is provided with a pan mounted on rails, serving the same purpose.

Before compounding and making the solution it is essential, as in rubber working, that all moisture be eliminated from the gum. The clean sheets are, therefore, taken from the sheeter direct to an oven or drying stove, Fig. 5. This is a chamber provided with shelving to receive the stock, and operates by a fan-actuated system of ventilation in which air at suitable temperature is drawn in at one side and expelled moisture-laden from the other. The thoroughly dry sheets are prepared for solution and compounding by passing through the strip-cutting machine, Fig. 6, in which they are reduced to thin strips to render the gum more readily soluble.

The solution-mixing machine, Fig. 7, consists of a vertical steam-jacketed power churn. The clean, dry, thin balata strips are placed in the mixer with the solvent and fillers, which may include such materials as regenerated balata, oxides, carbonates, resins and coloring matters. In the mixer the process of solution is effected by paddles rotating in opposite directions, while the materials are maintained at about 90 degrees F. by steam circulation in the outer jacket. When ready for use the charge is received in an open tank car placed under the mixer which is discharged through a quick-opening gate-valve.

At this point in the manufacture of balata belting comes the process of impregnation of the duck employed.

IMPREGNATION BY SOLUTION

English and American practices differ from the French in the method used for applying the balata to the fabric. The English and American processes deal directly with the compounded solution from the mixer in a machine of the type illustrated in Fig. 8, which shows an end view. The arrangement consists of two pairs of pressure rollers, through one pair of which the dry duck to be impregnated is passed down into the prepared balata solution contained in a V-shaped truck tank run under the machine. The entire structure of the duck is thus filled with the gum preparation and the excess is removed by the second pair of pressure rollers and returns to the tank.

The solvent which saturates the impregnated fabric is ex-

pelled by the horizontal drying apparatus, Fig. 9, which is essentially a horizontal multiple-deck steam-pipe dryer, through which the fabric is run and the solvent expelled.

Final thorough drying and cooling require that the coated fabric be passed also through a vertical dryer and lastly on an overhead, open drying and cooling apparatus, Fig. 10. From the latter apparatus the coated duck issues ready for the belting making-up processes.

IMPREGNATION BY SPREADING MACHINE

The French system of impregnating duck with balata is by the use of the ordinary spreader. As in the case of spreading rubber composition, this method involves a preparation in solvents of the pure or compounded gum to a fairly thick consistency which admits of even distribution on the warm duck as the latter passes through the plastic mass between the roller and spreading knife. As in ordinary spreading of rubber stock, the solvent is eliminated from the fabric by evaporation as the goods pass over a drying table warmed by a steam heating system.

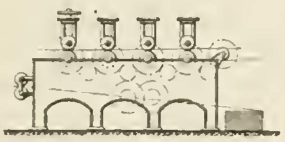
Fig. 13. Rolling and Marking Machine

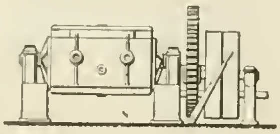
Fig. 14. Dry Masticating Machine

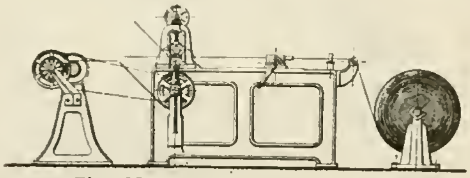
Fig. 15. Belting Trimming Machine

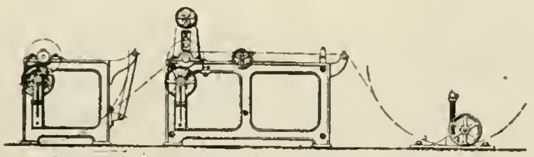
Fig. 16. Belt Cutting and Measuring Machine

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IMPREGNATING BY FRICTION CALENDER

During the Great War, owing to the scarcity of solvents, the French makers of balata belting found it feasible to use the ordinary three-roll friction calender for applying balata to warm duck, thus saving both time and solvent.

BALATA BELT-MAKING MACHINERY

By whatever method of impregnation the balata-coated duck may be prepared, it is made up into belting in specially designed machines here illustrated.

The first operation is cutting the fabric to the widths necessary to make the desired plies. This is rapidly and accurately done by a special slitting machine, Fig. 11. The fabric is next folded back upon itself and passes through the rolling machine, Fig. 12. In these machines the balata stock is kept sufficiently warm to insure the strongly adhesive condition of the balata compound necessary to bind the plies into a homogeneous body under the rolling pressure of the building machines. After having been rolled two-ply thick the duck passes over a conveyor and is again folded, heated and rolled, and so on until the desired number of plies is completed.

The warm belt is then ready for stretching between the straining heads in connection with a stretching machine. The belt is cooled while under strain so that the stiff balata may fix the warp of the fabric at the stretched length which will not further elongate under the service strains of power transmission.

After stretching and cooling, the belt is ready to receive a final covering of balata. This is applied to one side only as the belt goes through the rolling and marking machine, Fig. 13. On the opposite or driving contact side the surface is left as impregnated. The composition used as a cover is generally inferior in quality to that used in impregnating the duck and is prepared without solvent in the dry masticating machine shown in Fig. 14.

The belt is finally finished in the trimming machine, Fig. 15, which trims and finishes the edges, stamps the surface with the maker's trade mark, and delivers the goods in a finished roll ready for measurement and cutting to specified lengths as required by orders for shipment.

COMPOSITION AND TESTS[1]

TYPICAL COMPOUNDS

No. 1. Exterior Coating:

Specific gravity, 0.989.
Ash, 2.53 (iron and magnesia).
Adhesive coating:
Ash, 1.29 per cent.
Weight of duck, 852 grams per square meter.
Weight of gum, 425 grams per square meter.
Weight of exterior coating, 500 grams per square meter.
Adhesive temperature of the gum, 50 degrees C.

No. 2. Exterior Coating:

Specific gravity, 1.656.
Ash, 12.09 (iron and magnesia).
Adhesive coating:
Ash, 1.38 per cent.
Weight of duck, 745 grams per square meter.
Weight of gum, 300 grams per square meter.
Weight of exterior coating 550 grams per square meter.
Adhesive temperature of the gum, 54 degrees C.

ANALYSIS OF BALATA BELTING MIXTURES

Sample	Percentage Composition	Specific Gravity	Breaking Strength Kilos Per Square Mm.	Stretch Per Cent	Softening Point Degrees C.
	Washed balata	floating	0.650	180	43.5
	Deresinated balata	.....	2.200	380	58.
1	Washed balata 50....... Organic fillers 50.	.....	0.400	...	41.
8	Washed balata 66....... Mineral fillers A-34.	1.186	0.630	...	45.5
13	Washed balata 50%..... Mineral fillers A-50.	1.350	0.350	35	45.5
14	Washed balata 50....... Mineral fillers B-50.	1.350	0.650	20	46.
15	Washed balata 50....... Mineral fillers C-50.	1.570	0.650	120	41.
33	Washed balata 66....... Mineral fillers B-34.	1.060	0.650	120	40.
114	Washed balata 50....... Reclaimed balata 50.	floating	0.580	210	43.

ADHESION TESTS OF PLIES

Samples	Adhesion Temperature Degrees C.	"Friction" Test or Resistance to Separation: Between Plies One and Two Kilos.	Between Plies Two and Three Kilos.
Washed balata	56	4.986	4.686
No. 1	50	1.936	1.286
No. 2	54	2.236	2.336
No. 14	58	2.032	1.934
No. 33	47	3.259	3.114
No. 114	50	2.307	2.180

[1]From article by Gustave Bernstein in Le Caoutchouc et la Gutta Percha, March 15, 1920.

NEW STYLES AND MATERIALS IN BRITISH WATERPROOFS

From England comes a good-looking line of waterproof clothing made of rubberized cloth in various colors and materials. This company makes a specialty of ladies' high-class garments and capes of silk lined with pure rubber. Others are made of rubberized cotton and cotton-and-wool mixtures. The styles shown are nobby and becoming, and perfectly appropriate for stormy weather. Motor jackets, motor suits, cycling capes and children's capes with hoods are included in this line of rubberized clothing.—The Crown Court Waterproof & Rainproof Co., Limited, Crown Court, Ashley Lane, Manchester, England.

Artificial Lighting in the Rubber Industry

By E. Leavenworth Elliott

In a recent issue of this publication there was an article describing in detail the equipment for a tire plant. Under the heading of "Power, Heat and Light," the subject of illumination is disposed of as follows:

"The lighting required is a good industrial lighting unit with the exception of around the calenders, where a special unit is required so that there will be a sufficient light both in front and back of the calenders. The lighting unit for the plant as outlined is one light to a bay, the bay being 20 feet square."

How extremely simple is this matter of lighting; "a single lighting unit to each bay," and it is done! Call the next case.

It must not be inferred that this is intended as a personal criticism of the writer of the article; the quotation is given as an example of the treatment which the vitally important subject of lighting too often receives at the hands of consulting engineers and architects. What is still more unfortunate, the question is also quite generally either side-stepped or bungled by production managers and the executives "higher up." There is still a prevalent notion, inherited from the days of the candle and the gas flame, that artificial lighting at the best is but a makeshift, which has to be resorted to when daylight fails, but which of necessity reduces the efficiency of those working under it. The actual fact is, that modern electric light can not only furnish a full equivalent of the best daylight, but in many cases may appreciably surpass it, by increasing the productive efficiency of labor. In a comparison of the relative merits of daylight and electric light for industrial illumination the advantage rests with the latter.

Artificial Lighting by Which Labor Operates as Efficiently as by Daylight

THE HIGH COST OF BAD LIGHTING

In one large city the electrical engineer of a large tire plant, which was running three 8-hour shifts, told me that the first night shift was 60 per cent efficient, and the second only 40 per cent efficient, as compared with the day shift. He explained the greater inefficiency of the second shift by the fact that the learners were put on it. I also found in this same city a specialized plant in which the night shift was 17 per cent *more* efficient than the day shift, and a number of gigantic works in which the night production was fully equal to the daylight output.

The difference between 40 per cent discount and 17 per cent premium on factory output is certainly no small matter in manufacturing cost. To what can such wide discrepancy be due? Certainly not to mechanical equipment, nor difference in the personal skill of the workmen; it was simply a matter of good and bad lighting. The plant which was turning out 17 per cent more product on its night shift was by no means an isolated case; plenty of instances could be given in all branches of industry where the output under electric light regularly exceeds that under daylight. What can be done in one factory can be done in any other of its type.

THE REMEDY FOR WAR HYSTERIA

The feverish condition of industry, running often into hysteria, that was induced by the war, reached its climax a year ago, and the inevitable reaction has set in. Efficiency, economy and thrift are the tonics essential to this period of convalescence. The more thoroughly they are administered the quicker and more complete the final recovery of our declining industries will be.

In other words, the remedy is: Get the utmost out of the physical equipment, and out of the human machine; eliminate waste, of both energy and materials; and keep to a steady course that does not involve too many or too long chances.

Taking these up in order, we find one of the greatest transgressions at the very beginning. The most is not being gotten out of plant and equipment. What is called "full time" operation is in actual fact not one-half full time. Taking the 8-hour workday as the standard, the factory that is running the usual day shift is idle two-thirds of the time. What physical reason is there for this gross inefficiency? Nothing but the substitution of artificial for natural light. All other conditions are exactly the same throughout the twenty-four hours of the day. If the artificial light enables the workman to do his work as rapidly and as well as natural light, then there is nothing in the way of uniform production—of a "flat production curve"—so far as physical facilities are concerned.

HYGIENIC ASPECTS OF NIGHT OPERATION

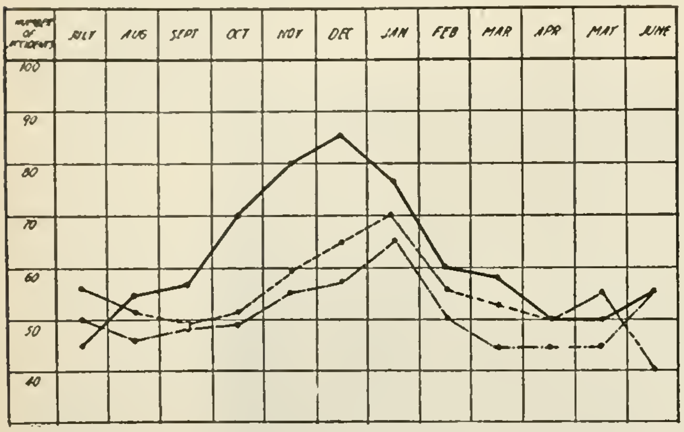
So far as statistics go, there is no evidence that the health of night workers suffers in proper night work, and there is no scientific reason why it should. The great fact is that night work means daylight leisure. Day leisure means outdoor recreation; and the value of open-air enjoyment to indoor workers is unquestioned. The general outcry against the repeal of the "daylight-saving" legislation is an impressive lesson on the appreciation of daylight leisure by the indoor worker.

What direct action has light upon the health of the workers? Such knowledge as we have on the subject points to two lines of inquiry: first, the action of light in promoting the vital processes; and second, the germicidal effect of the violet and ultra-violet rays. Without attempting to discuss these highly technical subjects, it may be said that one of the two kinds of electric light now in common use possesses the same quality as sunlight in respect to these rays; and there is reason to believe that this

light is at least as effective in promoting life and destroying harmful germs as indirect sunlight, or direct sunlight that has passed through glass. From the hygienic standpoint, then, there is nothing against night work in a properly lighted room.

THE PSYCHOLOGICAL ASPECTS

And what of the psychological aspects of the subject? A few years ago such a question would have been ruled out as "high-brow stuff" by the "practical" works manager. But not so now; the very obvious fact that the human machine is operated by the brain, and therefore the condition of this controlling apparatus is a matter of prime importance, has filtered into the minds of the whilom scoffers. Electricians tell us that the amount of electricity that you can obtain from a given connection is directly proportional to the electromotive force at the source, and inversely proportional to the resistance of the conductor. This may serve as an analogy by which to describe the effect of the mind upon the worker. The "electromotive force" is the necessity for him to make his living—the fear of "losing his job"; the "resistance" is his natural laziness, the irksomeness of labor as such. The output of any individual worker will depend upon these two forces.



Relation of Industrial Accidents to Illumination

A Maximum of Accidents Occur During November, December and January, the Months of Minimum Daylight

The effect of a greatly reduced "labor-motive force" resulting from the shortage of workmen is still a very vivid memory in the minds of employers. How to reduce the resistance, the innate repugnance to work, is the most serious problem confronting the efficiency engineer and the scientific manager today. To supply incentive, to create interest, to inspire enthusiasm, to relieve tedium, in short, to increase the will to work, are subjects which fall within the domain of modern psychology. Aside from the ancient prejudice of the worker against night labor, the fact is that night offers better conditions for work; there are fewer distractions, and less heat in summer.

That there are sociological problems involved is evidenced by the fact that at least one of the great manufacturing states has a law against night work by women, and strenuous efforts have been made to introduce such laws into New York State.

THE ECONOMIC ASPECTS

Little argument is needed to show the economic advantages which night work presents. The difference between profit and loss in manufacturing may often be solely a question of the overhead expense. Interest, taxes, insurance, and depreciation of plant make up the larger part of the fixed charges. Double shift means cutting this in half, and triple shift, or continuous operation, cutting in thirds, prorated to output. To build and equip new factories to be idle half or two-thirds of the time is an unpardonable sin against efficiency and economy. Adequate and proper electric lighting is capable of doubling the value of the total investment in manufacturing plants throughout the world, measured by their producing capacity.

But the economic importance of artificial lighting is not confined to the strictly night-shift operation. Daylight is insufficient for maximum production for a considerable portion of the time of the 8-hour day shift, totaled for the year. There are dark days in the winter, dark mornings and afternoons in spring and fall, and many rooms that are naturally dark at any time. In one of the most up-to-date automobile plants I recently saw hundreds of electric lamps burning on a bright autumn day. To have the production kept up in both quantity and quality regardless of the vagaries of the weather, or changes of season, is a manifest wisdom to a manufacturer who would thrive,—to keep at the top in those trying periods when the weaker go to the wall. Any loss in production due to inadequate lighting is an absolutely needless waste.

COST OF ARTIFICIAL LIGHTING

The cost of artificial lighting is a matter that can be disposed of with very little discussion. Light is the one facility that most directly affects the output of the human machine. Its results vary from zero, or nothing, in total darkness, to 100 per cent in proper illumination. A light that reduces the output 10 per cent is equivalent to a 10 per cent raise in wages. The only logical method of figuring the cost of light is therefore to equate it with wages. In one tire plant, which may serve as an example, the cost of electric light was two cents for an average size tire. A curious case is that of a very large automobile plant, in which the cost of washing the windows is equal to the cost of all the electric light used, and the plant regularly runs continuously. A little arithmetic will show how the matter stands. Suppose a workman is receiving a wage of 60 cents an hour, which is one cent a minute. Suppose the cost of electric current is one cent per unit (k.w.h.). One minute of wages is then equal to one unit of current, or 1,000 watts, for one hour, or 100 watts for 10 hours. One minute of wages, therefore, will pay for the current for a 100-watt lamp for a ten-hour day. Current, however, is not the whole cost of the light; there are the other items of lamps, accessories, and upkeep. All of these should not exceed the cost of the current. One minute of wages may then be considered equal to the entire cost of light from a 50-watt lamp for a 10-hour day, or a 60-watt lamp for 8 hours. This would be ample for work in a fixed position; but if general illumination were required where the work or machines were more or less widely separated, two, or even three times this amount might be required.

We may, therefore, say that the loss of from one to three minutes of a workman's time will balance the cost of a 100 per cent light for his whole working day. Economy is good management, the most profitable proportioning of outgo to income. Can there be any worse economy than a failure to supply the best possible light for the workman?

LESSENS SHOP ACCIDENTS

There is one collateral branch of the subject of the economics of lighting which is of importance, and that is its relation to industrial accidents. Some ten years ago a fairly comprehensive compilation of statistics showed that 25 per cent of industrial accidents were due to faulty lighting. Recent statistics indicate that but 15 per cent are now traceable to this source. This is a gratifying improvement, but it is still exactly 15 per cent too many. With the present cheapness and ease with which ample light for safety can be supplied, there is no excuse for failure in this regard. Avoidable accidents to the human machine are not good economy.

THE SUMMARY

Artificial light can now be produced by which all kinds of labor can be performed as efficiently as by daylight, and in some cases more efficiently.

Since light is the only difference between the day and night conditions for work in the factory, there is no necessity for the plant being idle at night.

The continuous operation of plant is the greatest source of economy in production that can be made, short of a large investment in more efficient machinery if such is obtainable.

Sunlight is insufficient for the full day shift, and artificial light is therefore a necessity. It should enable the worker to produce as much as by the best daylight.

Compared with the cost of labor, the cost of light is a negligible quantity.

There is no excuse for industrial accidents from inadequate lighting.

Light is the most vitally important of all the facilities necessary for the performance of labor. It should be given correspondingly careful consideration.

In the next article the fundamental principles pertaining to the use of light will be discussed.

Cost Accounting in the Rubber Industry—II[1]

By Ferd G. Kirby[2]

PRIVATE LEDGER ACCOUNTS

Figures 2, 3 and 4 are charts of private ledger accounts, covering the accounts of a rubber heel factory. The accounting for this plant will be used as an example to demonstrate the methods suggested. It will be noted that the order of the accounts in the ledger is the same as that in which they appear on the statements shown later. Assets are arranged in order of their availability and are followed by liabilities in order of priority. These, in turn, are followed by the various revenue and expense accounts in logical order. This arrangement greatly simplifies the preparation of all statements, reducing it to a simple matter of copying off the amounts from the ledger.

PRIVATE LEDGER ACCOUNTS — ASSETS				
	A	B	C	D
	Quick Cash and Rec	Quick Inventories	Fixed	Nominal
1	Cash in Office		Land	Insurance Unexpired
2	Cash in Bank		Old Buildings	Rubber Association of America-Dues
3	Accounts Receivable Customers		New Buildings	
4	Reserve for Trade Discount		Machinery and Equipment	
5	Notes Receivable		Tools	
6	Notes Receivable Discounted		Stable and Garage Equipment	
7	Accounts Receivable Personal		Office Furniture and Fixtures	
8				
9				
10	Trade Acceptances Receivable			Interest Prepaid
11	Liberty Bonds			Branch Rent Prepaid
12	War Saving Stamps			
13		Factory Ledger Controlling Account		
14		Finished Merchandise		
15		Samples	Reserve for Depreciation	
16				
17				FIG. 2
18				

PRIVATE LEDGER ACCOUNTS — LIABILITIES				
	E	F	G	H
	Current	Reserves	Indirect	
1	Accounts Payable Wages		Capital Stock	
2	Accounts Payable Trade		Surplus	
3	Notes Payable			
4			Gross Profit	
5		Reserve for Employers Liability	Manufacturing Profit	
6	Accrued Taxes		Net Profit	
7			Dividends Paid	
8			Federal Taxes Paid	
9				
10	Trade Acceptances Payable			
11	Accrued Interest			
12				
13				
14				
15				
16				
17				FIG 3
18				

PRIVATE LEDGER ACCOUNTS — REVENUE AND EXPENSE						
	J	K	L	M	N	O
	Sales	Deductions	Cost of Shipments	Administrative Expense	Selling Expence	Other
1	Merchandise Sales	Freight Allowed	Factory Cost of Shipments	Executive Salaries	Selling Salaries and Commissions	Interest Received
2			Commercial Cost of Shipments	Office Salaries	Traveling Expense	Discounts Received
3		Trade Discount Allowed		Telegraph Telephone Postage	Catalogues	Rents
4		Other Deductions		Tax Stamps	Advertising	Scrap Sales
5		Returns and Allowances		Stationery Printing Office Supplies	Credits and Collections	
6				General Office Expense	Bad Debts	Resales
7				Other Administrative Expense	Branch Rent	
8				Patriotic Fund	Freight on Returns	Interest Paid
9						Discounts Allowed
10						Dwelling Real Estate Expence
11						Scrap Delivery Expence
12						
13						
14						
15						
16						
17						FIG. 4
18					Reserve for Commercial Burden	

Any of the accounts as shown may be subdivided and the subdivision indicated by placing an additional letter after the account symbol, thus A3, accounts receivable customers, may be subdivided:

A3a—Accounts receivable, city.
A3b—Accounts receivable, foreign, etc.

The account symbol is placed upon the outer upper corner of the ledger sheet, and the sheets arranged alphabetically in the ledger by sections. In each subdivision thus established the accounts are arranged numerically.

INVENTORY ACCOUNTS

The inventory accounts as detailed in the foregoing are charged with the result of physical inventories when taken. For each succeeding month they are charged with all material purchased and credited with the quantities of materials consumed, which will be determined by the reports provided through the material requisitions. The balances appearing in these accounts at the end of each month represent the inventory value of raw materials on hand, the amount of material, labor and burden in process and amount of material, labor and burden on hand of finished product, and the amount of burden unabsorbed and overapplied.

VOUCHER AND CHECK REGISTER

As indicated in the foregoing, in this particular application of costs shown, no ledger was kept for accounts payable. The voucher register serves both as a purchase ledger and check register and, as invoices are paid, the proper purchase accounts are debited. At the end of the month all unpaid invoices, the goods for which have been received, are entered at the foot of the voucher register, and their amounts distributed in the various debit columns. The total amount of these unpaid invoices, instead of being entered in the "Amount of Check" column, is carried to the "Accounts Payable Cr." column, from whence it is posted to the private ledger. The next month, when these vouchers are paid the checks are entered in the "Accounts Payable Dr." column instead of being charged to the purchase accounts. In this manner the ledger will show the amount of unpaid bills at the first of each month, and at the same time the necessity of a purchase ledger and a separate disbursement record is avoided.

This arrangement was possible in this particular case because it was desired to distribute the charges to the various inventory accounts only when the bills were actually paid, instead of when the invoices were received.

[1] Continued from THE INDIA RUBBER WORLD, December 1, 1920, pages 155-157.
[2] Accountant, R. T. Lyman & Co., Inc.

Usually, however, a purchase journal is used, as this allows the proper distributions to be made to the works ledger accounts more promptly and also provides a daily balance of unpaid bills if necessary. When a purchase journal is used a cash book replaces the voucher and cash received registers.

DEPRECIATION

Depreciation is written off monthly by charging the works ledger controlling account and crediting reserve for depreciation. The credit balance in the reserve for depreciation account will be carried from year to year as a deduction from fixed assets. When any machinery is sold or scrapped this account should be credited with the amount written off to date upon the article disposed of.

MONTHLY STATEMENTS

The following statements should be made up each month: financial statement; factory ledger balance sheet; loss and gain statement; analysis of commercial expense; analysis of factory expense; graphic records.

These statements are made in comparative monthly form, showing the results of operations month by month, an extra column being provided for yearly totals and final results after closing the books. The accounts appear on the ledger in exactly the same order in which the items appear on the statements, and the mechanical work of taking off the statement is very simple.

Following are a few brief suggestions on the use of these statements after they are submitted to the executives:

FINANCIAL STATEMENT

This statement lists the assets in order of their availability and liabilities in order of their priority with sub-totals showing the totals of current liabilities and current assets.

A comparison of the current liabilities with the current assets available to meet them gives a very valuable insight into the financial condition of the business, and if carefully watched from month to month, will be of great assistance in arranging to take advantage of cash discounts and in avoiding the payment of excessive interest charges.

An examination of this statement will indicate exactly where the working capital is invested and will serve as a check upon investing too much capital in raw material and inventories.

FACTORY LEDGER BALANCE SHEET

This statement shows the details of the inventories which are summarized on the financial statement. It should be carefully watched with the following ideas in mind:

(a) The amounts of the various inventories should be kept as low as practical in order to prevent overbuying and tying up working capital unnecessarily.

(b) The amounts should be carefully compared with the actual amount of materials in the plant as any variation between the physical and book inventories must result from an error in the cost figures which should be investigated and corrected.

The work-in-process accounts particularly should be watched and a comparison made between the proportion of material, labor and burden in process, from month to month. Charges to these accounts may be relied upon as correct if material requisitions are properly handled. Any variation must, therefore, come from an error in crediting these accounts with the cost of shipments, and must therefore reflect an error in the cost of figures. If the book inventory exceeds the physical inventory, it is evident that the credits have been too small. That is, the cost of shipments have been figured too low and the profit as shown by the books is too high. If the physical inventory is greater than that shown by the books, cost of shipments have been figured too high and the actual profits are in excess of those shown on the books and statements.

The division of these work-in-process accounts into material, labor and burden facilitates the location of errors. Unabsorbed or overapplied burden should show only a small balance. The continued accumulation of any large amount under any one of these headings indicates a necessity of changing the burden rate.

PROFIT AND LOSS STATEMENT

This statement is self-explanatory and affords a monthly comparison of sales, cost of sales, operative profit and miscellaneous items of income and expenditure. The proportion of profits to sales gives a check upon the relative sales in profitable lines. The amount of job discount allowed should also be watched and kept as low as practical.

EXPENSE STATEMENTS

The monthly expense as shown by these statements should be carefully compared, both in detail and total, with that shown for previous months. Any material variations should be noted and investigated. The amounts shown on these statements represent an outlay for intangible items and any reduction or saving which may be effected is clear profit.

GRAPHIC REPORTS

A series of graphic reports should also be put in operation, showing in graphic form the productive and non-productive labor and bonus for each department. These reports should be watched from month to month, noting the relation of productive and non-productive labor, and the relation between the monthly productive labor and bonus earned. From an inspection of these reports a very good idea of the relative efficiency of the various departments may be obtained.

UTILITY OF COSTS

The preparation of these costs requires but one cost clerk in addition to the personnel of the planning department. This is made possible through the unification of production and cost records. In other words, the function of the control exerted by the planning department not only endeavors to control effectively the operation of the plant, but obtains its necessary production records in such a manner that a basis for costs is furnished without the expense of accumulating additional special records.

Occasionally, where the operation of the plan is somewhat difficult to check and control, it is necessary to obtain the costs not by orders, but to obtain the labor cost by operations. The job time cards are sorted by parts and operation and for each part of a unit of product a direct labor cost accumulation card is used. The total number of parts handled on each operation is divided into the total cost of performing this operation, as shown on the job time cards and posted against the proper operation as listed on the form. This is very valuable as a basis for comparing the cost of operations monthly, and reflects the efficiency of operation of the factory as a whole better than when these operational efficiencies are split up and recorded by others. Finally, at the end of each month, the total unit cost by operations is listed on the front of the total cost per unit form, the operations being listed in the proper column and the necessary burden and miscellaneous department items of labor accumulated into the total. On the reverse of the form the total cost of material is obtained. It should be noted that provision should be made for covering the fluctuation of rubber cost on this form, either because of changes in price or variations in waste percentage.

In either case, that is, whether costs are collected by orders or by operations, the cost figures should be analyzed to reflect not only true cost for the determination of selling prices as well as monthly financial statements, but to reflect operating efficiency. Any increase in material cost on an item should be analyzed to determine whether it is due to market fluctuation or to inefficient utilization of material. All labor cost increases should also be traced down to the operation and, when possible to the operative responsible, and steps taken to prevent a recurrence. In general, costs should be a lever to control the effectuality of a business rather than a history of past performances and positive constructive action should be taken that will stimulate production and make it cost less.

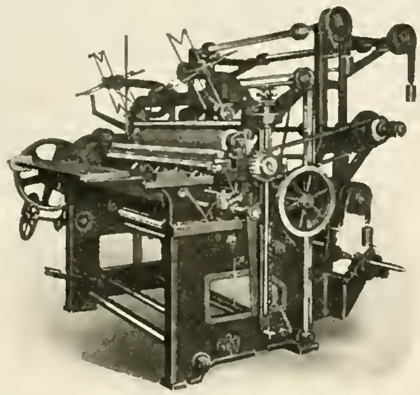
The Manufacture of Tire Flaps

Tire flaps were originated to meet the necessity of protecting the inner tube of a pneumatic tire against injury in service, from chafing on rim, tread or beads and from pinching caused by flexing of the tire walls.

Reliners are similar to tire flaps in construction, but generally are wider and thicker. They are formed to fit between the casing and inner tube against the tread side instead of the rim side.

CONSTRUCTION

Tire flaps and reliners are of laminated construction consisting of rubberized plies of fabric built up in stepped widths. Thus the flap is thick at the center and thin at the edges, which permits it to be readily molded with crescent-shaped cross-section.



Cameron Slitting and Rewinding Machine.

Referring especially to tire flaps, the concave side practically affords a continuation of the inner wall of the tire casing and accommodates the shape of the inflated tube, while its opposite convex surface is molded to seat comfortably on the tread surface of the rim between the tire beads. The edges of the flap or reliner are sufficiently thin and pliable to prevent injury to the tube by chafing.

MATERIAL FOR FLAPS

The material commonly used in the construction of tire flaps is light-weight flat duck, osnaburg, sheeting or combinations of these. Sometimes cotton flannel is employed as a facing on the inner-tube side. The number of plies is usually four or five. The inner plies are, of course, friction-coated on both sides, while those forming the outer surfaces are frictioned on one side only. The edges of the flaps are ordinarily two-ply by the union of the fabric layers of the outer surfaces. In such case the flap has a plain cut edge. Better grades are finished on the edges by folding about one-quarter of an inch of the ply from the inner tube side onto the opposite side.

HAND-MADE FLAPS

Flap production has probably advanced more rapidly during the past two or three years than any other feature in tire manufacturing. Previously it was thought necessary to build flaps singly on a concave drum, laying up the plies in rotation by hand. This construction was known as the "endless type." The method was gradually improved by home-made devices, making use of wringer rollers to pull the several plies from spindles. The wringer rollers also pressed the plies together, uniting them by the adhesive quality of the friction. The hand-built flap was generally cured in a press of the general design of ordinary platen presses, except that the face plates were so shaped as to give the cross-sectional curve to the flap. The defects of this method of curing were high cost per flap, due to slowness of production, and failure to impart to the flap the transsectional curve needed to perfect the proper shape of the finished goods.

MACHINE-MADE FLAPS

Machine processes have generally superseded hand methods in flap production, permitting them to be run off in continuous lengths at high speed. Various machines are employed for the purpose, namely: slitting and rewinding, flap building, flap measuring and cutting, and drum filling machines.

Rolls of adhesive friction-coated fabric in liners as received from the friction calender, with interliner of plain separating sheeting, are delivered to a slitting and rewinding machine. This is provided with adjustable circular knives by which the fabric is cut to precise widths, thence passing on through the rewinding device which separates and accurately winds the strips into individual rolls ready for making up in the flap-building machine.

FLAP-BUILDING MACHINE

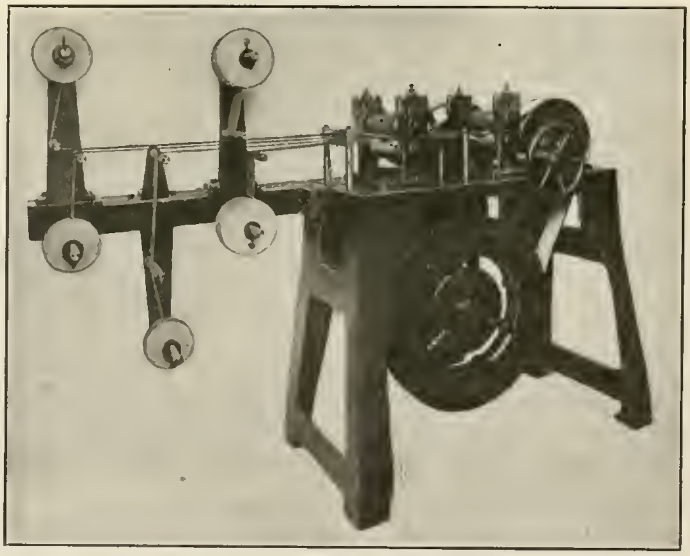
In general design the flap-building machine is similar to a belt-folding machine. It consists of two small calenders, the first of which strips the fabric from the rolls mounted on spindles at the rear of the machine as shown in the illustration.

The rolls of ply stock are arranged on the spindles so that the different widths are delivered for lamination in proper sequence and are faced on both sides by single-coated plies.

PROCESS OF BUILDING FLAPS

As the plies leave the spindles they run through a set of guides, each ply of the flap passing through a separate guide in order that all may register accurately as they unite in the laminated strip. From the guides the flap enters the first set of pressing rollers. This set of rollers also pulls the various plies from the stock rolls. Between the first set and second set of rollers is placed a folding device that turns over the edges of the flap. The advantage of a folded-edge flap is that the rough edges of the narrower plies are covered and thus do not come in contact with the inner tube. It also improves the appearance of the flap.

From the folding device the flap enters the second set of pressing rollers which rolls down the fold. The top roller is rubber-covered to accommodate the various thicknesses due to the plies varying in width and equalize the pressure across the flap.



Dexter Flap Building Machine.

From the second set of rollers the flap is drawn over a breaker drum, and wound on the detachable curing drum underneath the machine. The curing drum is friction-driven, so that its speed is much faster than that of the machine. This allows the flap to be pulled into the drums very tightly and conform closely to the curvature of the drum. Each drum as it fills up with stock is

taken from the machine and wrapped with strips of wet cloth to protect the top flap from the steam while curing.

The advantages of curing flaps in drums are numerous. First the flap is given both curves in one operation, thus insuring that the flap will exactly fit the rim and tire. Second, on the average curing drums approximately 50 flaps can be cured at one time. The average drum is about three inches in width, which permits many drums to be placed in a vulcanizer in the same heat.

The flap-making machine is driven by a direct-connected one-horse-power motor or from an overhead shaft and is speeded to produce 6,000 feet of flap per hour, either four or five ply.

CURING DRUMS

The curing drums upon which the flap as produced by the building machine is received are built of steel. They are so constructed, as shown in the illustration, that they give the proper curves to the flap, thus insuring its fitting the tube as well as the tire.

The drums are about 30 inches in diameter, divided into sections through the center and held together with thumb screws.

Dexter Flap Curing Drums

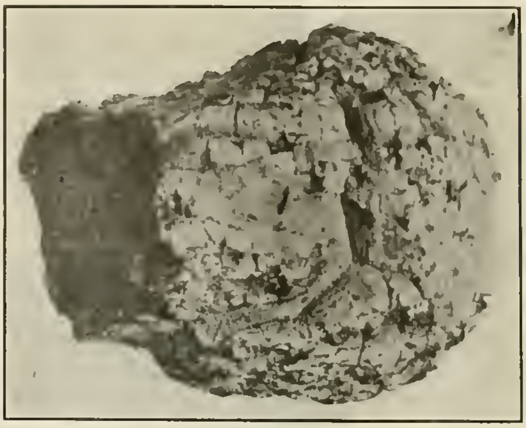
This feature provides for greater ease in handling the strips of flap stock after curing, without unreeling.

THE OLDEST PIECE OF RUBBER IN THE WORLD

The extensive use of rubber is so decidedly a development of later years that we are prone to consider it a substance of comparatively recent discovery. History refutes this, however, as Columbus, during his second visit to the new world in 1493-96, saw the natives of Haiti playing a game with balls of "gum," and it is also recorded that natives of Mexico played with rubber balls at the time of the advent of emigration from Europe.

The oldest piece of manufactured rubber in the world, in the belief of Francis E. Lloyd, professor of botany at McGill University, Montreal, Quebec, Canada, was discovered in December, 1909, in some excavations for a dam near Sasco, Arizona. While digging in an off-wash from an adjacent mountain, an earthenware jar was uncovered three feet below the surface, in which lay a ball of rubber together with some stone implements recognized by archeologists as belonging to the older prehistoric ruins of the country. The ball is shrunken, with cracked, hard surfaces incrusted with a sort of light buff-colored plaster. The cut surfaces are black and show a definite banding. The interior looks and feels like a quite good sample of ordinary crude rubber. Surrounding this is a dark shiny band, tacky and apparently resinous. Bubbles of air can be seen scattered in the mass of still preserved rubber.

The origin of this ancient plaything is a matter of conjecture. As it was found in a region similar to that in which guayule



The Dominion

A Prehistoric Rubber Ball

rubber is produced, it may be that substance. It may even have come by devious ways from far away South America. But whatever its origin the rubber has stood the tests of time almost as immutably as stone.

SOME MICROSECTIONS CUT FROM VULCANIZED RUBBER ARTICLES[1]

By Harlan A. Depew and I. R. Ruby[2]

It has long been recognized that pigments for use in rubber work should consist of very fine particles.

Microscopic work done in this laboratory on pigments in linseed oil and other paint vehicles has shown that fine particles tend to exist as flocculates. In certain vehicles this flocculation is largely or entirely overcome. In the case of water suspensions, as well as of paints, the physical properties of a deflocculated and a flocculated suspension differ greatly.

Carrying the suspension analogy still further to the very much more viscous (properly, plastic) medium, rubber, it seems reasonable to assume that dispersion and flocculation of pigments play important parts in determining the physical properties of compounded rubber.

Attempts to determine the dispersion of pigments in compounded rubber by reflected light have failed, because with the high magnifying powers necessary to see the individual particles of, for example, zinc oxide or carbon black, the illumination of the surface is entirely too weak, particularly where the reflecting properties of the medium and the suspended pigment are close. Our success with transmitted light in water and oil suspensions pointed to this method of illumination for the examination of compounded rubber.

There is considerable difficulty in cutting sufficiently thin sections of vulcanized rubber, owing to its elasticity and toughness, especially in the case of rubber highly compounded with zinc oxide or carbon black, where the thickness must not exceed one μ.[3] In less highly compounded matter the section can be 20 μ thick, or even thicker. The elasticity can be destroyed by immersing in liquid air, but this makes the sample too hard to cut. Accordingly, the rubber must be frozen to an extent just sufficient to destroy its elasticity and yet not make it too hard.

[1]Read before the Rubber Division of the American Chemical Society, Chicago, Illinois, September 6-10, 1920.
[2]Research Laboratory of the New Jersey Zinc Co., Palmerton, Pennsylvania.
[3]One μ equals 1/1000-millimeter.

PREPARING SECTIONS

The method finally developed consists in freezing the rubber by expansion of carbon dioxide on the stage of an ordinary Spencer microtome. The sample is held tight on the stage by means of a water-glycerol solution (90 : 10) which, on cooling, solidifies to a white mass. This solution is used because it does

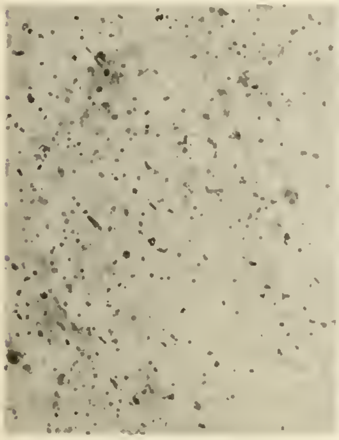


Fig. 1

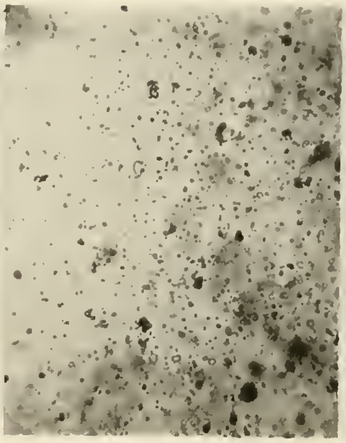


Fig. 2

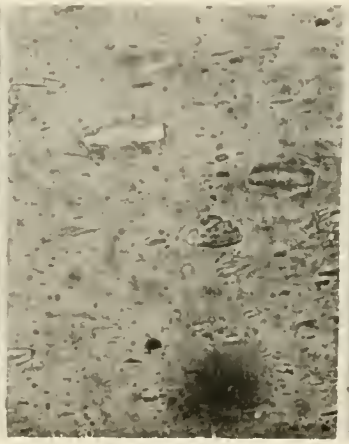


Fig. 3

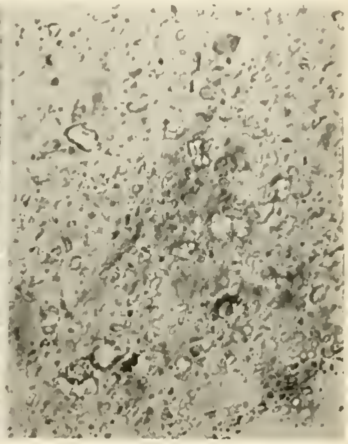


Fig. 4

not become very brittle at the low temperatures. The carbon dioxide does not cool the sample to a sufficiently low temperature, and a surface flash cooling is given by liquid air. The liquid air can be obtained at a convenient liquid air manufacturing plant and transported without difficulty in an "Icy-Hot" bottle, which will keep liquid air for several days. The liquid air may be ejected very satisfactorily from the bottle by introducing carefully a one-hole rubber stopper through which a glass tube about 3 to 4 mm. in diameter is passed into the bottle. The pressure developed by the continual evaporation will force a stream of the liquid out, which can be directed on the sample. A very small amount will freeze the sample sufficiently.

Fig. 5

Fig. 6

Fig. 7

Fig. 8

The section is then cut with the knife. Raising the stage is best controlled by hand. The thin section is mounted in Canada balsam on a microscope slide and preferably examined visually at 1,500 diameters, using a Zeiss 2-mm. apochromatic oil-immersion lens. For photographing, sharper negatives are obtained at 800 diameters.

DESCRIPTION OF ILLUSTRATIONS

In Fig. 1 zinc oxide is shown uniformly dispersed in rubber. A typical triplet crystal can be noted and also the grain in the rubber in the direction of working is shown by the definite alinement of the needle-shaped crystals.

In Fig. 2 a good lithopone is shown very well dispersed.

Fig. 3 contains aluminium flake. The grain is shown very decidedly, and it is not difficult to believe that the tensile strength and elongation will vary according to the direction of testing.

Fig. 4 shows whiting.

Fig. 5 is iron oxide. It is well dispersed but contains many large particles.

Fig. 6 was litharge when introduced and should have shown clear centered particles when in focus, but the particles have become black, due to a surface coating of sulphide.

Fig. 7 is a well-known white tread with magnesia as an accelerator. Chunks of magnesia stand out in sharp contrast to the uniform distribution of the zinc oxide. The individual particles of zinc oxide do not show up well except near the edge, owing to the thickness of the section which was necessary to show the large particles of magnesia.

Fig. 8 is a section from a widely advertised composition sole bought from a shoe repairman. It shows iron oxide used in coloring, zinc oxide used in reinforcing, and fiber used for stiffening. The photograph is poor, but the section can be seen more distinctly by direct observation with the microscope.

Fig. 9 shows a zinc oxide tread with a very small amount of lampblack to give a gray color. The lampblack is badly flocculated.

Fig. 10 shows a poorly dispersed carbon black.

Fig. 11 shows a well-dispersed carbon black together with zinc oxide.

Fig. 12 a section from the sidewall containing zinc oxide and whiting.

Fig. 13 a section of a cushion from a tire showing reclaimed rubber and a small amount of zinc oxide.

CONCLUSIONS

Microscopic examination affords the following possibilities:

(1) A knowledge of the dispersion of the pigment in rubber

which will tell a good deal about the quality of the product. Flocculated pigment readily accounts for many difficulties otherwise inexplicable. Among these is the heating up of tire treads heavily compounded with carbon black.

(2) A help in the analysis of rubber goods by showing the compounding ingredients used, such as reclaimed rubber, fiber, and pigment. In the case of the pigment, it may even be possible to learn its source, because the same pigment made according to different processes varies greatly in shape and size. Chemical analysis shows no difference between blanc fixe and ground barytes, but the microscope tells at once.

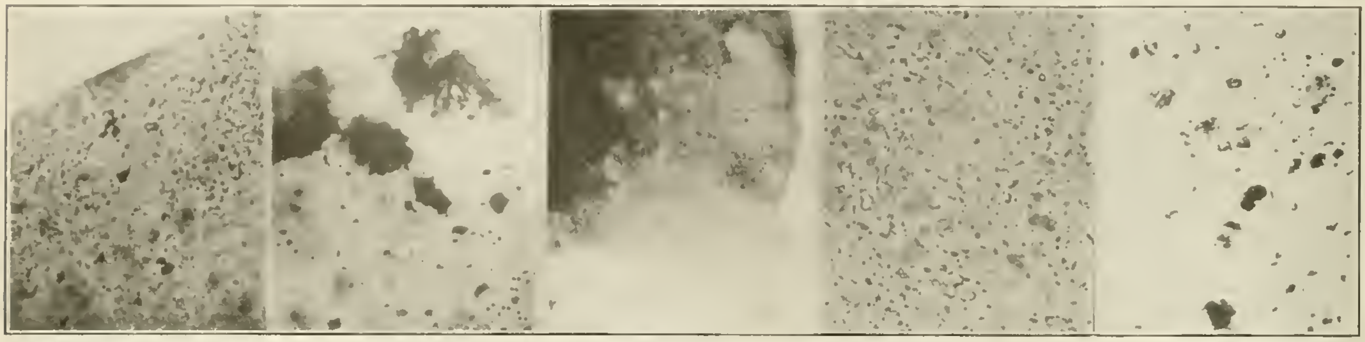


Fig. 9 Fig. 10 Fig. 11 Fig. 12 Fig. 13

Most work of this character is done by direct observation under the microscope without the trouble of photographing. By examining the slide with colored light, increased contrast is shown in certain cases. It is planned to make observations with polarized light, which should open a wide field for further investigation and for identification of the pigments. It should be mentioned also that staining of the section will bring out particles which would otherwise be invisible, as, for instance, glue.[4]

[4]W. E. Wiegand, Canadian Chemical Journal, 4 (1920), 160.

THE AGING OF CERTAIN RUBBER COMPOUNDS[1]

By I. R. Ruby and Harlan A. Depew[2]

There has been much discussion relative to the merits of carbon black and zinc oxide treads for automobile tires. The outstanding objection to the black tread tire is that, although in the beginning it wears comparatively well, it later chips away at an accelerated rate.

Three compounds, A, B and C, were prepared and investigated for the study of this problem. Table I gives their composition by weight and by volume. These compounds are typical fast-curing tread compounds, with the exception of A, which contains a low percentage of pigment. Treads in which XX red zinc oxide is the only pigment generally carry 55 to 58 per cent of zinc oxide instead of only 46 per cent, as in this case. There is no appreciable difference in aging, however, between compounds containing 46 and 58 per cent zinc oxide, as shown by evidence not included in this report.

Table I—Composition of Compounds

	By Weight			By Volume		
	A	B	C	A	B	C
First latex rubber	92	92	92	100	100	100
Sulphur	5.5	5.5	5.5	2.67	2.67	2.67
Hexamethylene tetramine	1.5	1.4	1.4	1.38	1.25	1.25
XX red zinc oxide	84	98	22	15.0	17.5	4.0
Carbon black	..	..	25	..	..	14.5
Lithopone	..	20	..	..	5.0	..

[1]Read before the Rubber Division of the American Chemical Society, Chicago, Illinois, September 6-10, 1920.
[2]Research Laboratory of the New Jersey Zinc Co., Inc., Palmerton, Pennsylvania.

The compounds were aged in an air bath at 70 degrees C. Tires, however, heat from internal friction while running, and this temperature is often exceeded. In solid tires, in fact, the temperature at times exceeds 100 degrees C.

The physical properties of the compounds after aging are tabulated in Table II.

Table II—Physical Properties of the Compounds on Aging at 70° C.

	0 Days		2 Days		6 Days		10 Days		16 Days	
Time of Cure 40 Lbs. Steam Min.	Tensile Strength, Lbs. per Sq. In.	Elongation, Per Cent.	Tensile Strength, Lbs. per Sq. In.	Elongation, Per Cent.	Tensile Strength, Lbs. per Sq. In.	Elongation, Per Cent.	Tensile Strength, Lbs. per Sq. In.	Elongation, Per Cent.	Tensile Strength, Lbs. per Sq. In.	Elongation, Per Cent.
Sample A										
45	3410	626	3702	639	2832	591	2761	576	2831	577
60	3594	645	3605	563	2849	544	1322	330	2403	512
90	2764	495	2650	485	785	190	786	185	855	202
120	3154	564	1251	266	915	184	992	147	766	160
Sample B										
45	3144	629	3050	589	2435	544	2403	526	1445	429
60	3203	605	2708	538	1746	429	1525	394	588	170
90	2212	485	1396	359	844	197	740	169	504	100
120	1321	339	734	189	653	132	591	99	519	87
Sample C										
45	3306	585	3243	540	1763	386	1342	308	588	182
60	3408	577	3233	525	1087	263	1470	314	502	140
90	3808	652	1645	298	773	141	684	115	496	71
120	3217	566	1008	191	607	106	543	79	550	124

It appears that the compound containing lithopone ages somewhat less satisfactorily than a straight XX red zinc oxide compound. The carbon black compound is much inferior to the others on the basis of tensile strength and elongation on aging. This is especially serious when it is realized that, as the percentage of carbon black in a tread compound increases, the heat developed by internal friction increases faster than a linear function.

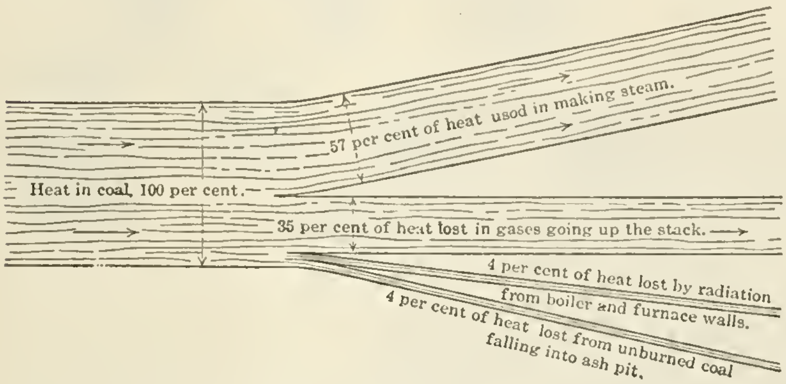
The test specimens were about 0.17-inch thick, and accordingly the tensile strength and elongation did not record an interesting hardening on the surface as fully as thinner specimens would have done. This hardening penetrated about 0.03 inch in 16 days. The rubber compounded with carbon black showed deep surface cracks from this effect by bending the rubber. There was no evidence of this surface hardening in the case of compounds A and B. This particular hardening is probably responsible to a considerable degree for the accelerated wear of a black tread tire with time, the hard surface being continually cracked and torn away by road abrasion.

The cause is uncertain, but appears to be oxidation. The absorptive power of carbon for oxygen has long been recognized and it may be reasoned that carbon black acts as a catalyst and oxidizes the soft rubber to hard rubber.

Rubber to the value of £16,551 was exported from British East Africa and Uganda in 1919, as against £14,026 in the preceding year.

CONTROLLING CHIMNEY LOSSES TO SAVE FUEL

The rubber manufacturer who congratulates himself on his economical management is distinctly shocked when reminded that while he may be saving at the spigot he is wasting at the bung-hole. Yet such a blow to the pride of many a manufacturer was delivered by one of the foremost combustion engineers



Where the Heat Goes in the Average Boiler Plant

of America,[1] in an address on "Saving Fuel by Controlling Chimney Losses," read before the Fuel Section of the 1920 National Exposition of Chemical Industries in New York.

Not that the average rubber manufacturer has been unaware that a considerable amount of the latent heat in coal, which latter commodity is getting perceptibly scarcer as well as dearer, is lost in ordinary furnace combustion. He has known it quite well and has tried his best, with good boiler equipment and trained firemen, to minimize such loss. But what he has not sufficiently realized is the large extent of the loss, not merely in smoke, which seldom exceeds one per cent of the loss through the stack, but in the other products of combustion, the total wastage in this way ranging often up to 40 and even 50 per cent of the fuel used. The most conservative estimate of government investigators[2] is that out of 100 tons of coal burned under factory boilers, the heat of 35 tons is entirely lost in the flue gases. On the other hand, in boiler plants equipped with the latest scientific devices for controlling heat loss, the wastage is reduced to as low as 20 per cent.

Coming as another surprise to many having to do with steam production is the noted engineer's contention that atmospheric oxygen—or fresh air—must not be fed freely to the burning coal to get the most nearly perfect combustion, and incidentally the utmost heat. Indeed, firemen are shown how excess air plainly dilutes the heat and overtaxes the temperature possibilities of the furnace. Nor do many firemen realize that in burning a ton of coal of average fineness they use up a column of air a foot square and three miles high. Often conscientious enough in handling coal, they could serve their employers better were they more economical in handling that which costs nothing at all—fresh air.

Shorn of technical terminology, the simple chemistry of efficient coal combustion in boiler plants is that the most important furnace product (apart from the heat itself) is carbonic acid gas, i.e., carbon dioxide or CO_2; and the greater the quantity of this gas that is produced in proportion to the amount of fuel consumed, the more certain it is that the coal user is getting the maximum of heat from his fuel. Overaeration—in other words, too much draft—means the carrying off of the carbon in the coal before it is perfectly oxidized, and hence low CO_2 percentage; while underaeration means semioxidation or imperfect combustion of carbon and the resultant production of too much carbon monoxide, CO, the familiar poison gas of ill-ventilated stoves. The ideal condition is where the production of CO_2 is 21 per cent of the flue gases and exactly equals the 21 per cent of oxygen in the air passed through the coal. Forty per cent of excess air will reduce the CO_2 content to 15 per cent, 100 per cent excess will bring it down to 10.5 per cent, and a 200 per cent excess to 7 per cent.

The remedy proposed is the installing of a plain-reading CO_2 gage on the boiler front to guide the firemen, and a CO_2 recording meter in the engineer's office to give daily charts checking up the firemen's work. It is said that with such devices to observe CO_2 production and graduate air supply, excess loss of heat can be controlled in 99 out of every 100 cases, and that such instruments afford a practically unfailing index to proper draft regulation, provided, of course, that due precaution be taken to prevent air infiltration through the brick furnace setting, that firebeds be kept within suitable thickness, etc. In 24-hour tests made recently in a small New England plant, where the firemen had probably never heard of CO_2 before but who willingly regulated their work according to the CO_2 production indicator, an immediate saving in coal of 9.9 per cent was readily demonstrated.

[1]F. F. Uehling, combustion engineer, New York City.
[2]Technical paper No. 205, United States Bureau of Mines.

COTTON FIRE HOSE IGNITED UNDER TEST

Several weeks ago, engineers of the Fire Department of Boston, Massachusetts, were testing a powerful motor fire pump, to which was attached a new length of double-jacket rubber-lined cotton hose. The pump was operated at capacity, with the hose outlet reduced to one-third the usual size and the water passing at an angle from the engine to the hose, striking a spot in the hose about eight inches from the engine coupling. Under these conditions heat, due to friction, was generated sufficient to ignite the cotton jackets and cause actual flame.

By request of Fire Commissioner John R. Murphy, an investigation of this occurrence was conducted by Professor Augustus H. Gill of the Massachusetts Institute of Technology, whose report to the Commissioner is quoted in part as follows:

> A thorough examination of the samples shows that the fire took place between the two cotton casings. Further examination reveals the fact that on each side of the burnt hole the casing is very severely chafed. This chafing, coming from the vibration produced in the hose by the pumping, was in my opinion, sufficient to produce great heat and finally active combustion. It seems to me that the cotton casing of the hose is not as closely woven as it should be, as is the case with certainly one other make of fire hose. It would seem that the tension on the cords in the process of weaving was not sufficiently high.
>
> I have not made a chemical analysis of the rubber lining to ascertain the percentage of free sulphur, for I cannot see how this would be material. The sulphur here is finely scattered throughout the rubber lining and does not occur in pockets or lumps.
>
> In conclusion, I am of the opinion that the occurrence was due to excessive friction between the cotton casings produced by the vibration of the hose in service.

ACID FORMED IN FIRE HOSE[1]

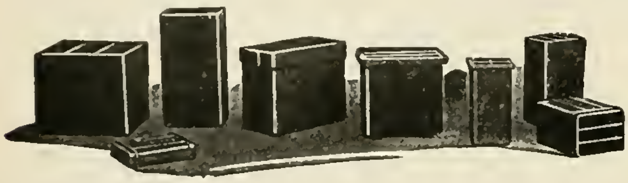
Several years ago considerable excitement was caused in various New England city fire departments because of the presence of acid found in lengths of fire hose which had been suspended on racks while partially filled with water. The technical work involved in a thorough and complete research on this matter was turned over to the chemical department of the Underwriters' Laboratories. Tests have been going on for more than a year under two distinct divisions. One was the practical aspect in which commercial full length samples of fire hose were used, and the other the laboratory investigation done on a small scale with various rubber compounds and ingredients.

[1] Laboratories' Data, Vol. 1, November, 1920, page 144, Underwriters' Laboratories, Chicago, Illinois.

Sufficient results were obtained to indicate that sulphuric acid is generated in varying amounts, and endeavor is now being made to explain scientifically how this acid is formed, where it is formed, what causes contribute to its formation, what deleterious effects it exerts upon the hose, and what remedies can be suggested to prevent its formation or nullify its action. The research program may require a year's work before the final answers can be determined.

HARD RUBBER PARTS OF STORAGE BATTERIES

In the annals of up-to-date lighting, hard rubber seems to hold a place of considerable importance. If you descend into the depths of the sea by submarine, there are lighting elements stored away in hard rubber battery jars that make this journey possible. If perchance you ride in an airplane, hard rubber battery jars still go with you, an important factor in your safety and comfort. If you prefer to travel on land or sea,



The B. F. Goodrich Co.
BATTERY JARS

in motor boat, automobile, or train, the storage battery goes along, and if you go down into the earth you will find it there before you, in the miner's lamp. And wherever there are storage batteries of the lead-acid type, there you will find hard rubber battery jars.

Although glass and porcelain containers are sometimes used, hard rubber is a more frequent choice because it is much less fragile and also considerably lighter. A battery constructed with hard rubber containers is much simpler than one made with

The B. F. Goodrich Co.
BATTERY COVERS

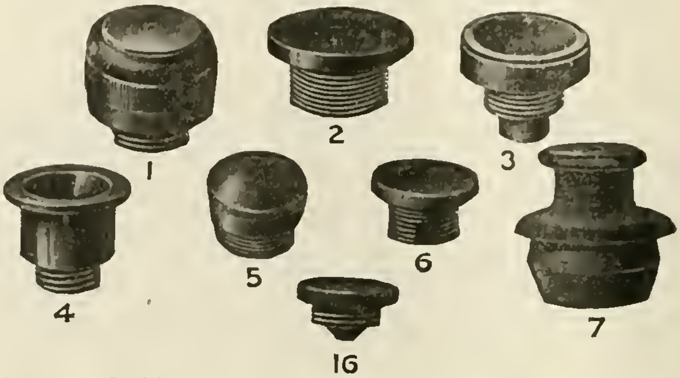
lead-lined tanks, such as are sometimes used in trains, as the insulated lining between the plates and the containers is eliminated.

JARS

The main danger to be guarded against in hard rubber jars is the use of too thin walls. For the various types of batteries in common use, a prominent company which has specialized in their manufacture for many years recommends certain wall thicknesses as the minimum. For submarine boat batteries, 5/16-inch walls should be used; in batteries for electric vehicles, industrial trucks and electric launches, nine-plate and less, 3/32-inch walls, and if more than nine-plate, ⅛-inch walls are recommended. Ignition, starting and lighting batteries for motor cycles, either single or multiple compartment, take also a hard rubber container with ⅛-inch wall, and if the batteries are for automobiles and gasoline launches a wall thickness of 3/32-inch is advised, provided that compartment jars of the exposed type (not enclosed in another container) should have 5/32-inch walls, with suitable reinforcements at top and bottom. Miners' lamp batteries require ⅛-inch walls. The addition of 1/32-inch to any of the above thicknesses is advised as a good investment. Every hard rubber battery jar is subjected to an electrical test before shipment, thus guarding against the slightest defect in the marketed product.

COVERS

Battery covers are also made of hard rubber but instead of being cut from hard-rubber sheet, as was formerly the common



The B. F. Goodrich Co.
HARD AND SOFT RUBBER VENTS

method of manufacture, they are now molded. The best class of covers are vulcanized under great hydraulic pressure and in molds that do not warp or stretch. This makes them very accurate in dimensions and of great strength and superior finish. They can be made accurately to fit any type of hard rubber battery jar.

VENTS

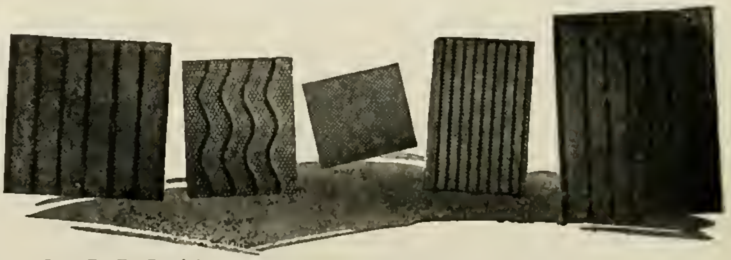
Vents are made of hard and soft rubber, according to use. One large rubber company offers sixteen styles, accurately made

The B. F Goodrich Co.
BATTERY SEPARATORS

with clean threads and holes, including one style of soft rubber made of an acid-resisting compound that has been proved successful against sulphuric acid. Seven styles of vents are designed for use with vent tubes in ignition, starting and lighting batteries.

SEPARATORS

In choosing battery separators, a material should be selected that is flexible enough to permit of assembling without breakage.



The B. F. Goodrich Co.
RIBBED SEPARATORS

Hard rubber has just the right toughness and is a superior material for this use. Battery separators made of hard rubber by a reliable manufacturer will retain their strong but pliable condition for a long period and will be very slow to become brittle, either in stock or in service. In addition to all these good qualities, hard rubber is a permanent battery insulator.

Battery separators may be had either with or without ribs and with perforations ranging from 16½ per cent to 29½ per cent porosity, representing the proportion of the area of the perforations to the total area. Ribbed separators should have a sheet thickness of 1/32 inch.

NEW USE FOR GAS CONTAINERS

The possibility of using gases extensively in new processes of vulcanization, such as Peachey's, at once suggests storage containers other than tanks which are weighty and not easily moved about. The solution is the gas bag made of rubberized fabric, a container whose prime function is to hold gas and not to lift a load.

The rubber gas bags used on London buses during the war, when motor fuel became so scarce that gas was used in its place, demonstrated that this sort of container was entirely practical and, when properly constructed, perfectly safe. Needless to say, the sudden demand for these containers resulted in all sorts of flimsy structures being used, with disastrous results in some cases. The government formulated rigid specifications for gas bags, providing that two-ply diagonally doubled cotton wigan textile should be used, impregnated with a primary coat of rubber and then proofed with six coats of rubber containing not less than 90 per cent of first-grade native or plantation rubber, the weight of the proofing to be six ounces per square yard between the plies. These requirements seem to have resulted in a stagnation of the industry and the later abundance of fuel resulted in disuse of gas bags.

In designing fabrics for gas containers, weight need not be considered, and as a result the containers are built of heavy fabrics to insure long wear and great resistance to pressure. In the case of gases used for vulcanizing, it has not yet been ascertained that the two gases would not be destructive to a rubber gas bag. An inside coating such as is used in gas tubing might obviate trouble.

Big rubber gas bags have been used successfully as reservoirs in connection with dirigibles. For companies having a small output of gas as a by-product, cylindrical containers, which can be suspended readily in the average size room, offer the logical means for handling this supply of gas. For laboratory use or for plants where only small amounts of gas are handled, small spherical containers will be found convenient.

The Goodyear Tire & Rubber Co.

A 5,000-Cubic-Foot Gas Container

The Goodyear Tire & Rubber Co.

Suspension Test of a Finger Patch Which Failed When a Load of 2,000 Pounds Was Applied

Gas containers are moored by means of the ingenious finger-patch which shows so clearly in the illustration. This clever device distributes the strain so that there is no disrupting pull on any part of the rubberized fabric.

SANITATION IN RUBBER MILLS

Just as the old-fashioned, dingy, untidy store rather repelled than attracted trade, and as its depressing atmosphere lessened the interest and enterprise of its clerks, so, too, in the grimy, dimly-lighted, and unsanitary old-fashioned workshop the morale and ambition of the workers usually struck a low average. The dissatisfied employer generally ascribed the listlessness of his helpers and the relatively small output to everything but the real cause—a lack of healthful and agreeable surroundings for his employes. The modern merchant has achieved success quite as much by his eagerness to better working conditions for his help as by astute merchandising; and the up-to-date manufacturer has quite as well learned the lesson that safety, comfort, sanitation, and general cleanliness for employes have economic importance, apart from ethical and esthetic consideration. Popular education is also playing its part in bringing about improved conditions. Labor associations are growing more exacting than ever about favorable working conditions for their members. Hence it seems fair to assume that in the near future the factories that will get the choice help will be those only that offer to workers the cleanest, most healthful, and most agreeable surroundings.

In an address on "Industrial Sanitation,"[1] the results in progressive manufactories of an intelligent study of the workers' health and comfort, and detailed means employed to bring about better working conditions, were interestingly reviewed. As beneficent measures of prime importance, ample light and pure air, especially air free of dust and noxious vapors, were stressed. Windows should be transparent, not merely translucent; walls and ceilings be dustless and grimeless if they would function as they should in the scheme of illumination;

[1] By W. N. Fitch, director of accident prevention and sanitation, The B. F. Goodrich Co., Akron, Ohio. Paper read before the Rubber Division of the National Safety Council at Milwaukee, Wisconsin, September 30, 1920.

the broom and the brush should be banished and both replaced with the vacuum cleaner, portable time and money-saving types of which having recently appeared; workers should be required to place all rubbish in fire-proof containers; an ample supply of drinking water should be provided, tested daily by a bacteriologist, and used with individual cups. If Bristolware jars be used they should be filled from a wheeled tank with a pump and hose attached, but preferably an automatically-cooled circulating system should be used for distributing the water, provided with non-contaminating founts at convenient points and cleaned daily. Even the lowly cuspidor could be standardized, and the speaker showed how these "necessary evils" are best collected, cleaned, and steamed.

Proper toilet accommodations in factories are given too little attention. Even when of modern construction, they are often so placed that workers lose much time in reaching them, they are often set where light and ventilation are insufficient, they are not automatically flushed, and locks are put on doors where springs would serve as well and tend to lessen loafing, etc. The placing of a small, porcelain, non-stopper, spray-head lavatory with foot-valve control is suggested for each five toilets or less, and special care urged in draining and cleaning toilet rooms. Stress is laid, too, on the importance of providing metal, ventilated, combination-padlocked lockers for clothing and lunches, and suitable washing units on the same floor. One of the best forms of the latter, it was stated, is of white enamel, eight feet long, with five spray-head goosenecks with liquid soap dispensers between them, and with box foot-control valves. Individual linen or paper towels are used.

The value of shower baths is also pointed out, and it is urged that they should be provided for all workers whose tasks are very dirty, who have to handle poisons, or who completely change their clothing on entering and leaving a factory. There is not enough attention devoted to the lunch room. Indeed, while many industrial managers often score notable success in enhancing the health, comfort, and efficiency of workers in their care through all the departments of a big factory, they fail in their regulation of the lunch room. Here, it is pointed out, sanitation is just as necessary as in all other sections of a mill, and good food is a factor of no mean importance in keeping an industrial army, just like a fighting one, in a fit condition.

PNEUMATIC TIRES CRITICIZED

An interesting criticism of present-day pneumatics appears in a letter by W. J. P. Moore, of New York City, to the editor of *Automotive Industries*. In discussing the possible adaptability of pneumatic tires for heavily loaded motor trucks, the writer asserts that the principle of construction as embodied in the round pneumatic tire is wrong, and the fundamental idea, resiliency, for which the tire is designed, is in effect defeated because of the high pressure to which the tires are pumped. This high pressure is necessary to maintain the shape of the tire (not to carry the load), and thus prevent working or intermovement of the dissimilar materials of the tire wall, the fabric or cord and the rubber composition.

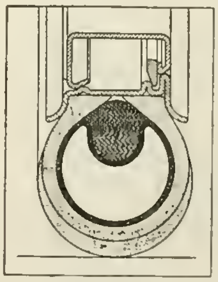
Mr. Moore proposes a two-fold remedy: (a) Improve the quality and strength of the rubber, have only one homogeneous material (as in a solid tire), and do away with internal movement, friction and heat of the dissimilar elements. (b) If it is impossible to find a suitable rubber composition, the shape of the pneumatic cord tire should be designed so that with lighter air pressures the deflection would be so modified as not to injure the fabric and also produce better riding qualities.

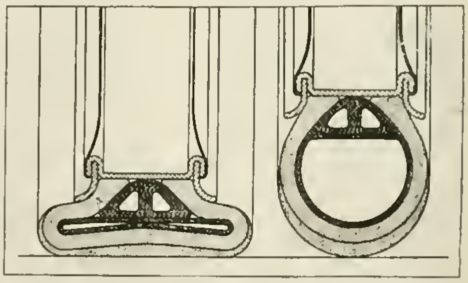
As long as we continue to use the present form of round tires, he asserts, some form of base filler strip should be introduced, (as shown in the illustration herewith), so as to prevent the tire being cut by riding on the rim in case of deflation. A tire so protected could be safely driven to the journey's end. Such a device is patented and in use in Germany, but not in this country.

Having started with light tire loads, the round tire was perhaps the natural evolution, Mr. Moore contends, but had we started with larger tires and heavier loads it is possible that an entirely different form of tire would have been evolved. He supports this contention by citing the analogous mechanical problem of constructing a building with spherical or double-curved walls. (Imagine a Woolworth building with such walls!) The problem is easy until you add weight to the structure, when you must add cross-stays to stiffen the curved side walls, as in the Eiffel tower at Paris. The round pneumatic tire typifies this construction, with high air pressure to act as cross-stays on the tire walls. A better construction, he suggests, would be an Eiffel tower effect with a broad base, producing a pneumatic suspension combined with partial or indirect compressibility in a tire, with only necessary air pressure to carry the load without straining the fabric.

If the desired effect cannot be produced with the round tire carrying lower air pressures, the solution must be sought along the lines of a broad base construction, since it appears unreasonable to have, say, a ten-inch depth of air when the actual flattening is from one to four inches, even when striking sudden obstructions.

Another outstanding defect of present tire construction, concludes Mr. Moore, seems to be the depth of the side ring of the





Automotive Industries

Suggested Pneumatic Tire Design—All Rubber

Base Filler Strip Suggested for Present Pneumatic Type

rim. This is unnecessary in the present straight-side tires, and the deeper the side ring, the heavier the car rides upon it, unless a filler as suggested is used.

"TREADO" TO REPAIR RUBBER GOODS

A new prepared rubber used to rebuild worn treads, and rut-worn tires, is called "Treado." It is claimed to require no cement, heat or patches. It may also be used for mending leaky rubbers and rubber boots, rebuilding rubber belts, fiber soles, rubber soles and heels, etc.—Treado Manufacturing Co., 42 Dwight street, Springfield, Massachusetts.

"LASTAWL" FIBROUS RUBBER SOLING

Another British product is a set of sole and heel pads made of composition rubber and fiber material which is called "Lastawl" fibrous rubber soling. The pads are to be attached to the bottom of a shoe and are intended to preserve the expensive leather sole from wearing out. The long-wearing qualities of the rubber and fiber soling offset the original cost of the pads, which are adaptable to fit any size boots or shoes.—The Lastawl Co., 132-148 Boundary street, Liverpool, England; British & Foreign Agencies Limited, 17 St. John street, Montreal, Quebec, Canada.

What the Rubber Chemists Are Doing

Acceleration of Vulcanization—II[1]

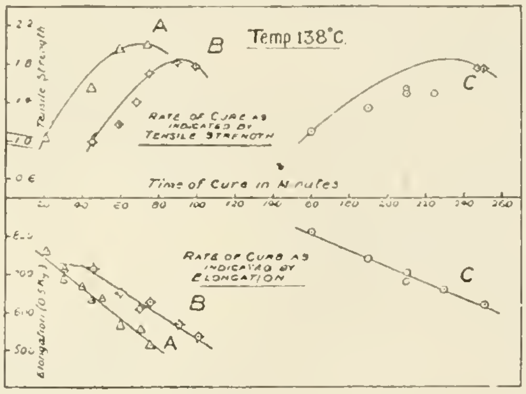
A DISCONTINUITY IN THE EFFECT OF VULCANIZATION

In the previous paper on the above subject[2] the results were given of comparative experiments with aldehyde ammonia, *m*- and *p*-phenylenediamine, thiocarbanilide, and hexamethylene tetramine.

The present paper contains the results of further tests. The method of procedure was the same as that adopted earlier, the most important feature being the use of a heated bath of oil for vulcanization of the samples, whereby the periods of vulcanization are rendered more definite than with steam heating.

Fig. 1 represents the progress of vulcanization of the standard mixing (pale crêpe rubber 90, sulphur 10) with and without the addition of 1 per cent and 0.4 per cent of a high-grade, light calcined magnesia. Judging the rate of vulcanization by the period required for the attainment of maximum tensile strength, the acceleration factor[2] for the magnesium oxide in question is approximately 3.3 and 2.5 respectively for 1 per cent and 0.4 per cent; the presence of the finely dispersed particles of undissolved magnesium oxide somewhat affects the extensibility of the rubber, and the acceleration factor assessed by the periods required for the reduction of the extensibility at 0.5-kilogram per square millimeter to 650 per cent possesses a slightly exalted value.

Magnesium oxide.



A, 1% MgO; B, 0.4% MgO; C blank (S=10%).

Fig. 1.

In Fig. 2 is represented the effectiveness of 0.5 per cent of the same concentration and is approximately equal to the factor for the magnesia in the preceding experiment at twice the concentration.

The insistence of supporters of the use of thiocarbanilide that this substance needs the simultaneous presence of zinc oxide for the development of its catalytic effect, was suggestive of the possibility that the active substance might really be carbodiphenylimide, $C(:N.C_6H_5)_2$, produced from the thiocarbanilide, $CS(.NH.C_6H_5)_2$, by the desulphurizing effect of the zinc oxide, and which is known to be remarkably active chemically. An experiment made with a sample of carbodiphenylimide prepared by the action of mercuric oxide on thiocarbanilide in benzene solution revealed no marked catalytic activity, but on account of the easy polymerization of carbodiphenylimide this evidence could not be regarded as final, and it was considered necessary to produce the carbodiphenylimide *in situ* by the interaction of the thiocarbanilide and mercuric oxide in the rubber mixing.

Parallel vulcanization experiments were therefore made, using (*a*) the standard mixing of rubber 90, sulphur 10; (*b*) the standard mixing with the addition of 1 per cent of thiocarbanilide and 3 per cent of yellow mercuric oxide; and (*c*) the same mixture as in (*b*) but without the thiocarbanilide. The results given in Fig. 3 show that mixture (*b*) possesses no marked advantage in rate of

Potassium hydroxide.

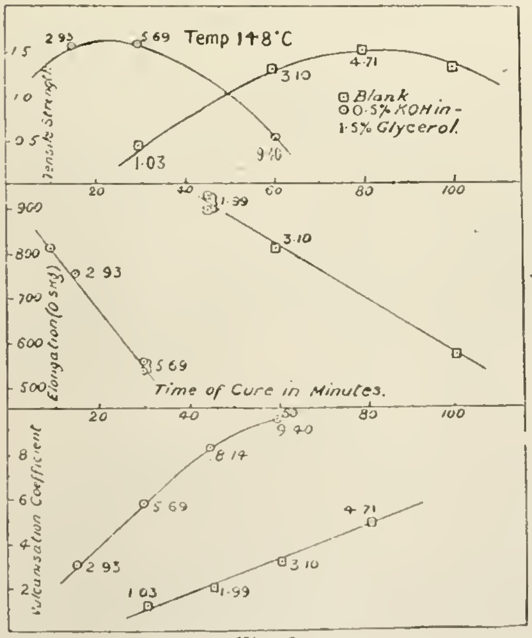


Fig. 2.

Mercuric oxide and thiocarbanilide.

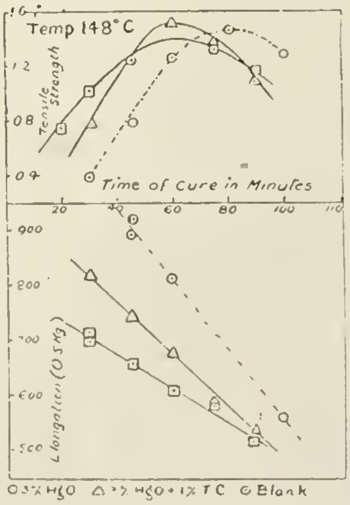


Fig. 3.

Zinc oxide and hexamethylenetetramine.

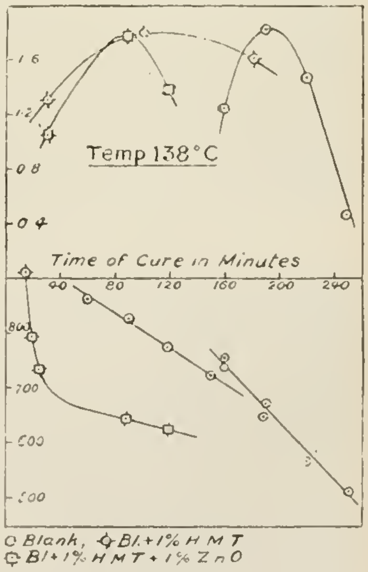


Fig. 4.

potassium hydroxide introduced as a solution in three times its weight of glycerol.[3] The acceleration factor, judged by the tensile strength method or by the period for the production of extensibility of 650 per cent, has a value between 3 and 4, which compares very favorably with many popular organic accelerators at vulcanization relative to (*c*), and that any advantage in rate of

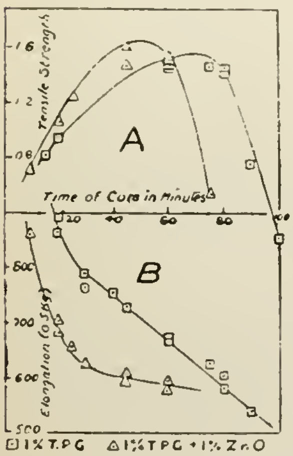
[1] D. F. Twiss and C. W. Howson, Journal of Society of Chemical Industry, August 31, 1920, pages 287-289T.
[2] Part I, D. F. Twiss and S. A. Brazier, Journal of the Society of Chemical Industry, May 15, 1920, pages 125T-132T; abstract, The India Rubber World, August 1, 1920, pages 730-732.
[3] See Twiss, Journal of the Society of Chemical Industry, 1917, page 1185.

vulcanization imparted to a mixing by the introduction of thiocarbanilide cannot be ascribed to the formation of carbodiphenylimide. It is noteworthy, however, that the curves for mixing (*c*) indicate marked catalytic power on the part of the mercuric oxide, which, indeed, might have been expected from the basic character of this substance.

Reference to the previous paper[2] reveals the remarkable fact that, although the mixing containing the organic catalyst, together with zinc oxide, vulcanizes much more rapidly than the blank mixing, the slope of the extensibility or elongation curve in the lower part of the diagrams, instead of being steeper, tends to be more gradual. Closer examination of the behavior of mixtures of this composition reveals the fact that the extensibility curve in question undergoes a remarkable change of direction at an early stage of the vulcanization process. A similar phenomenon is observable with a rubber-sulphur mixing containing as accelerator a mixture of triphenylguanidine and zinc oxide. The results are reproduced in Figs. 4 and 5. In both cases the extensibility at first decreases very rapidly with increasing vulcanization, but finally assumes a much more gradual rate of change.

The presence of zinc oxide appears to be favorable, if not conditional, to the occurrence of the inflexion in the extensibility curve within the usual range of vulcanization. From the results

Triphenylguanidine and zinc oxide.



Curves show rates of cure as indicated by (A) tensile strength, (B) elongation.

Fig. 5.

ldehyde-ammonia and zinc oxide.

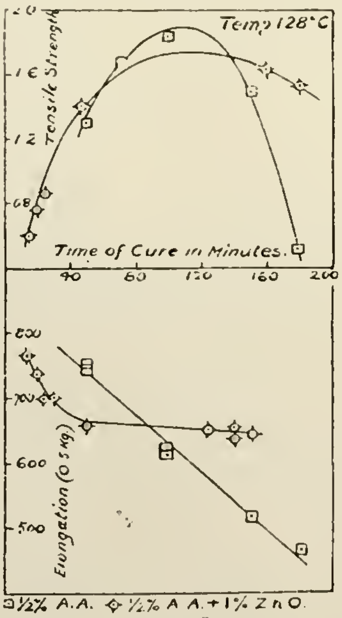
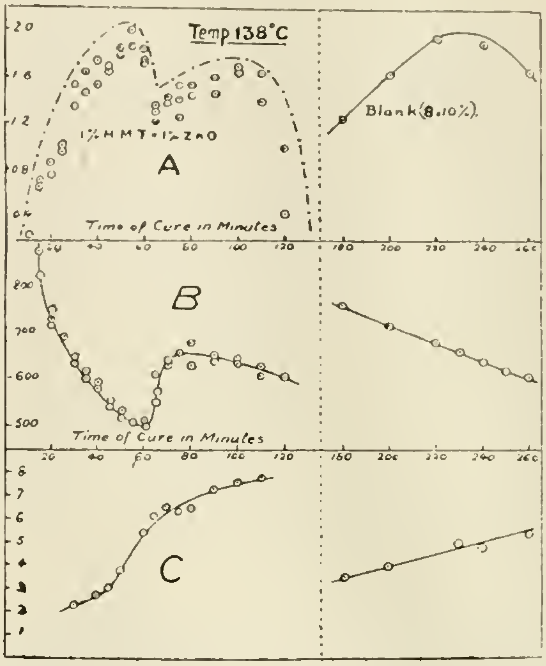


Fig. 6.

given in the previous paper it is evident that no indication of such inflexion exists in the extensibility curves for the mixings, containing aldehyde ammonia. When the aldehyde ammonia is used in conjunction with zinc oxide, however, an inflected extensibility curve is obtained, as is demonstrated by the results in Fig. 6. No such inflexion appears to occur in the progressive vulcanization of the standard rubber-sulphur mixing with the addition of thiocarbanilide and zinc oxide. It is possible, however, that when the bend appears to be absent the extensibility curve undergoes a change of direction at a stage of vulcanization beyond the range of convenient testing.

By concentrating the number of tests around the point of inflexion of the extensibility curve for the hexamethylene tetramine-zinc oxide mixing it is found that, in at least this case, the curve in reality undergoes a double inflexion within a short interval of time, Figs. 7 and 8.[4] This surprising result has been

Hexamethylenetetramine and zinc oxide.

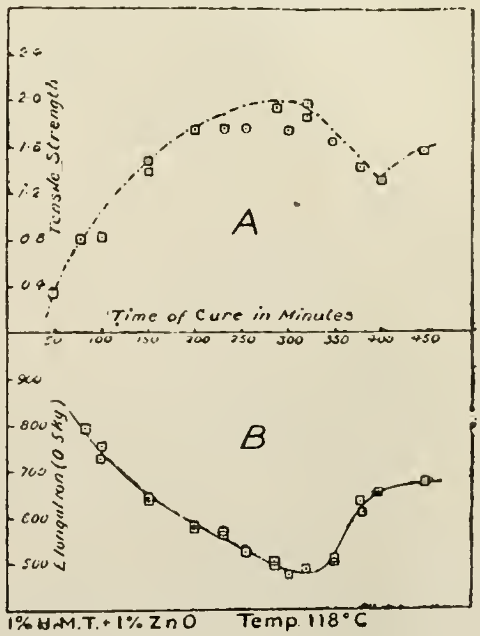


Curves show rates of cure as indicated by (A) tensile strength, (B) elongation, (C) vulcanisation coefficient.

Fig. 7.

confirmed by repeated reinvestigation with different mixings of the same composition vulcanized at the same and different temperatures. The results also indicate some concomitant discon-

Hexamethylenetetramine and zinc oxide.



Curves show rates of cure as indicated by (A) tensile strength, (B) elongation.

Fig. 8.

tinuity in the tensile strength and combined sulphur curves, but the actual outline of the tensile strength curves in Figs. 7 and 8 is given with a certain amount of reserve on account of the somewhat greater variability in the values obtainable. It is note-

[2] Part I, D. F. Twiss and S. A. Brazier. Journal of the Society of Chemical Industry, May 15, 1920, pages 125T-132T; abstract, The India Rubber World, August 1, 1920, pages 730-732.

[4] The effect, which is observable over only a small range of concentration, is probably to be attributed to the physical nature of the zinc oxide as an exceedingly fine powder rather than to its chemical nature; 1 per cent of carbon black (gas black or lampblack) introduces a similar irregularity.

worthy that the inflexion in the extensibility curve occurs at a vulcanization coefficient of 4 to 5, indicating that the first peak in the tensile strength curve represents the ordinary "optimum cure," and that the subsequent peak is the abnormal one. It may also be observed that the maximum extensibility attained just after the inflexion of the curve, has approximately the value of 650 commonly observed at the tensile optimum of a rubber-sulphur mixing vulcanized under ordinary conditions. The explanation of this unexpected irregularity in the alteration in the physical characteristics of the rubber is not at all obvious. It appears probable that the two sections of the extensibility curve indicate two distinct processes causing alteration in the physical characteristics of the rubber, the point of inflexion representing the stage at which the one preponderating earlier is overtaken by the other, which then becomes predominant.

From the curve in Fig. 7 it will be seen that for one mixing it may be possible within a small range of cure to apply three distinct periods of vulcanization and yet to obtain identical extensibility in the resulting rubber in spite of the three different vulcanization coefficients. Such a result, which is independent of the further complications introduced into the relation between the physical properties and the vulcanization coefficient by subsequent aging,[5] serves to emphasize more strongly than ever the lack of simplicity in the relationship between the physical alteration effected in rubber during vulcanization and the chemical change by which this alteration is induced.

LITHOPONE[1]

Anhydrous zinc sulphide is prepared from hydrated sulphide by treating zinc hydroxide, heated to 90 to 100 degrees C. by means of steam, with sufficient sodium sulphite. The resulting caustic soda is decanted off and is used to prepare a fresh amount of zinc hydroxide from zinc sulphate. Periodically it is necessary to purify the caustic soda by crystallization and to reject the mother liquor which becomes charged with impurities.

The precipitation of the zinc hydroxide is performed hot to avoid the formation of a gelatinous product of low density, and the sodium sulphate simultaneously produced is used to prepare barium sulphate and sodium sulphide from barium sulphide. The latter is obtained by the reduction of barium sulphate by means of carbon, thus completing the cycle in which zinc sulphide and precipitated barium sulphate are obtained from zinc sulphate, barium sulphate and carbon. The hydrated zinc sulphide after being washed free from alkali is filtered and dried at 100 degrees C. or in a vacuum. It is then mixed with sulphur and heated to 450 to 500 degrees C. in a muffle furnace, thereby volatilizing any cadmium sulphide, and allowed to cool with exclusion of air.

To prepare lithopone, the precipitated barium sulphate, after washing and drying, is mixed with the desired proportion of zinc sulphide in a revolving horizontal iron cylinder and finally passed through a sieve.

VULCAZOL

The following is quoted from André Dubosc in *Le Caoutchouc et la Gutta-Percha*, September 15, 1920:

"Theoretically," says Spence, "the number of accelerators is infinite and probably the best have not yet been found."

I will not say that Vulcazol, the latest of catalyzers of vulcanization, the remarkable properties of which I have investigated, may not be the ideal body to which Spence referred, but certainly it is one of the most active and interesting among the accelerators actually tested. This singular aldehyde is furfurol derived by condensation with ammonia, and belongs to the group of hydramides. These are neutral nitrogenous bodies formed by the action of aromatic aldehydes and of furfurol on ammonia. Three molecules condense with two molecules of alkali, eliminating two molecules of water, and the action is reversible according to the equation:

$$3\,(C_7H_6O) + 2\,NH_3 = (C_7H_6)_3\,N_2 + 2\,H_2O$$

They are solid, crystalline, slightly soluble in water, soluble in alcohol and ether and decompose by volatilization.

By boiling with water or by the action of dilute acids many of them decompose into aldehyde and ammonia, such as hydrobenzamide, hydrosalicylamide and furfuramide. If held for some time at a temperature higher than their melting point, or treated with boiling potash, they are changed into basic isomers which act as true alkaloids.

Hydrobenzamide furnishes also amarine, anishydramide, anisine, furfuramide and furfurine. Five hydromides are known, namely: hydrobenzamide, cuminhydramide, anishydramide, hydrosalicylhydramide, and furfuramide or furfurol.

[1] British Patent No. 147,658.
[5] Reports of the Progress of Applied Chemistry, 1919, 4, 338.

METHODS OF ANALYSIS

COLORIMETRIC DETERMINATION OF LEAD DIOXIDE IN LITHARGE

The following method, devised by W. V. Morgan, is taken from the *Journal of Industrial and Engineering Chemistry*, November, 1919. It is intended for the determination, in a semi-quantitative way, of lead dioxide in the presence of litharge, and has been used to advantage in connection with rubber work where it is important to know the amount of oxidizing agent present. The method with slight alterations is applicable to the determination of oxidizing agents in general where they occur as an impurity with non-oxidizing agents.

METHOD

A definite amount of litharge, for example, five grams, is boiled for a minute with a solution containing two grams of aniline hydrochloride dissolved in 10 cc. of water and five cc. of concentrated hydrochloric acid. The solution is then cooled to separate any lead chloride which has formed, then filtered to remove the lead chloride and any litharge which has not been dissolved. It is not necessary to convert all or part of the litharge into lead chloride as the action depends upon the oxidizing power of the dioxide only. The filtrate is compared with standards made by adding definite amounts of lead dioxide to the above-mentioned solution. A colorimeter may be employed to estimate the amount of aniline purple formed, or the solutions may be compared in suitable receptacles.

The lead dioxide oxidizes the aniline to aniline purple. The intensity of the color is proportional to the lead dioxide content.

CHEMICAL PATENTS

THE UNITED STATES

Rubber Substitute and Process for Producing It, consisting of treating by heat a mixture of fixed oils and sulphur substantially free from air and moisture under pressure until the period of the elements reacting has ceased.—Harry H. Haseltine and Morton Gregory, Tacoma, Washington, assignors to Western Rubber Co., Tacoma, Washington. United States Patent No. 1,360,744.

THE UNITED KINGDOM

Utilizing Waste Rubber. The separation and recovery for re-manufacture of textile materials and rubber from such articles as automobile or bicycle tires is effected by treating the coarsely ground fragments with a solvent under heat in a closed drum. The mass is worked mechanically until all the rubber is dissolved, when the solution is run off and distilled to obtain the rubber. The extracted textile material is adapted to paper making.—F. Waitz, 78 Obernstrasse, Bremen, Germany. British patent No. 19,585.

VULCANIZING INDIA-RUBBER BY HEATING IN AN ATMOSPHERE OF volatile alkali, such as ammonia or organic alkali, and air, which may also contain inert or reducing gases. About 250 grams of ammonia are used for every cubic meter capacity of the vulcanizing chamber. Thick articles may necessitate the employment of pressure, obtained preferably by the use of previously compressed inert or reducing gases.—E. Tilche, 67 Rue de Tocqueville, Paris. British patent No. 148,350.

GERMANY

VULCANIZED PRODUCTS, SOFT, ELASTIC, DUCTILE AND TENACIOUS, are produced by use of the following chemical substances: (a) ammonium compounds, aliphatic or aromatic amines, or their derivatives or salts, such as diphenylamine, diethylaniline, formanilide, dimethylaniline, dimethyltoluidine, to the extent of 5 per cent or more, and/or (b) aniline sulphate, which in small quantities acts as an accelerator, are added to the materials during vulcanization.—Farbenfabriken formerly Friedrich Bayer & Co. German patents Nos. (A) 303,984 and (B) 305,667.

THE DOMINION OF CANADA

VULCANIZATION OF RUBBER. THE METHOD OF ACCELERATING vulcanization which consists in adding to the mixture to be vulcanized an anhydrous compound resulting from the interaction of strongly basic substances with the nuclear monohydroxy derivatives of benzene in which the hydrogen of the hydroxyl group is replaced by the radical.—The North British Rubber Co., Limited, assignee of Benjamin Dawson Porritt, both of Edinburgh, Scotland, Canadian patent No. 204,387.

RUBBER LIQUID DRESSING FOR SURFACES OF LEATHER AND THE like, comprising a quickly drying combination of a relatively large quantity of asphaltum, a volatile solvent, a relatively small quantity of rubber cement, and a relatively still smaller quantity of black pigment, beeswax and Japan drier.—Alfred R. Caldwell, Whittier, California, U. S. A. Canadian patent No. 204,458.

TIRE CORE FOR VEHICLE TIRES, CONSISTING OF RUBBER MATERIAL formed of approximately 40 parts pure Pará rubber; 20 parts vulcanized rubber; five parts rosin oil; ten parts zinc oxide; five parts petroleum; ten parts flour of sulphur; five parts ammonium carbonate and five parts baking powder, all amalgamated and vulcanized.—Carl Elwood Judson, Toronto, Ontario, Canada. Canadian patent No. 204,467.

VULCANIZING PROCESS WHICH COMPRISES HEATING UNDER vulcanizing conditions a mixture consisting of rubber-like material, sulphur and amino-methyl-isopropyl-benzene.—The Selden Company, assignee of Chester Earl Andrews, all of Pittsburgh Pennsylvania, U. S. A. Canadian patent No. 204,779.

WOOD SUBSTITUTE FORMED BY A PROCESS WHICH CONSISTS IN building up in a mold a plurality of layers of coir fibre mingled or impregnated with a vulcanizable rubber, compressing the composition and vulcanizing it.—George Daubney Rose, Manchester, England. Canadian patent No. 205,163.

ARTIFICIAL RUBBER. AN ELASTIC COMPOSITION COMPRISING GLYcerine, 2¼ pounds; glue, 5⅝ pounds; water, 9 pounds; tannic acid, 2¼ ounces, and a solution of formaldehyde, 4 ounces.—Ernest E. Cathcart, Tecumseh, Nebraska, U. S. A. Canadian patent No. 205,403.

VULCANIZING RUBBER. A PROCESS WHICH CONSISTS IN ADDING to the mixture of rubber and other materials a small proportion of a nitrogen derivative of furfuryl and heating the mixture under usual vulcanizing conditions.—La Société Ricard, Allenet & Cie., assignee of Eloi Ricard, both of Melle (Deux-Sèvres), France.—Canadian patent No. 205,728.

OTHER CHEMICAL PATENTS

THE DOMINION OF CANADA

NO. 205,701 Coated fabric having base coating containing rubber and no nitrocellulose, surface coating containing nitrocellulose and no rubber, and intermediate coatings containing increasing quantities of nitrocellulose and decreasing quantities of rubber as they approach the surface. The Canadian Fabrikoid Limited, Montreal, Que., assignee of E. I. du Pont de Nemours & Co., Wilmington, Del., U. S. A., assignee of H. W. Matheson, Montreal, Que.

GERMANY

PATENT APPLIED FOR, WITH DATE OF APPLICATION

86,268 (May 3, 1918.) Method for the production of synthetic product similar to caoutchouc. Badische Anilin-und-Soda Fabrik, Ludwigshafen, Germany.

PATENTS ISSUED, WITH DATES OF ISSUE

303,224 "K" (October 3, 1916.) Filling materials for the manufacture of soft and hard rubber goods. Farbenfabriken formerly Friedrich Bayer & Co., Leverkusen, near Köln-on-Rhine.

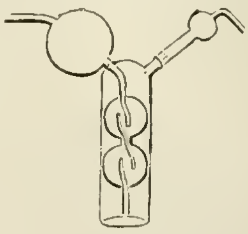
329,593 (November 1, 1918.) Method of manufacturing substances similar to caoutchoue. H. Otto Traun's Forschungslaboratorium G. m. b. H., Hamburg.

329,676 (May 4, 1918.) Method of manufacturing substances similar to caoutchouc. Badische Anilin-und-Soda Fabrik, Ludwigsbafen-on-Rhine, Germany.

LABORATORY APPARATUS

POTASH BULB

THE ILLUSTRATION shows a potash bulb of the Bender and Holbein type. The two bulbs shown herewith are filled with caustic potash solution to the tops of the outflow tubes and a slight excess of solution is added for the outer space. The potash bulb is operated for carbon dioxide absorption by allowing the gas stream to enter the bulb so that the gas must bubble through each bulb and through the outside solution, finally leaving the apparatus through the calcium chloride tube, which retains moisture that otherwise would be carried out, thereby causing loss of weight.—Scientific Utilities Co., Inc., 18 East 16th street, New York City.



POTASH BULB

LABORATORY FILTRATIONS

Efficient laboratory filtrations are readily effected either industrially or for analytic purposes through amphibole asbestos of the actinolite and tremolite varieties, which come as long, short and woolly fibers adapted for technical and commercial filtration, prepared by an American concern.—Powhatan Mining Co., Baltimore, Maryland.

PLATINUM CRUCIBLE WITH CAPSULE COVER

PLATINUM CRUCIBLE

For determination of volatile matter in coals and coke by the standard method given in Technical Papers Nos. 8 and 76, United States Bureau of Mines, a platinum crucible with a capsule cover is used, as shown in the illustration. The percentage of volatile matter obtained by the use of such a crucible at 10-cc. capacity is slightly lower than that obtained by the use of a 30-cc. crucible with ordinary cover, due to the fact that the loss in weight of the sample under test is usually less than 0.3 per cent with the capsule-covered crucible while it often amounts to one per cent in a crucible with flat cover.—American Platinum Works, Newark, New Jersey.

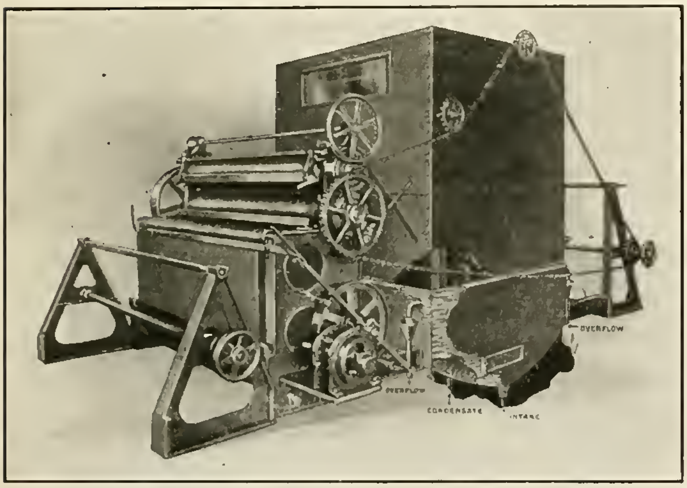
"CRUDE RUBBER AND COMPOUNDING INGREDIENTS" should be in the library of every progressive rubber man.

New Machines and Appliances

SOLVENT RECOVERY APPARATUS

The importance of conserving the health of rubber workers exposed to the fumes of benzine and safeguarding them from the danger of explosion when benzine gas mixed with air reaches a proportion between 28 and 44 per cent is fully appreciated in the industry. In providing means for preventing the escape of benzine gas into mill rooms, rubber manufacturers could, while benefiting their employes, also benefit themselves by installing aparatus which would not only check the spread of the noxious and dangerous fumes, but also collect and liquefy the free volatile hydrocarbon and make it again available as a solvent.

With modern apparatus this result has been accomplished in a high degree and with marked improvement in the health and comfort of millroom workers, not to mention the reduction in insurance rates due to the decreased danger from fire. Calenders, spreaders and impregnators may be provided with gas-tight housings, and by a water cooler the evaporated benzine is condensed on the floor of the housing, whence the liquid is conveyed to the benzine tank, the piping being safeguarded with special devices against fire. Safety valves in the upper half of the housing raise automatically should an explosion occur, and return at once to the former position after an explosion, thus instantly reestablishing the gas-tight inclosure. It is said that with such vents practically no harm can result from any blast. Even though a fire followed inside the housing, it would extinguish itself through lack of atmospheric oxygen. In one test it was shown that 85 per cent of the evaporated benzine was recovered, 10 per cent passed into the finished product, and but 5 per cent was lost.



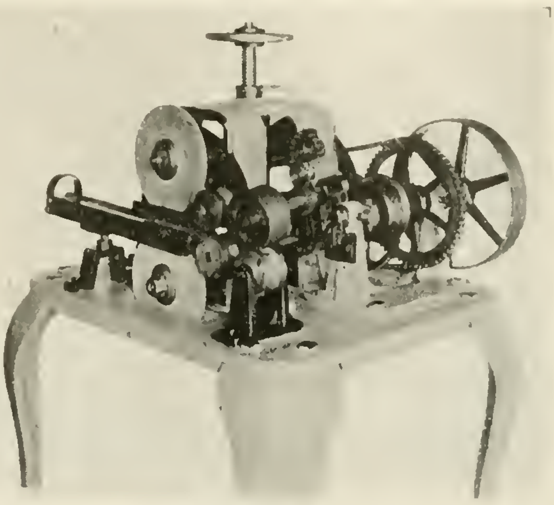
Solvent Recovery Apparatus Applied to Banner Impregnator

Recent applications of the benzine solvent recovery device have been made successfully to a spreading machine and a horizontal calender used in making asbestos packing, and also to an impregnator used in making cord tire fabrics. In the device used on the latter, gasoline or benzol can be recovered quite as readily as benzine.—Benzine Condensation Co., Inc., 224 West 42d street, New York.

MACHINE FOR TRIMMING MOLDED HOSE

The rind or overflow from molded hose, carriage tires, bead fillers or any of the various rubber products of a similiar nature is readily removed by this device. The machine is quickly adjusted to all the different sizes of hose and operates at an average capacity of 3,500 linear feet an hour. However the capacity has been known to be increased to 6,000 linear feet an hour. Both sides are perfectly and uniformly removed at one operation. The guide trough between which the hose travels and through which the abrading wheel operates, is constructed in such a manner that the hose cover cannot be injured in the process of trimming.

Attached to the machine is a measuring mechanism that accurately records all hose trimmed. By disconnecting the abrading parts the machine can be used for measuring only. The complete machine is mounted on an iron table to which is attached four wrought-iron legs with casters for portability.



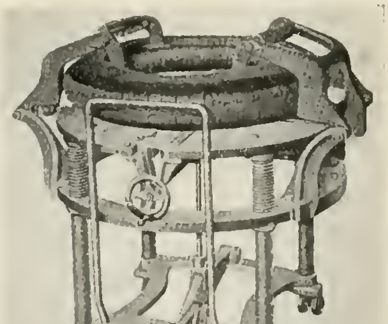
Hose Trimming Machine

An additional claim put forth by the maker is that a most inexperienced workman will get excellent results with this device.—Frank C. Moore, Canton, Ohio.

TUBE AND AIR BAG INSERTING MACHINE

Tire manufacturers will be interested in this machine for opening tires, inserting and removing tubes and air bags. One of the chief claims is that one man can tube or bag tires equivalent to the labor of three men by the hand method.

In operating the machine the casing is placed on the table, engaging four adjustable slides on the lower bead of the tire and four swinging arms on the upper bead. The tire is then uniformly opened by pressure of the foot treadle. The air bag is quickly and easily inserted. A round wooden breaker laid across the tire holds the air bag in position until both sides of the bag enter the casing. The air bags are removed by using a tool designed to enter into the tire and lift one side of the bag out, so that it can be readily picked out by hand without breaking or injuring it.



The Finch Tire Opener

A statement has been made to the effect that by using this device one air bag can be used to cure approximately 100 tires. Whereas by the old method, the average life of the bag was from 8 to 12 tires.

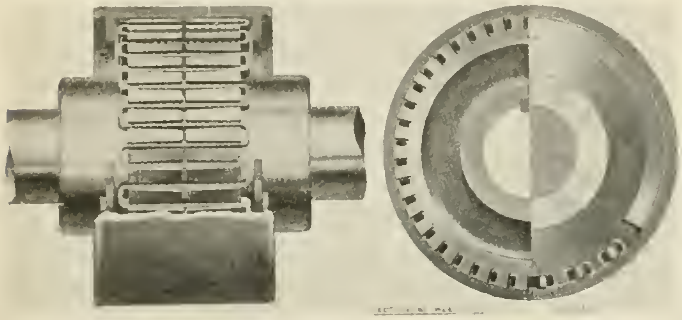
This machine is adjustable to all sizes of tires from 30 by 3½ to 37 by 5 inclusive. The machine is portable and can be moved to the different departments of the factory.—Akron Gear & Engineering Co., Akron, Ohio.

COMPENSATING COUPLING FOR MILL LINES

Rubber manufacturers will be interested in the performance of this flexible coupling, a feature of which is a large overload capacity equal to five or six times the normal value.

The coupling consists of two flanged bosses, one keyed to each shaft end, a steel spring and a shell. The continuous spring is placed in the pitched cross grooves around the circumference of the flanges, filling the grooves at the outer edges only. Under a normal load, the spring is unsupported between the outside ends and is consequently very flexible. As the overloads increase the spring bears further and further along the faces of the grooves and the unsupported span of spring becomes less and less, the increase in load is thus set off by the decrease in span. The stress in the spring does not therefore increase proportionately with the load.

The torque is equally distributed over a large number of units. The spring acts on the outsides of both flanges, thus permitting the coupling to be small in diameter and light in weight. The shape of the spring is such that no end thrust is



Flexible Shaft Coupling

produced between the shafts, which are free to float within limits. The only force exerted between the two shafts is torsion.

The small diameter and the freedom from end thrust allow the cover ring to be a plain cylindrical shell with a grease-retaining ring at each end. This shell is not put on until after the bosses are keyed to the shafts. The safe running speed of this coupling is higher than is ever required in practice. The load on each driving unit is comparatively light, and as the spring chamber is filled with grease, no wear takes place when the shafts are out of line.—Wellman Bibby Co. Limited, 36 Kingsway, London, W. C. 2, England.

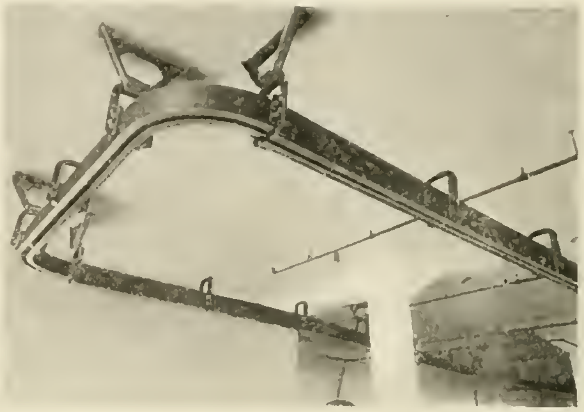
NEW ELEVATOR CONTROLLERS

The C-H line of D. C. and A. C. elevator controllers has been replaced by newer types of simpler construction. The general design is the same. The new features are: standard carbon-to-copper power contacts, which are non-freezing and quiet in operation; and, time limit acceleration by a simple dash-pot relay, which is accurate in operation and provides smooth acceleration regardless of load conditions. The resister, formerly automatically inserted in the solenoid circuit, has been omitted, as the coil is of sufficient size to prevent overheating on intermittent duty, without having to reduce the current when the plunger reaches the end of its stroke.—Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin.

OVERHEAD CONVEYING SYSTEM FOR RUBBER FACTORIES

The short-turn overhead trolley, shown in the illustration, is of undoubted interest to rubber manufacturers, particularly tire makers. It is used to convey a variety of materials, also finished tires mounted on their cores, to the curing room and for carrying the cores back to the tire-building room again, etc. It is a simple system, designed to take up little space, and it is easily installed.

The track consists of two channels held in place by clamps and the weight is carried by supporting points naturally provided by the building. Additional supporting members are used only where necessary, such as for carrying corners or switches. The trolley runs



Overhead Track in a Concrete Building

on the top of the flanges. All the trolley wheels are supplied with ball bearings and are furnished without flanges, consequently there is no binding or jamming against the track on curves. Due to these special features of construction sharp curves in the track as small as 18-inch radius are safely used. The track may be wired to operate electric hoists.

The trolleys are made with two, four, or eight wheels, and have a carrying capacity of 1,000, 2,500 and 5,000 pounds respectively.—S-T Engineering Corporation, Buffalo, New York.

ELECTRICALLY HEATED GLUE-POT

While the electrically heated pot here pictured was designed for heating glue, its utility in other directions is apparent to practical rubber men.

It is a 2-quart electric pot of the dry type, eliminating the water bath entirely. The glue-pot consists of a copper vessel contained in a steel case. It fits snugly, makes a perfect thermal contact with the heating element, and may be easily taken out for cleaning.

One of the strong claims made for this pot is, that the direct

Dry-Type Glue-Pot

contact insures the glue being at the right temperature all the time, that it will not burn, and that the heater cannot be burned out.—Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania.

AN IMPROVED TIRE BUILDER

Of particular interest to tire manufacturers at this time when production costs are paramount is the recent improvement in the Hermann tire building machine. Having a capacity of ten 30 by 3½-inch tires per hour and a proportionate number of larger sizes, this machine automatically guides, positively centers and marks the fabric before it is placed under tension. It is

built in two styles, the "Universal" and the "Special." The former is adapted to build either regular fabric or cord fabric up to and including 5-inch tires. The "Special" is particularly designed for building motorcycle and Ford sizes.—The Hermann Tire Building Machine Co., Columbus, Ohio.

MILL-STONE GRINDER

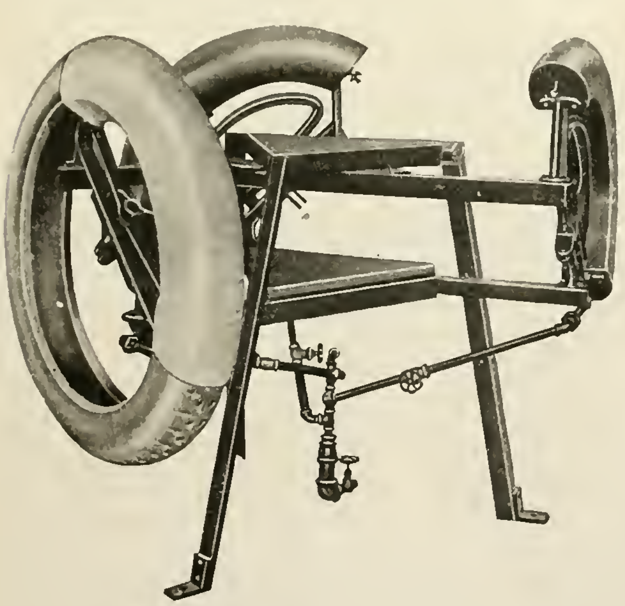
In the manufacture of reclaimed rubber by the mechanical process, an ordinary rubber mill is employed for coarse grinding the combined rubber scrap and fabric, following which the

Buhr Mill Grinder

fine reduction necessary for the complete separation of rubber and fabric is done on a Buhr stone mill. The mill-stones require occasional dressing to maintain them in good operating condition. This is effected by an electrically driven abrasive wheel attached to a flexible shaft, as shown in the illustration. The particular form here shown is the Snow mill-stone grinder.—R. G. Haskins Co., 27 South Desplaines street, Chicago, Illinois.

MACHINE FOR VULCANIZING WHOLESOLES TO OLD TIRES

A great deal of interest is evinced in this mehod of vulcanizing wholesoles to old tire casings from the inside, applying the heat through the various plies of fabric, instead of outside, as formerly done. The vulcanizer consists of a heavy angle-iron frame, which



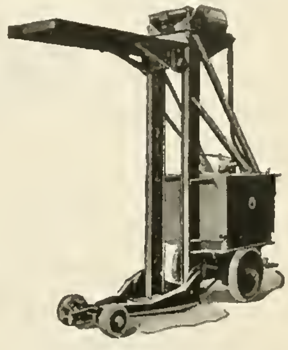
The Eno "Enso" Vulcanizer

supports three steam-heated sectional cores. Each adjustable core is equipped with valves and provided with a pet-cock to allow air to escape from the core while heating. The steam cocks are set to allow a little steam to escape, thus insuring live, dry moving steam necessary for perfect vulcanization.

Three tires can be operated on at the same time. Only a third of a tire is cured at one wrapping. The wholesole attached to the casing is adjusted on the core and wrapped down with wet tape. The core is tightened to give all the pressure possible during vulcanization. A fifty-minute cure is necessary. After curing, the wrapping is removed and another section of the tire is moved over the core and then wrapped for curing. In this way the capacity of the vulcanizer is raised to nine cures, or three tires a day, for each core.—George W. Eno Rubber Co., Los Angeles, California.

AN ELECTRIC INDUSTRIAL TRUCK

Many possibilities of increasing the storage capacities, or reducing the labor item for piling rolls of fabric, crude rubber, tires, molds, or other bulky materials, are offered through the use of this machine.



Lakewood Tier-Lift Truck

The truck frame is rigidly constructed of cast steel. The load platform of corrugated steel may be raised or lowered at will and has a carrying capacity of 4,000 pounds. It is hinged at the column end, to avoid straining the mechanism in case an obstacle is encountered when lowering the platform. The load platform is carried by a cantilever type support. The stresses set up by the load on the platform are distributed from heavy steel rollers each mounted on two annular ball bearings. The load on the platform is balanced over the load-carrying wheels which eliminates the tendency to tip when the load is raised. The motor operating the lifting or tiering mechanism is mounted on top of the columns. It is directly connected through a flexible cushion joint to a worm operating two worm-gears, each of which in turn operates vertical thread steel screws.

At the back of the truck is located the driving apparatus. The storage batteries, main drive motor, and controller are all enclosed and are absolutely dust proof. The drive motor is 24-volt, 65-ampere, with ample overload capacity. Connected to the platform on which the operator stands are the brake and operating pedals. The steering handle and operating control are conveniently placed. The truck is supplied with four wheels, having cast steel axles. The tires on the wheels are solid rubber.—Lakewood Engineering Co., Cleveland, Ohio.

AIR MOISTURE SEPARATOR

Separator for Removing Moisture and Dirt From Air Lines

Compressed air is an important adjunct in rubber manufacture, therefore this air-cleaning device is of interest. This separator is claimed to relieve all troubles occasioned by the presence of moisture, dirt, etc., in the compressed air lines. The air enters the separator through a pipe and strikes against the casing or inside wall at an angle. This causes it to have a centrifugal action and the water or dirt consequently falls to the bottom of the separator, while the clean, pure air passes on to the pipe. There are no delicate parts to get out of order and the only attention required is to drain it once in a while.

These separators are made in two sizes, with a capacity of 150 and 400 cubic feet respectively.—Independent Pneumatic Tool Co., 600 West Jackson boulevard, Chicago, Illinois.

MECHANICAL "TAKE-OFF" OR BATCHING ATTACHMENT FOR THE BOLTON VERTICAL BIAS CUTTER

A feature of much practical value has recently been added to the Bolton vertical bias cutter in the form of a perfected "take off" which receives the fabric strips as they are cut by the machine,

and automatically places them in books or wind-up, if books are not desired. It is claimed that even with the "take off" the cutter still occupies a minimum amount of floor space and increases the efficiency of bias cutting since it produces a great saving in labor and expense. It may be seen at the permanent exhibit on the sixth floor of the Grand Central Palace, 480 Lexington avenue, New York.—Spadone Machine Co., 126 Duane street, New York City.

INNER TUBE SPLICING BRUSH

Camel's-hair brushes are customarily used for applying pure gum cement and tube splicing acid in the manufacture of inner tubes. As a less expensive substitute, the brush here illustrated can be recommended to the trade. It is made with triple thick black Chinese bristles and in widths from 1 to 3 inches, with lengths of hair from 2 to 3 inches.—E. F. Hooper & Co., Trenton, New Jersey.

XXX CHINESE BRUSH

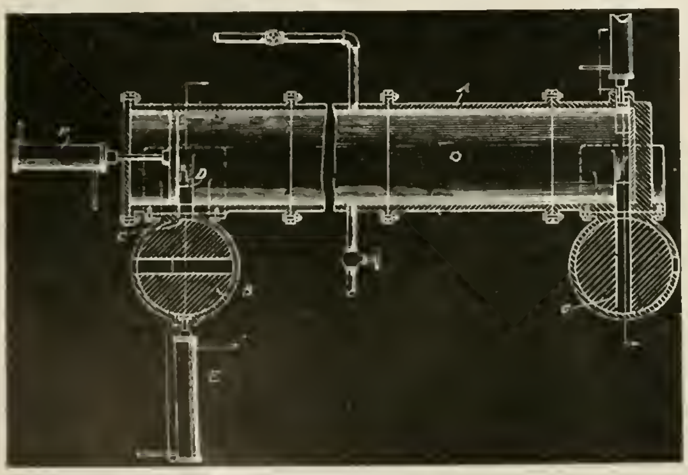
MACHINERY PATENTS

CONTINUOUS TIRE VULCANIZER

This invention provides a heater through which the tires pass continuously and are vulcanized, and at the same time obviates the necessity of exhausting the steam in order to remove the tires, thus eliminating a waste in labor and loss in steam.

This machine consists of a cylinder *A* of suitable diameter to allow the molds containing the tires to be passed through it. Steam of 40 pounds pressure, and at least 287 degrees F. is admitted into the cylinder through a pipe connected with the steam boiler. An exhaust pipe is also provided for the purpose of exhausting steam when necessary.

The tire encased in the mold is placed within the open chamber of the rotatable plug *B*, after which the plug is given a quarter turn. The opening containing the mold will then register with the slot *C* in the casing which is in alinement with the slot *D* in the cylinder *A*. Slot *D* is large enough to allow the admission of the mold carrying the tire into the cylinder *A*. Next the cylinder *E* is operated and its plunger passes through the open chamber of plug *B* and pushes the mold with the tire through the slot *D* into the cylinder *A*. Then the cylinder *F* is operated.



A NOVEL TIRE VULCANIZER

Attached to it is a plunger which is slightly less in size than the inside diameter of the cylindrical vulcanizer. This moves the mold carrying the tire through the vulcanizer.

The operation is repeated until the cylinder is filled with tires, and by the time the first tire reaches the end of the cylinder it has been cured and is ready to be removed. It is forced by another plunger into the open chamber of the rotatable plug *G*, which is turned until it registers with the opening or slot in the casing through which the mold is removed.—Thaddeus F. Baily and Frank T. Cope, Alliance, Ohio. United States patent No. 1,346,158.

MACHINES FOR MAKING BATTERY JARS

WILLARD'S MACHINE AND PROCESS

This invention relates to an apparatus for forming storage battery jars from rubber or rubber compound. It consists of a mandrel *A* in the shape of the jar, mounted on a flat bed *B*, and a number of dies *C* secured to hydraulic rams, which are arranged to direct pressure to the sides and end of the mandrel, thereby forcing around the mandrel *A*, the rubber compound, which is in sheet form, thus forming the jar. Fig. 1 is a sectional plan view, and shows the four side dies in position, while the cross-sectional view shows the sides of the jar already formed and the upper die for the top.

After the rubber compound is rolled into sheets of the correct thickness, it is cut into pieces approximately the size of the top and sides of the jar. These pieces are then placed on the mandrel

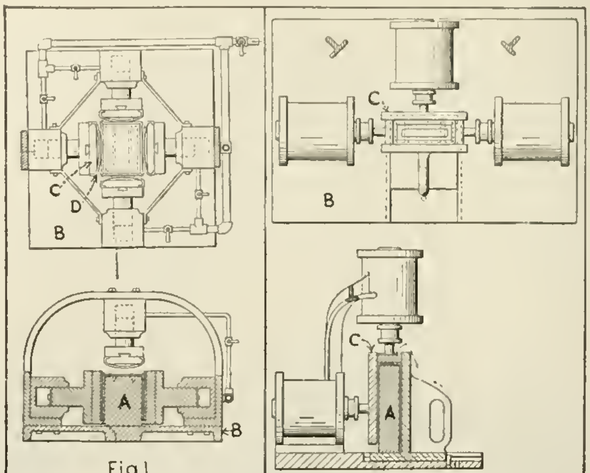


Fig 1 Willard BatteryJar Machine Fig2 Boyer BatteryJar Machine

A. The horizontal dies indicated by *C* are mechanically forced inwardly, compressing the rubber and forming the sides of the jar. The concave spring metal face *D* of each die comes in contact with the rubber first at the middle, then works out to the edges. As the metal face *D* flattens out, it gradually forces out the air between the rubber sheet and the mandrel *A*. At the same time the surplus rubber is brought to the end of the sheet, where it is squeezed together with the rubber from the adjoining sheet, thus forming the corners. The operation of squeezing the ends together eliminates all seams or joints. When the sides are formed, the top die is lowered to form the end of the jar.—Theodore A. Willard, Cleveland, Ohio. United States patent No. 1,352,160.

Patent No. 1,352,161 issued to Theodore A. Willard, of Cleveland, Ohio, covers the process of forming hard rubber storage battery jars with the apparatus described above, covered by patent No. 1,352,160.

BOYER'S MACHINE

Another patent has been issued which covers a method of making battery jars similar to the one mentioned in the foregoing paragraphs. The drawings in Fig. 2 give a concise idea how the jars are made. Plastic uncured rubber, previously rolled to the required thickness and cut to size, is wrapped around the metal core *A*, which is the size of the inside dimensions of the battery jar, except a little longer. As soon as the operator has placed the rubber around the core it is placed in the pressing

machine *B*. Heavy pressure is simultaneously applied to all four sides of the core and to the top, closing all joints and seams. The vertical pressing faces *C* are operated automatically. The plunger for the end of the jar is operated by hand and locked into position. Air pressure of 100 pounds is used. The pressing faces *C* are automatically released and the core with the formed jar is placed in a vulcanizer and cured.—Harry L. Boyer, assignor to Joseph Stokes Rubber Co., both of Trenton, New Jersey. United States patent No. 1,352,170.

OTHER MACHINERY PATENTS

THE UNITED STATES

No. 1,357,217 Rubber mixer. D. R. Bowen and C. F. Schnuck, assignors to Farrel Foundry & Machine Co.—all of Ansonia, Conn. (Original application divided.)
1,357,899 Tire-cutting machine. C. Rasmussen, assignor of ½ to R. T. Ingalls—both of Racine, Wis.
1,357,948 Rubber mixer. D. R. Bowen, Ansonia, and C. F. Schnuck, New Haven, assignors to Farrel Foundry & Machine Co., Ansonia—all in Conn.
1,357,967 Multiplex circular loom for weaving multiply tubular fabric. M. P. Du Pray, Trenton, N. J.
1,357,984 Electrical repair vulcanizer. S. J. Hurwitz, Youngstown, O.
1,358,068 Repair vulcanizer for boots and shoes. H. D. Ferguson, Dowagiac, Mich.
1,358,094 Tire-fabric loom element. H. I. Morris, assignor to The Savage Tire Co.—both of San Diego, Calif.
1,358,120 Mold for vulcanizing tires in repairing. C. L. Smith and E. S. Webster, assignors by mesne assignments to Smith One Heat System—all of South Bend, Ind.
1,358,124 Apparatus and method for making rubber tubes. H. R. Stratford, Cleveland, O.
1,358,289 Apparatus for forming hollow articles of rubber. F. A. Cigol, Paterson, N. J.
1,358,614 Machine for producing textures rubber-coated on both sides. Albert Boecler, Malmö, Sweden.
1,358,702 Rubber mixer. D. R. Bowen, Ansonia, and C. F. Schnuck, New Haven, assignors to Farrel Foundry & Machine Co., Ansonia—all in Conn.
1,358,729 Tipping form for tire repair. T. L. Harkins, Boston, Mass.
1,358,770 Tire repair vulcanizing machine. A. W. Meyers, Milwaukee, Wis.
1,358,820 Vulcanizing mold. A. J. Brown, Union, N. J., assignor to G. & J. Tire Co., Indianapolis, Ind.
1,358,888 Tire retreading mold. J. H. Smith, San Francisco, Calif.
1,358,903 Mold and process for shaping battery jars. H. Weida, Highland Park, assignor to India Rubber Co., New Brunswick—both in N. J.
1,358,941 Collapsible tire core. H. A. Denmire, assignor of ½ to The General Tire & Rubber Co.—both of Akron, O.
1,359,072 Machine for trimming rubber mats. W. J. Kent, Brooklyn, N. Y., assignor to The Mechanical Rubber Co., a New Jersey corporation.
1,359,487 Tire repair vulcanizing press. G. W. Bulley, St. Joseph, Mich.
1,359,489 Machine for molding plastic articles. E. R. Claussen, Hartford, Conn.
1,359,562 Repair vulcanizer. N. M. Anderson, Worthington, Ind., assignor by mesne assignments to T. Bemis, Sr. and Jr., and R. Bemis, trustees of Anderson Steam Vulcanizer Co., a real trust.
1,359,632 Machine for making cord tires. K. O. B. Textorius, New York City, assignor of 1/3 each to T. A. Liebler, Riverside, Conn., and Eli Cahn, New York City.
1,359,779 Device for making tires. P. I. Anderson, Des Moines, Ia. (Original application divided.)
1,360,059 Sectional boot tree. W. C. Troche, Akron, O., assignor to The B. F. Goodrich Co., New York City.
1,360,310 Apparatus for filling tires with resilient compound. Z. Olsson, Toomsboro, Ga.
1,360,736 Clamp for tire cores. E. A. Ericson, Akron, O.
1,360,962 Portable repair vulcanizer. W. Frost, assignor to Harvey Frost & Co., Limited—both of London, England.
1,360,982 Repair vulcanizing apparatus. H. R. Auld, assignor to T. L. Harkins—both of Boston, Mass.

REISSUES

14,994 Tire stripper. G. E. Blaylock, assignor to The G. E. Blaylock Tire & Rubber Co.—both of Baltimore, Md. (Original No. 1,320,728, dated November 4, 1919.)

THE UNITED KINGDOM

147,508 Collapsible cores for manufacturing tires. P. and B. de Mattia, Clifton, New Jersey, U. S. A. (Not yet accepted.)
147,509 Collapsible cores for manufacturing tires. P. and B. de Mattia, Clifton, New Jersey, U. S. A. (Not yet accepted.)
147,960 Rubber mixing machine. F. H. Banbury, Ansonia, Conn., U. S. A.
148,045 Machine for stripping tires. W. H. Phipps, 57 Wick Road, and W. T. Hooper, 71 Repton Road, Brislington, Bristol.
148,077 Device for vulcanizing tire covers. E. Hopkinson, 1790 Broadway, New York City, U. S. A.
148,268 Apparatus for manufacture of pneumatic tires. T. Sloper, Southgate, Devizes, Wiltshire.

THE DOMINION OF CANADA

205,327 Attachment for rubber mixing mills. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of H. A. Weldon, Detroit, Mich., U. S. A.
205,347 Bead-forming ring for molding pneumatic tires. The Howe Rubber Corporation, assignee of John Schmidt, both of New Brunswick, New Jersey, U. S. A.
205,703 Mold for battery jars. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of H. Weida, Highland Park, New Jersey, U. S. A.
205,712 Apparatus and method for asbestos gasket manufacture. The Goodyear Tire & Rubber Co., assignee of E. A. Nall, executrix of Edward Nall, deceased—all of Akron, Ohio, U. S. A.
205,819 Clamp for vulcanizing machines. O. T. De Long, Atlanta, Ga., U. S. A.
205,906 Tire tube deflating machine. M. C. Schweinert, New York City, U. S. A.
206,022 Mold for retreading tires. A. C. Davidson, Lacombe, Alta.

GERMANY

DESIGN PATENTS ISSUED, WITH DATES OF ISSUE

754,130 (November 3, 1919.) Vulcanizing apparatus. Fleming & Co. G. m. b. H., Charlottenburg.
754,141 (June 19, 1920.) Automatic comb-cutting machine. Fritz Scholz, Naumburg a. S.
754,183 (September 8, 1920.) Tire repair apparatus. Hans Schmückert, Molkenmarkt 19, Brandenburg a. H.
754,721 (September 8, 1920.) Hose repair apparatus. Hans Schmückert, Molkenmarkt 19, Brandenburg a. H.

PROCESS PATENTS

THE UNITED STATES

No. 1,357,379 Manufacture of storage-battery separators. H. L. Boyer, assignor to Joseph Stokes Rubber Co.—both of Trenton, N. J.
1,357,779 Construction of doll head, using as mold for shaping fabric face, soft rubber applied to a die. L. R. Kampes, Atlantic City, N. J.
1,357,784 Manufacture of connected blow-out patches from worn pneumatic tires. B. J. Levin, New York City.
1,358,957 Producing composite rubber and fabric cycle saddle tops. J. Jelley, Coventry, and H. Jelley, Birmingham—both in England.
1,359,075 Manufacture of tire valves. H. P. Kraft, Ridgewood, N. J.
1,359,919 Manufacture of hard rubber combs, etc. J. Reardon, Bloomingdale, assignor to American Hard Rubber Co., New York City—both in N. Y.
1,360,486 Heating crude rubber in inert, non-oxidizing atmosphere. J. V. Worthington and A. W. T. Hyde, assignors to The Dunlop Rubber Co., Limited—all of Regents Park, London, England.
1,360,702 Weaving fabric from rubberized yarn. C. Zeglen, Cleveland, O.

THE UNITED KINGDOM

147,387 Joining ends of inner tubes. Fuller's United Electric Works, Limited, Woodland Works, Grove Road, Chadwell Heath, Essex, and P. J. Hawkins, 67 King Edward Road, Walthamstow, London.
147,910 Manufacture of leather substitutes from used tires. A. Korn, 6 rue de Bretagne, Levallois, Seine, France. (Not yet accepted.)
148,327 Finishing tire fabrics. Obligser Leinen- und Baumwollweberie P. de Weerth, 5 Marktstrasse, Obligs, Germany. (Not yet accepted.)

THE DOMINION OF CANADA

205,640 Applying outer tire members to worn casings. C. C. Gates, Denver, Colo., U. S. A.

"JEM" RUBBER REPAIR AND CEMENT

"Jem" rubber repair for tires and tubes includes a can of rubber compound and one of solvent to be used as a cement. Applied cold, it is said to be self-vulcanizing and the makers guarantee a repair to last the life of the tire.—Amazon Rubber Co., 244 North Fifteenth street, Philadelphia, Pennsylvania.

"KEYS KUMFORT" HOSE SUPPORTER

A new kind of hose supporter for children which has recently been patented by a California woman, consists of a very short skeleton waist of cotton material, bound around the edges, with two strips of elastic webbing across the back and two more stitched to the lower edges of the waist beneath the arm-holes on each side, to form a triangular support for the stocking supporters attached. The garment acts as a shoulder brace and gives easily when stooping. It is very comfortable to wear because the pull of the stockings is distributed evenly on the wide shoulder band instead of on a narrow strap which would tend to cut and bind. The garment slips on over the head and has no buttons or pins to become loose.—Mrs. Hattie Keys, 717½ South Crocker street, Los Angeles, California. Canadian patent No. 201,795.

New Goods and Specialties

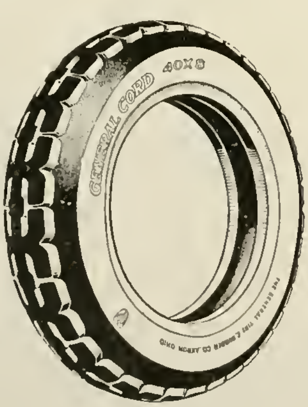
"PNEUMATIC" BATHING CAP

A new and comfortable waterproof bathing cap that does not stretch to fit the head is held in place by pneumatic pressure. An air-cushion band is attached inside the rim and may be inflated to head size, holding the cap on easily and securing a flexible adjustment entirely controllable at all times. The crown of the cap may be worn as loosely as desired, permitting any arrangement of the hair, and avoiding headache caused by pressure as in ordinary tight-fitting rubber bathing caps. The hair does not get wet as no moisture can possibly leak in past the firmly fitting air cushion-band. The "Pneumatic" bathing cap is good-looking and stays firmly on the head.—The Pneumatic Bathing Cap Co., 14 East Jackson Boulevard, Chicago, Illinois.

"Pneumatic" Bathing Cap

A PIONEER PNEUMATIC CORD TRUCK TIRE

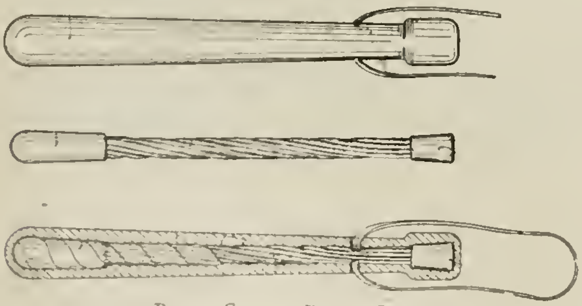
Among the pneumatic cord truck tires that have attracted favorable attention is the General, claimed to be the pioneer in its line. Cord tires are generally claimed to be resilient to the greatest possible degree, and therefore do not eat up the car's power through friction in the tires themselves, as each cord is insulated in its own coating of rubber. General cord truck tires are built of specially compounded stock on the best cord fabric, with wear-resisting treads, and are claimed to have a record of 12,000 miles on the original tread.—The General Tire & Rubber Co., Akron, Ohio.



General Cord Truck Tire

A NORWEGIAN POLICE CLUB, RUBBER-COVERED

A humane police club which, according to the inventor, will "disable the antagonist at one stroke without thereby damaging him," comprises a core of wire rope with ferrules at each end, covered with rubber. At the handle end the club is provided with a carrying knot which is threaded through the wire rope core. This unique but practical weapon has been adopted by the police departments of Christiania, Norway, and Copenhagen, Denmark, and all-wood clubs have been discarded. It is the invention of a Norwegian policeman, Emil Evensen Welflen, and has been patented by him. United States and Canadian patents are for sale by Anthon Berg, Christiania, Norway.



Rubber-Covered Police Club

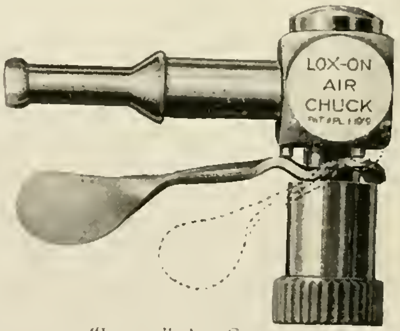
DETACHABLE FASTENER FOR HATS

The "Tight-On" hat elastic is a patented and clever variation of an old idea. It obviates sewing on elastics, can be attached in a moment to any hat, and will not pull out under any strain of high winds. It consists of a length of elastic with double pins on each end that are to be pierced through the hat and then spread apart. The elastic is adjustable in length by means of a slide. The "Tight-On" hat elastic is made in black or white and is adapted to children's hats or sports hats. It is a boon to the woman who wears her hair bobbed.—Marcus & Smith, 376-380 Lafayette street, New York City.

"Tight-On" Hat Elastic

A CONVENIENT TIRE ACCESSORY

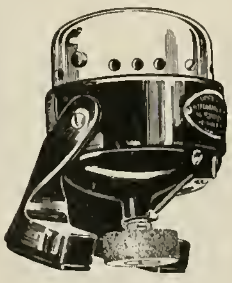
The "Lox-on" air chuck, shown in the accompanying illustration, is intended for use on compressors in inflating tires. It contains a rubber cylinder that fits loosely over the valve, but grips it tightly when the lever is turned on, preventing any escape of air. The check-valve cannot be smashed by jamming, and the metal baffle-plate prevents jamming over the valve shoulder, protecting the valve. All parts are standardized and interchangeable.—Automatic Tire Valve Corporation, 1755 Broadway, New York.



"Lox-on" Air Chuck

PHONOGRAPH MOTOR WITH RUBBER WHEEL

A phonograph motor has been devised which has a wheel of sponge rubber to revolve the turn-table. Any convenient electric light socket furnishes the power, connection being made by a cord of the desired length. There is an inside automatic switch which controls the current and stops the motor when the record is finished. The sponge rubber wheel permits the turn-table to revolve smoothly and evenly, keeping up any rhythm desired for dancing, and doing away with the annoyance of interrupting some choice musical selection to wind up the motor. The "Simplicity" motor is not large and conspicuous. It is finished in nickel and black enamel and is practically dustproof and "foolproof" as there are no exposed parts to get out of order. It attaches easily to any make of phono-

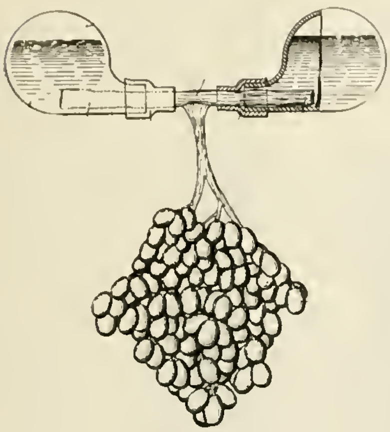


"Simplicity" Phonograph Motor

graph. All that is required for installing the motor is to remove the crank handle and let the spring motor of the phonograph run down.—Shelton Electric Co., 16 East 42d street, New York City.

WATER VESSEL FOR KEEPING FRUIT AND VEGETABLES

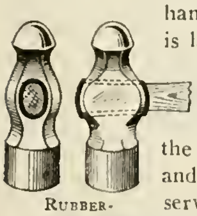
A novel water-containing vessel for preserving fruits and vegetables in a fresh state has recently been patented in the United States by an Argentinian. The device consists of a glass bobbin containing water, fitted with a rubber socket which fits closely over the stem of the fruit and prevents evaporation of the water which penetrates into the stem of the fruit as needed to preserve its freshness. This invention is particularly applicable to choice bunches of grapes, which can be kept in perfect condition for many months by fitting bobbins with rubber sockets to both ends of the vineshoot. The grapes are then suspended in a natural position and all the water in the bobbins is maintained above the stem to be absorbed by the fruit as necessary.—Luis Robichon, Mendoza, Argentina. United States Patent No. 1,360,024.



Water Vessel with Rubber Socket

A RUBBER-CUSHIONED HAMMER

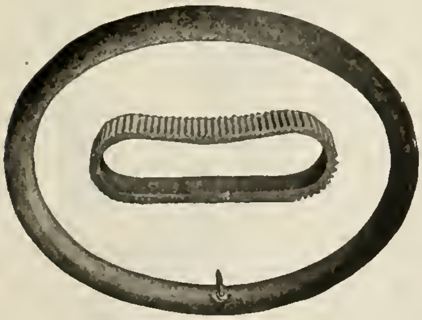
A new use for rubber is found in its application to a hammer handle, thereby firmly holding the head to the handle without wedges. A red rubber gasket is fitted over the handle and the hammer head forced on over it. Its present use is largely in rehandling hammers and sledges, but the inventor says that several hammer manufacturers are considering placing it in their manufactured product. Like the rubber tire, the rubber gasket makes these hammers resilient and tends to lessen shock to the user, thus conserving the workman's strength. He can use a lighter hammer, also, and attain equal efficiency, while he does not have to carry any "extra" hammer to meet the emergency of the hammer head flying off. The cushioned hammer, therefore, acts as a safety appliance, preventing accidents to workmen, in addition to its other advantages.—H. S. Isham, Belmar, New Jersey.



Rubber-Cushioned Hammer

A CORRUGATED INNER TUBE

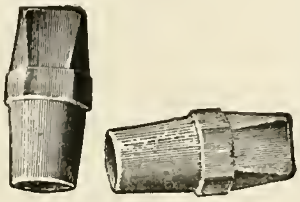
By a special patented process, the "NoCeem" inner tube is made of red rubber in a mold which gives it an annular shape and corrugates that portion of the exterior surface which contacts with the tire casing. The compound used is said to contain a much higher percentage of actual rubber than generally used for inner tubes. The size, in both millimeters and inches, is molded on the surface immediately at the valve, for convenience, and the valve itself is seated on a specially reinforced fabric and rubber insert, properly and integrally vulcanized. The corrugations prevent the tube from sticking to the casing and its shape makes it practically impossible to exhaust the interior air, thereby minimizing the tendency to stick together or be pinched by the rim.—NoCeem Rubber Corporation, Harrison, New Jersey.



"NoCeem" Inner Tube

PENCIL ERASER EASILY ATTACHED

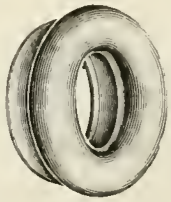
An invention which every pencil user will welcome is a practical rubber tip called the "Wedge" eraser, because of its peculiar shape. When an attached eraser is desirable it is readily slipped on and will stay on. The "Wedge" will erase large areas readily without smudging. It equals a "rubber finger" for turning pages and keeps the pencil from falling out of the pocket. Its pyramidal sides keep the pencil from rolling off the desk and its weight and shape keep the point upright if dropped. It is made of the best quality soft red rubber and is claimed to outwear three pencils.—Joseph Dixon Crucible Co., Jersey City, New Jersey.



"Wedge" Pencil Eraser

COMFORT IN TELEPHONING

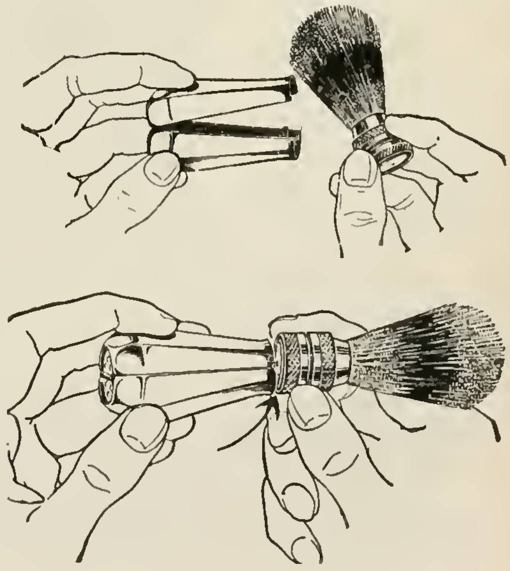
A pneumatic receiver pad is one of the new conveniences for use with the telephone. It is made ring-shaped of soft rubber to fit over the hard rubber receiver, and encloses sufficient air to permit the receiver to be pressed closely to the ear, thus excluding all outside sounds and aiding conversation in a noisy office.—The Davol Rubber Co., Providence, Rhode Island.



Pneumatic Receiver Pad

"EVER-READY" FOLDING SHAVING BRUSH

A novel convenience for travelers is a shaving brush that fits compactly into its handle, thus keeping the brush absolutely safe from contamination and also protecting other contents of a traveling bag from contact with a wet brush. The bristles are a mixture of best quality badger hair and are vulcanized in hard rubber. This well-known feature of high-grade brushes does away with the annoyance of loose bristles, as once set in the rubber it is impossible for them to come out, no matter how long the brush is in use. To use the brush, the hinged cover is opened and closed again and the end of the brush fitted into the opening. The handle is made with patented, reversible, self-locking ferrule and when folded and packed ready for traveling

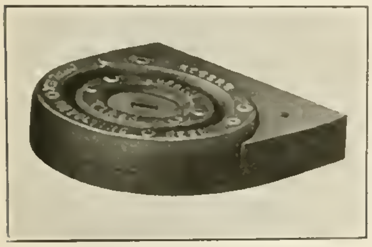


"Ever-Ready" Folding Shaving Brush

becomes a ventilated compartment which permits the wet brush to dry. All metal parts are built of heavy brass, highly nickeled.—American Safety Razor Corporation, Jay and Johnson streets, Brooklyn, New York.

A NEW TYPE OF RUBBER HEEL

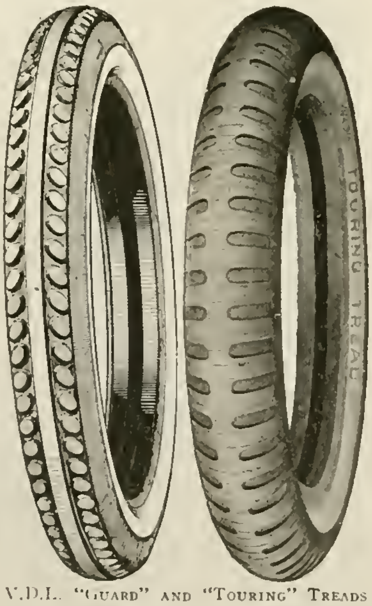
Rubber heels that wear down on one side in the same manner as leather heels will have to look to their laurels, if the makers of the newer type revolving rubber heels speak true. The Rogers revolving rubber "Duplex" heel is made on a principle generally in use in Europe but little known on this side of the water. As shown in the illustration a disk of rubber is sunk below the level of the heel. This revolves in use, all parts receiving the wear alike, and it absolutely cannot "run down." Slipping is claimed to be reduced to a minimum and maximum wear is attained, as the heel is discarded only when worn thin and flat all over.—The Rogers Rubber Co., Inc., Century Building, Pittsburgh, Pennsylvania.



Rogers 'Cavity Revolving "Duplex" Heel.

CANADIAN TIRE DESIGNS

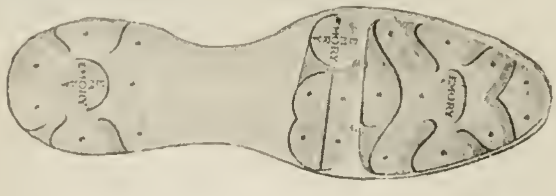
Two new designs of the Canadian "V. D. L." tires are the distinctive "Guard" and "Touring" tread casings, designed to meet various highway conditions. "V. D. L." tires are all Canadian in manufacture and are backed by Canadian capital. They are claimed by the maker to be the result of the experience of some of the foremost tire engineers on the North American continent. They are hand-made to meet Canadian road conditions and give great mileage and more comfort, being supersize.—Van der Linde Rubber Co., Limited, 142 Western Road, Toronto, Ontario, Canada.



V.D.L. "Guard" and "Touring" Treads

AN AMERICAN SOLE AND HEEL PAD SET

The Emory rubber sole pad is a patented device, made in two parts, to be attached to the leather half-sole of a shoe, the principle being the same as that of the rubber heel. This sole is made in two pieces in order to give greater service, as a whole half-sole of rubber is likely to crack at the point of bending. It is not heating to the feet, and it cushions the shoe, making walking easy by absorbing shocks. It is non-skid, which is a big asset in wet weather. Emory rubber heels are designed to conform to the sole, are as near non-skid as possible, and are made of springy live rubber.—The Emory Rubber Sole Co., 705-706 Board of Trade Building, Norfolk, Virginia.



Emory Sole and Heel Pads

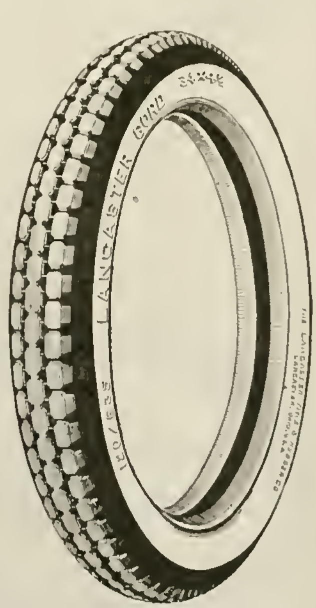
RED SHORT BOOTS FOR SERVICE

Rubber boots that are built like tires for miles of hard wear are the product of a rubber manufacturer whose tires are guaranteed for a long mileage. Hood "Red" boots are built for service and every place where hard wear can attack a rubber boot has been made the subject of special study with the idea of fortifying these places to resist the hard usage. The heavy gray rubber molded heels and eight-ply soles are "tough on rocks" and are joined by the Hood tire process to the high-grade red uppers. The soles run all the way under the heels and cannot come apart; they are claimed to give better mileage than the soles of the average boot without cracking. An extra thick vamp and heavy duck lining add materially to the life of the boot, which is cured under heavy pressure. Hood "Red" boots have light-colored foxing and look just as well as they wear.—Hood Rubber Products Co., Inc., Watertown, Massachusetts.

Hood Short Red Rubber Boot

A DUAL TREAD CORD TIRE

A distinct dual tread cord tire which is the result of five years of experiment and research work is the "Wiregrip" tire. The makers assert that in this new tire is embodied the duel vacuum tread. Skid blocks extending across the carcass of the tire diagonally permit the carcass to flex freely in any desired direction. The cross section is built wide and low, distributing the flex of the tire from bead to bead. It is said to develop remarkable ease of riding and in fast driving to show a marked tendency to hug the road.—The Lancaster Tire & Rubber Co., Columbus, Ohio.



Lancaster "Wiregrip" Cord

VALVE CAPS BOXED IN SETS

Recognizing a need in the tire world, a manufacturer of tire valves is putting out sets of five caps in small metal boxes. Valve caps were found missing from 1309 Broadway automobile valve-stems in a recent survey.—A. Schrader's Sons, Inc., 783 Atlantic avenue, Brooklyn, New York.

The Problem of Gutta Percha Cultivation Solved

More than twenty years ago gutta percha was successfully extracted from the leaves of the *Palaquium* or gutta percha tree. The product, however, was very soft and usually of a greenish color. It was not particularly valuable and what promised to be a valuable process was therefore abandoned. Taking a hint from the mechanical extraction of rubber from dried shrubs and vines, experiments were undertaken by Dr. Tromp de Haas in the Government Botanical Gardens in Java. Dried leaves were used and the process is so far successful that the gutta percha is now extracted in commercial quantities at a profit. The fact that leaves from young plants in the nursery, as well as leaves from mature trees may be used, greatly increases the available supply and indeed makes gutta percha cultivation on a large scale possible. The history of the leaf extraction experiments that follows is extremely interesting.

Gutta Percha Nursery

Extracting gutta percha from the leaves of gutta-yielding trees was first accomplished by Rigole[1] in 1892. He used carbon bisulphide as a solvent on finely ground green leaves. In 1896 Serullas[1] obtained a patent[2] for a process in which hot toluol was used for extraction, and the solution precipitated with acetone. Rosin oil was sometimes used instead of acetone but with indifferent success.

The method named after Obach[1] is based on the solubility of gutta in petroleum ether at boiling point and the capacity to precipitate when cooling at 15 degrees.

All of the above produced a soft inferior product, and experimenters turned to mechanical extraction as the only solution.

Mechanical extractors embody grinding mechanisms for pulverizing the leaves, rolls for agglutinating, sieves and water for separating the woody matters from the gum. Guayule and grass rubber extraction machines[1] such as the Abbé pebble mill, the De La Corte crusher, the Bridge crusher, the Guiget crusher and the Valour crusher may all be adapted to this sort of work. There are in use today two systems of mechanical extraction in the Dutch East Indies, the Ledeboer, and the Tromp de Haas.

The advantage of the mechanical process over the chemical is that much more material can be handled at one time, making the exploitation of an estate easier. The Ledeboer method is employed with success by the Nederlandsche Getah Perchafabriek, Singapore. Natives collect the leaves in the forest and bring them to the factory where the gutta is extracted. Since the natives are anxious to bring in as large a quantity of leaves as possible, they do not scruple to mix any kind of leaves with those from true gutta-yielding trees.

The Tromp de Haas system is in vogue at the Experiment Station at Tjipetir, Java, where the government has large gutta plantations. Among the advantages of collecting leaves on a plantation as against collecting in a forest, is the obvious one—that coolies cannot mix valueless leaves with the useful ones.

So successful is the mechanical process that a second gutta percha plantation has already been started at Tjitarik, Preanger Regency, Java.

As for yields obtained by the mechanical process, it has been found that a 10-year-old tree gives 15 pounds of dry leaves per annum, from which is obtained 9 to 10 ounces of gutta percha. The annual production by this means at Tjipetir is given as follows: about 38 tons in 1914, 47 in 1915, 51 in 1916, 67 in 1917, and 68 in 1918.

While it was at first thought that the leaf gutta percha would be inferior to that obtained by tapping methods, the process has so far been improved that leaf gutta is now used for insulating submarine cables and many other purposes.

[1]Rubber Machinery. By H. C. Pearson. Pages 257-270.
[2]British patent No. 11,166, 1892.

TRADE-MARKED BRANDS OF BELTING, HOSE AND PACKING

Recent rubber products of interest include an oil-resisting packing, grain and ore-elevator beltings, and steam hose—all made by the same manufacturer.

"Volunteer" packing is a black, oil-resisting sheet packing, specially compounded for use in contact with oil.

"Kohinoor" elevator belt is made of a special heavy duck and high-grade friction rubber, the outstanding feature being the unique way in which the rubber cover is anchored to the body of the belt. This is done by the application of a layer of coarse meshed fabric known as "cider cloth" between the outside ply and the rubber cover. The rubber compound used for the cover is forced through the meshes of this cider cloth and thus anchored to the body of the belt. The cover cannot blister or peel off, thus making the "Kohinoor" an ore-elevator belt suitable for severest service.

"Grainvey" is a very strong, rubber-covered belting, made of closely woven, rubber-impregnated duck, especially for conveying grain horizontally or on an incline, troughing easily without spilling.

"Elevay" belting is made of heavy, woven duck, impregnated with rubber, and is intended especially for bucket elevators and wherever extra strength is required.—The Diamond Rubber Co., Akron, Ohio.

WAR DEPARTMENT SPECIFICATIONS FOR MECHANICAL RUBBER GOODS—IV[1]

War Department Specifications No. 333-1-1, frequently referred to in the following specifications, were published in The India Rubber World January 1, 1920.

LABORATORY TUBING

War Department Specification, No. 333-1-15—June 5, 1919

(Authority of Supply Circular No. 8, P. S. & T. Div., January 24, 1919)

General.—(a) This specification covers the requirements for compounded and pure-gum tubing for use in chemical laboratories.

(b) See War Department Specification No. 333-1-1, headed General Specification for Mechanical Rubber Goods[2], which is made a part hereof, except in such cases as the provisions below directly conflict. In such cases the word and meaning of this specification will govern.

Construction.—See General Specifications.

(a) Dimensions as follows:

Compounded		Pure Gum	
I. D.	Wall Thickness	I. D.	Wall Thickness
Inch	Inch	Inch	Inch
1/ 8	1/32	1/ 8	1/32
3/16	1/16	3/16	3/64
1/ 4	1/16	1/ 4	1/16
1/ 4	1/ 8	3/ 8	5/64
....	....	1/ 2	3/32

(b) Lengths of the compounded tubing to be as specified; that of pure gum will be in 12½-foot lengths.

(c) Method of manufacture shall be optional with manufacturer provided a tubing of the quality desired is produced.

Branding.—No branding required.

Material.—See General Specifications.

(a) Compounded tubing shall contain not less than 40 per cent of fine Pará rubber; remainder to consist of such ingredients as will insure good aging qualities and service.

(b) Pure-gum tubing shall contain not less than 92 per cent fine Pará, not more than 5 per cent sulphur. Remainder of the compound shall consist of such ingredients as will insure good aging qualities and service. The use of reclaimed rubber is not permitted.

Inspection.—See General Specifications.

(a) Inspector may cut at random a 4-foot section from each lot of 1,000 feet or less.

Tests.—See General Specifications and following table.

(a) Test specimens shall be ¼ by 1 inch at constricted part.

Table

	Tensile Minimum Pounds	Ultimate Elongation, Minimum Inches	Set Stretch for 10 Minutes Inches	Per Cent Set After 10 Minute Rest, Maximum
Compounded	1,300	1–5½	1–4½	25
Pure gum.........	1,300	1–8	1–7	12

CLOTH INSERTION TUBING

War Department Specification, No. 333-1-16—June 5, 1919

(Authority of Supply Circular No. 8, P. S. & T. Div., January 24, 1919)

General.—(a) This specification covers the requirements for C. I. tubing for general use.

(b) See War Department Specification No. 333-1-1, headed General Specification for Mechanical Rubber Goods[2], which is made a part hereof, except in such cases as the provisions below directly conflict. In such cases the word and meaning of this specification will govern.

Construction.—See General Specifications.

Dimensions.—(a) See the following table.

Branding.—See See General Specifications.

(a) Use letters "C. I."

Material.—See General Specifications.

(a) Fabric plies shall be of sheeting or a plain weave fabric weighing not less than 4¾ ounces per square yard.

Inspection.—See General Specifications.

Tests.—See General Specifications and following table.

Table

Size	1/8-Inch	3/16-Inch	1/4-Inch
Fabric, plies, minimum..................	2	3	4
Thickness:			
Tube, minimum ....inch	3/64	3/64	3/64
Cover, minimum ....inch	1/64	1/32	1/32
Ultimate elongation, tube and cover, minimum ....inches	2–6	2–6	2–6

[1] Continued from The India Rubber World, September 1, 1920, pages 805-808.

[2] See The India Rubber World, January 1, 1920, page 214.

Tensile:			
Tube, minimum ....pounds	500	500	500
Cover, minimum ....pounds	450	450	450

WHITE MACHINE RUBBER TUBING

War Department Specification, No. 333-1-17—June 5, 1919

(Authority of Supply Circular No. 8, P. S. & T. Div., January 24, 1919)

General.—(a) This specification covers the requirements for tubing for general use.

(b) See War Department Specification No. 333-1-1, headed General Specification for Mechanical Rubber Goods[2], which is made a part hereof, except in such cases as the provisions below directly conflict. In such cases the word and meaning of this specification will govern.

Construction.—See General Specifications.

(a) Dimensions shall be as follows:

I. D.	Wall Thickness
¼-inch	1/16-inch
⅜-inch	5/64-inch
½-inch	3/32-inch
¾-inch	1/ 8-inch
1-inch	1/ 8-inch
1½-inches	3/16-inch

Branding.—Not required.

Material.—See General Specifications.

(a) Tubing shall be white.

Inspection.—See General Specifications.

(a) Inspector may cut at random a 3-foot section from each lot of 1,000 feet or less.

Tests.—See General Specifications and following table.

(a) Test specimens to be ¼ by 1 inch at the constricted part.

Table

Tensile, minimum ....pounds	900
Ultimate elongation, minimum..................inches	1–5
Set:	
Stretch for 10 minutes.......................inches	1–4
Per cent set after 10-minute rest..............maximum	25

RUBBER TIPS FOR FLEXIBLE METALLIC HOSE

War Department Specification, No. 335-1-1—June 5, 1919

(Authority of Supply Circular No. 8, P. S. & T. Div., January 24, 1919)

General.—(a) This specification covers the requirements for molded tips to be used with metallic hose in airplanes, etc.

(b) See War Department Specification No. 333-1-1, headed General Specification for Mechanical Rubber Goods[2], which is made a part hereof, except in such cases as the provisions below directly conflict. In such cases the word and meaning of this specification will govern.

Construction.—See General Specifications.

(a) Size and shape, together with metal tips, as specified in proposal.

Branding.—See General Specifications.

Material.—See General Specifications.

Inspection.—See General Specifications.

(a) Manufacturer shall furnish inspector with eight strips for test purposes, as specified in the General Specifications, for each shipment.

Tests.—See General Specifications and following table.

Table

Tensile, minimum ....pounds	800
Ultimate elongation:	
Maximum ....inches	2–9
Minimum ....inches	2–5

BUMPERS

War Department Specification, No. 335-1-3—June 5, 1919

(Authority of Supply Circular No. 8, P. S. & T. Div., January 24, 1919)

General.—(a) This specification covers the requirements for automobile bumpers.

(b) See General Specifications for Mechanical Rubber Goods[2] which are a part hereof.

Construction.—See General Specifications.

(a) Size and shape as specified in proposal.

Branding.—See General Specifications.

(a) Shall be molded with the words "U. S. A. Bumper," manufacturer's name, and date. Any other branding shall be specified in proposal.

Materials.—See General Specifications.

Inspection.—See General Specifications.

(a) Inspector shall select 3 pieces at random from each and every shipment of 1,000 pieces or less.

Tests.—See General Specifications and following table.

(a) Test pieces shall be cut from bumpers and buffed to a thickness of approximately ⅛-inch.

Table

Tensile, minimum ....pounds	800
Elongation, minimum ....inches	2–5
Ultimate, maximum ....inches	2–9

The Obituary Record

PRESIDENT OF THE BOSTON RUBBER SHOE CO.

Colonel Harry E. Converse, president of the Boston Rubber Shoe Co., Malden, Massachusetts, and for many years one of the prominent figures in the American rubber trade, died of heart failure at his country estate, "The Moorings," in Marion, Massachusetts, December 8, aged 57. He had been in failing health for more than a year.

Colonel Harry E. Converse

Colonel Converse was born in Malden in 1863, the son of the late Elisha Slade Converse, founder of the Boston Rubber Shoe Co., first mayor of Malden and popularly regarded as Malden's "grand old man." Following his education in the public schools and in the Chauncy Hall School, of Boston, he entered his father's employ as office boy in 1882 and soon procured a lumper's job. After two years he was called into the office, where he successively filled several responsible positions, being appointed assistant general manager in 1894 and general manager the following year. On the death of his father he was elected president and a director of the company.

In 1899 Colonel Converse was made a director of the United States Rubber Co., succeeding George A. Lewis, resigned, and also became a director of the Bay State Rubber Co., Boston Rubber Co., American Rubber Co., Revere Rubber Co., Glendale Elastic Fabric Co., and Rubber Manufacturers' Mutual Insurance Co.

He was also identified with numerous other business interests, having been a director of the Cotton & Woolen Manufacturers' Insurance Co. of New England, Industrial Mutual Insurance Co., Broadway Storage Co., East Boston Dry Dock Co., Metropolitan Storage Warehouse Co., Touraine Confectionery Co., Glenark Knitting Co., Export Lumber Co., and the First National Bank of Malden. He was trustee of the Malden Hospital, Malden Savings Bank, the Soldiers Home in Chelsea and the estate of Elisha Slade Converse.

Prominent in public life as well, he served two years in the Malden city council, was for several years fire commissioner of that city, a quartermaster in the state militia, and as a member of the staff of Governor Wolcott, with the rank of colonel, went to the front during the Spanish-American war. His public spirit was further shown by building the Malden Auditorium and its annex in order to give that city high-class amusements.

Yachting was his favorite diversion in leisure hours and he became one of the most prominent yachtsmen in the East, being a member of the New York, Larchmont, Eastern, Boston and Beverly Yacht Clubs. At "The Moorings," his 65-acre estate overlooking Buzzards Bay, a place of much hospitality in past years, a wireless telegraph system kept him in constant touch with his several yachts when they were in surrounding waters.

Colonel Converse was a thirty-second degree Mason and a member of numerous associations and clubs, including The Rubber Association of America, Chamber of Commerce of the United States of America, Boston Chamber of Commerce, Home Market Club, Real Estate Exchange of Boston, Boston Athletic Association, Brookline Country Club, Boston Art Club, and the Algonquin and Exchange Clubs of Boston.

He is survived by his widow, Mary Caroline (Parker) Converse; two sisters, Mrs. Costello C. Converse and Mrs. Lester Leland, both of Boston; three sons, Parker Converse, Roger Wolcott Converse, and Elisha Edmands Converse of California; and two daughters, Mrs. Margaret Butler of Chicago, and Mrs. Mary Essick of Oregon.

The funeral took place at the Converse homestead in Malden. Interment was in the family lot at Woodland Cemetery that city.

Colonel Converse was a type of the 100 per cent American, a worthy successor of his honored father, trusted and respected by his business associates, beloved by all who knew him. His untimely death comes as a distinct shock to the rubber trade, by which his passing will be generally mourned.

FORMER DIRECTOR OF THE UNITED STATES RUBBER CO.

Commodore Elias Cornelius Benedict, banker, broker, rubber planter and yachtsman, whose death, late in November, was briefly noted in the December issue of The India Rubber World, was for some three score years one of the most picturesque outstanding figures of the American financial world, and long prominently identified with the rubber industry.

Commodore E. C. Benedict

Born in Somers, New York, January 24, 1834, the son of the late Rev. Henry Benedict and Mary Betts Lockwood Benedict, he received his education in the schools of Westport, Connecticut, and Buffalo, New York, where he spent part of his youth. When 15 years old he became clerk in the Wall street office of Corning & Co. In 1857 he succeeded to this business and organized the firm of Benedict & Co., in 1863 becoming a member of the New York Stock Exchange. In 1871, Roswell P. Flower, later Governor of New York, joined Commodore Benedict and the name of the firm was changed to Benedict, Flower & Co. This continued for four years, when Commodore Benedict organized the present firm of E. C. Benedict & Co.

He played an important part in the early financial life of New York City, and with his brother organized the Gold Exchange Bank, which grew out of the gold speculation of the 60's and 70's. He specialized in gas stocks and was for some time president of the Commercial Acetylene Co., vice-president of the Indianapolis Gas Co., president of the Greenwich Construction Co., and for many years a director of the United States Rubber Co., and its subsidiary the General Rubber Co., until he resigned in 1914.

Ever a hearty believer in outdoor sports for the business man, his particular hobby was yachting. He owned several large steam yachts at various times in which he cruised to all parts of the world, and, as Commodore of the New York Yacht Club and

Yachting Commissioner of the State of Connecticut for several years, became one of the world's most famous yachtsmen.

In 1913, with the "Atreus," formerly the property of John Hays Hammond, he was the first private yacht owner to steer his vessel through the Panama Canal. In his best known yacht, the "Oneida," he cruised more than 275,000 miles, making it practically his home during the latter years of his life. His love of fishing and other sports won the firm friendship of former President Grover Cleveland, Rear Admiral "Bob" Evans and Thomas Jefferson, the actor, with whom his name has requently been associated, and all of whom he outlived. It was on the "Oneida," July 1, 1893, while cruising slowly up the East River, New York City, that President Cleveland underwent the now famous secret operation whereby his entire left upper jaw was removed because of a malignant growth, an artificial rubber jaw being subsequently fitted. And it was with the "Oneida" in 1915 that he rescued the crew and eleven passengers from the wrecked sloop "Southern Cross" and towed the sloop to the Leeward Islands, for which he was officially thanked by the British Government.

Commodore Benedict's yachting hobby served his business interests to an eminent degree, however. It was his habit to spend his winters cruising in southern waters, and his connection with the rubber industry led to numerous trips of investigation to the rubber country of South America during the period when crude rubber demand overtook supply. In the winter of 1904-5 his steam yacht "Virginia" with a party of New York rubber men was the second vessel to carry the American flag up the Amazon, which he ascended for a thousand miles. From the facts unearthed by this and several subsequent trips, together with his experiences as prime mover in the Moju Rubber Plantations and Development Co. near Pará on the Moju River, a tributary of the Amazon, he foresaw the hopelessness of greatly increasing the Amazonian rubber output, and his investigations were largely instrumental in the early interest of the United States Rubber Co., in the plantation rubber industry of the Far East. One of his most prized possessions was a $5,000 gold cup, presented by the United States Rubber Co., commemorating his first trip up the Amazon. It was Commodore Benedict who established wireless telegraphy on the Amazon for commercial purposes, it having been found impossible to establish ordinary telegraph systems in the forests.

When in 1917, owing to failing health, Commodore Benedict retired from the firm of E. C. Benedict & Co., of which he had been the senior partner for sixty years, he was the third oldest member of the New York Stock Exchange in the order of admission. That year he donated a $500,000 hospital to Greenwich, Connecticut, and completed the conversion of his extensive and beautiful estate at Indian Harbor, near Greenwich, into a model bird sanctuary on plans laid down by the Greenwich Bird Protective Association, an organization of prominent residents of that town. It was at his Indian Harbor home that he died quietly November 23, 1920, in his eighty-seventh year, following an illness of more than a year due to a complication of diseases incident to old age.

One of our great financiers, keen, progressive and enthusiastic in business, jovial, witty and companionable in his leisure hours, a thorough sportsman, his death closes a notably active, eventful and useful life and will be regretted by those who enjoyed his acquaintance.

A MANUFACTURER OF TIRE FABRIC LOOMS

Lucius J. Knowles, president of the Crompton & Knowles Loom Works, Worcester, Massachusetts, died of influenza in London, England, November 26, 1920, while on a business trip.

Mr. Knowles was born in Worcester, Massachusetts, on April 6, 1879, the son of Francis B. and Hester A. Knowles. Following his graduation from Worcester Academy he took a course at Harvard University, graduating with the class of 1902. His business career began when he joined the Crompton & Knowles Loom Works, of which his father was one of the founders. In 1906 he was appointed treasurer; in 1911, vice-president, and in 1917, president. He was also president of the Reed-Prentice Co., of Worcester from 1914 to 1915.

He was a director in the Merchants' National Bank and the Bancroft Realty Co., a trustee of the Worcester City Real Estate Association, a trustee of Burnside Associates, and managing trustee of the Knowles Building, all of Worcester.

He is survived by his widow, one daughter, Sarah M. Knowles, and a son, Lucius J. Knowles, Jr.

PROMINENT IN THE CRUDE RUBBER TRADE

The death of F. C. J. Pusinelli at the age of 61 years, at Berne, Switzerland, on October 30, 1920, has removed one of the best-known international figures in the Pará rubber trade. Mr. Pusinelli became associated with the London firm of Heilbut, Symons & Co., in the early eighties and about 1884 he went to Brazil, where he founded the house of Pusinelli, Prusse & Co., the chief rubber exporting firm in Pará and with the London firm mentioned practically controlled the Pará rubber trade at that time.

F. C. J. PUSINELLI

He continued at the head of this company for ten years, serving also as German Consul and Austrian Vice-Consul for several years and for a time as a member of the Commercial Chamber of the State of Pará. In 1897 he returned to London to take a prominent place in the management of Heilbut, Symons & Co.

Mr. Pusinelli was prominent in the rubber trade of the United States through his continuous connection with the well-known New York firms, Reimers & Co., Poel & Arnold, Arnold & Zeiss, and Poel & Kelly.

F. C. J. Pusinelli was a man of unusual business ability and possessed of a broad and analytical mind. He was really a big man, yet modest and retiring in disposition. His genial presence will be greatly missed by his friends and colleagues in the trade.

MANUFACTURER OF RUBBER SUBSTITUTE

Dr. Louis A. Dreyfus, president, treasurer and general manager of the L. A. Dreyfus Co., Rosebank, Staten Island, New York, died suddenly December 1, 1920, while speaking at the inauguration of the municipal trolley service on Staten Island.

Born in Fremont, Ohio, in 1867, and educated in the public schools there, he graduated from the University of Michigan with the degree of Ph.C. in 1887, then studied at Heidelberg, Germany, and in 1891 received the degree of Ph.D. at the University of Zürich, Switzerland.

Returning to the United States he started his business career as an analytical chemist in Cleveland and later in Chicago, specializing in cold water paints, for which he was granted several patents. In 1902 he came to Staten Island as chemist for the Muralo Co., a large manufacturer of cold water paints which still uses his patents.

In 1909 Dr. Dreyfus organized the company which bears his name. From a small beginning the business grew until in 1917 it made necessary the erection of the large and modern rubber substitute factory at Rosebank.

THE BERLIN *Gummi-Zeitung* REPORTS THE DEATH IN VIENNA of Georg Schneider, senior partner of G. Schneider, Gummihof,

G.m.b.H, Vienna. He was formerly a partner of Metzeler & Co. in Munich, and first came to Vienna as representative of that firm. He was the first president of the Austrian Association of Surgical Rubber Goods Wholesale Dealers.

THE EDITOR'S BOOK TABLE

BAMBER'S RUBBER CACULATOR BOOK. MACLAREN & SONS, Limited, 37 Shoe Lane, London. Flexible leather, 4¾ by 6¼ inches, 65 pages.

This is a collection of data arranged in convenient pocket form for the use of works managers, superintendents, cost clerks, salesmen and others who require to ascertain weights of certain rubber goods for purposes of manufacture or quotation, in either English or metric units. Tables are furnished for washers, disks, gas tubing and solid cord, ranging in specific gravity from 1.00 to 2.00. These are duplicated in English and metric measures and cover the full range of sizes in the goods mentioned. Tables are included showing specific gravities and corresponding weights per cubic inch, and per cubic foot and cubic inches per pound. There is also included a table of equivalent times and temperatures for vulcanization for the adjustment of curing conditions. The work is prefaced in English, French, Italian and Spanish, with notations concerning the value and use of the tables. It is worthy of consideration as a practical help for busy rubber factory executives, salesmen and merchants.

THE TWENTY-NINTH ANNUAL EDITION OF HENDRICK'S COMmercial Register of the United States for Buyers and Sellers. S. E. Hendricks Co., Inc., 70 Fifth avenue, New York City. Cloth, 2572 + 164 pages, 7½ by 10 inches.

This annual register of producers, manufacturers, dealers and consumers which has just appeared for 1921, is indispensable as a buyers' reference for men of every industry and business activity. The rubber industry is well represented in machinery as well as in manufacturing. In order that the wealth of information contained in the volume shall be readily accessible, it is divided into sections, indicated in color on the edges of the leaves, namely: Index to Trades; Classified Trades Section; Trade Names Section; Alphabetical Section; Advertisers' Index. A Service Bureau is maintained free of charge by the publishers for the assistance of users of the register. In case one cannot find the information wished for, a request to the bureau will enlist its services to find the article or manufacturer required, and a reply will be promptly sent.

"EXPORT REGISTER OF THE FEDERATION OF BRITISH INDUStries." Industrial Publicity Service, Limited, London, 1920. Cloth, 312 pages, 7 by 9½ inches.

"The Export Register of the Federation of British Industries" is an epitome of all British industry, and is the first book of its class to give a comprehensive survey of this broad field and to be of real service to all who use or buy British goods throughout the world. It is divided by an industrial grouping system, with an elastic number of groups, of which Rubber, Asbestos, Leather and Allied Trades is an important member, with five subdivisions. Principal business houses are grouped under firm names and also listed under the names of their products in the index of manufactures and products. The Federation of British Industries was founded during the war and occupies a predominant place in British industry today.

NEW TRADE PUBLICATIONS

The Year Book of the American Chamber of Commerce in London (Inc.) for 1920 is an interesting compilation containing lists of officers, directors, committees and membership, together with the president's report for the year and the by-laws of the Chamber. The aims of the Chamber, which was organized in 1916, are to promote friendship and trade between the United States and Great Britain. In America it works closely with the Chamber of Commerce of the United States and the leading trade and financial organizations. In Great Britain the Chamber has established useful working relations with the British Government and the leading British commercial and industrial organizations. Among the associate members are several of the most important American manufacturers of the principal lines of rubber goods, such as footwear, tires, mechanicals, etc.

A most complete catalog of hardware and plumbers' rubber specialties has just been issued by the Lavelle Rubber Co., 413-421 North Franklin street, Chicago, Illinois. It is well printed, profusely illustrated, and describes everything in the line from anti-splashers to welding hose.

An esteemed British contemporary, *The Financier*, London, oldest among financial daily papers in that city, has recently published a 16-page pamphlet entitled "A Tax on Turnover." The solution set forth of the nation's fiscal problem, which is no less applicable to the affairs of the United States, was first advocated in England by *The Financier*, which believes it to be "the only safe and effective substitute for the excess profits duty which now cripples industry and trade, inflates prices, causes unemployment and is largely responsible for prevailing discontent."

INTERESTING LETTERS FROM OUR READERS

A BRIEF FOR OFFICIAL RUBBER FIGURES

To the Editor:

Dear Sir: In analyzing the article in The India Rubber World, December 1, 1920, covering "The Rubber Surplus and its Relation to Future Tire Production," written by Richard Hoadley Tingley, my attention was drawn to Table 1, showing the world's production, consumption and surplus of rubber from 1912 to 1919, inclusive, and on comparing his "consumption" figures of 1912 to 1917 with the figures as compiled by the War Service Committee of the Rubber Industry of the U. S. A., I am unable to reconcile them, and would request further information that will explain these differences satisfactorily.

If you will refer to the second chart of the memorandum prepared by the War Service Committee, and particularly to the lower half of the chart which covers "World's Consumption," you will note that the figures given on United States consumption agree with the charted lines accurately, but when you compare the figures of the consumption of the "Rest of the World" with the drawn chart you will find that the figures are only shown for Great Britain, France, Germany and Italy, and no figures are recorded for "The Rest of the World" as shown on the chart in pink color. For instance, take the year 1916, the chart shows a consumption for the rest of the world of approximately 85,000 tons, while the figures beside the chart are as follows:

Great Britain	26,760
France	14,685
Germany	3,000
Italy	8,552
Total world	52,997

Note that the chart differs from the figures by 85,000 tons—52,997, or approximately 32,013 tons, which apparently is consumption by the rest of the world outside of other countries enumerated, and if this is true, then Mr. Tingley's figures are wrong, as his consumption figures as shown on Table 1, only take the aggregate of the United States, Great Britain, Germany, France and Italy, leaving out the balance of the world, which would be made up of Russia, Japan, Holland, Denmark, Sweden, etc.

In other words, Mr. Tingley's figures on the world's consumption differ from the War Service Chart as follows:

Year	War Service Committee Charts, in Tons: U. S. A.	Rest of World	Total	Mr. Tingley's Figures as Per Table No. 1	Difference
1912	52,964	45,000	97,964	95,863	2,101
1913	52,179	56,000	108,179	102,455	5,724
1914	61,251	59,000	120,251	99,800	20,451
1915	96,792	61,000	157,792	135,214	22,578
1916	116,477	85,000	201,477	169,474	32,003
1917	177,088	80,000	257,088	229,017	28,071
	......	......	942,751	831,823	110,928

Above figures show an additional 110,928 tons consumed in six years, which apparently Mr. Tingley has not taken into consideration, or else the War Service Committee intend to show this as surplus in place of consumption. If Mr. Tingley has omitted this quantity, then his figures of 224,000 tons world's surplus at the end of 1919, should be nearer 112,000 tons.

I have a further criticism to make and that is in the *Trade News Service* figures of 165,000 tons consumed for the first nine months of this year compared with the War Service Committee consumption figures, as shown on Table 2, of 236,977 tons for the full year of 1919 in the United States, when from reports received from other sources the belief is that the production of tires, etc., for the first nine months of this year was greater than 1919, yet the figures of the *Trade News Service* would have us believe that less rubber was consumed on a greater production of rubber goods.

If the production of rubber tires and goods was as great for the first nine months of 1920 as they were for 1919, then it is obvious that if 1919 figures of rubber consumption are correct the United States consumed as much in nine months as in the previous twelve or nearer 236,000 tons instead of 165,000 tons.

Bear in mind that I do not constitute myself as an authority on the rubber supply and demand of the world, but I do believe that the figures as given in Mr. Tingley's article of December require further explanation.

It is certainly to be regretted that the rubber importers and manufacturers are leaving this important matter in the form of a guess, and if supply has anything to do with demand, and simple economics prove it has, then it is exceedingly difficult to hazard a forecast of prices for the next twelve months at least.

If the reason of the importers and manufacturers is as Mr. Tingley states, "that the individual holdings are a private matter to be kept a trade secret," then why cannot the Rubber Association educate the rubber companies to the importance of obtaining authentic figures that can be depended on, giving them assurance that no individual holdings will be open to a competitor, but that all figures be sent to an impartial party such as Babson Statistical Organization, who would be under bond not to disclose any figures but the totals of all the industries using rubber in the manufacture of goods?

C. D. McKinnon,
The Goodyear Tire & Rubber Co. of Canada, Limited.

Toronto, Ontario, Canada.

RUBBERIZED DICE

To the Editor:

Dear Sir:—

I read an article of yours not long ago in which you stated that every line of work and sport today found rubber necessary in some form. Now, down here shooting craps is a pretty generally popular sport. We don't use rubber in it, either. Seems like your statement was a trifle broad.

El Paso, Texas. W. G. S.

We cannot agree with the writer in his conclusions for they are erroneous. In proof we cite one of the several advertisements found in a prominent sporting paper:

> Rubberized Friction Dice
>
> The Latest Creation in Transparent Dice Work, Either Missouts or Passers, $5.00 per Pair, Why Pay More? Rubberizing Liquid, Best Made, $6.00 per Bottle.

As to the wisdom of using magic liquids in his locality, that is a question.—The Editor.

JUDICIAL DECISIONS

The B. F. Goodrich Rubber Co. vs. Parshelsky Bros.

Where plaintiff, after cancellation of a contract between it and another providing for delivery of tires to defendant, by mistake delivered such tires, plaintiff is entitled to the return of the tires, or to recover from defendant their value, notwithstanding, had the tires been delivered pursuant to contract, defendant would not have been liable.—New York Supplement Reporter, Volume 183, page 30.

U. S. Rubber Co. vs. Silverstein.

In an action on a guaranty in writing, which was ambiguous on the question whether it guaranteed sales to two sons of the guarantor or one, evidence held to sustain a finding that it was a guaranty as to both sons.

Whether letter: "Inclosed find check for the three above bills. Please do not send my statements and my son's statements together. Send him his, and me mine. They do business for themselves, and therefore send them separate statements, but I am good for what they buy"—was a guaranty of sales to two sons of defendant, or only one, in accordance with a prior oral agreement, held for the jury.—Northeastern Reporter, Volume 128, page 123.

Fair vs. Hartford Rubber Works.

Under Workmen's Compensation Act (Gen. St. 1918, §§5351, 5352) employe, who had previously lost sight of left eye, and was hit in the right eye, so that he was rendered totally and permanently blind, held entitled to award for total permanent incapacity under section 5351, *i. e.*, to a weekly compensation of one-half his weekly earnings at the time of the injury for 520 weeks.—Atlantic Reporter, Volume 111, page 193.

In re U. S. Rubber Co.

Under Trade-Mark Act, 5 (Comp. St. §9490), denying registration to any mark consisting of insignia of the United States, no trade-mark having the letters "U. S." as its most prominent feature can be registered.—Federal Reporter, Volume 265, page 1016.

Metallic Rubber Tire Co. vs. Hartford Rubber Works Co. United States District Court, Connecticut.

Where infringement by defendant after termination of its license was willful and deliberate, it is liable for all profits made, and cannot require complainant to accept the royalty fixed by the license contract.

Where infringement was willful and deliberate, and it contested recovery in the courts for 12 years, complainant held entitled to interest from the date of the decision of the Circuit Court of Appeals, holding the patent valid and infringed, except for the time the matter of accounting was held for decision by the master after close of the evidence before him.—Federal Reporter, Volume 266, page 543.

ADJUDICATED PATENTS

I. T. S. Rubber Co. vs. United States Lace & Braid Manufacturing Co. United States District Court, Rhode Island.

The Tufford reissue patent, No. 14,049, for a resilient heel lift having its body portion of concavo-convex form on every line of cross-section, should be construed with reference to form and function of the structure shown. As so construed claims 5, 6 and 7 held not anticipated, valid, and infringed.—Federal Reporter, volume 266, page 375.

Activities of The Rubber Association of America

ANNUAL MEETING

THE SIXTH ANNUAL MEETING of The Rubber Association will be held in the Astor gallery of the Waldorf-Astoria, New York City, on Monday, January 10, 1921, at 2.30 p. m. Matters of great importance to the Association will be discussed, and a large attendance is expected.

ANNUAL DINNER

The twenty-first annual dinner of The Rubber Association of America will be held in the grand ball room of the Waldorf-Astoria at 7 p. m. Firm members, affiliated members, associate members and those in their employ are eligible to attend and may invite guests, no limitation being placed to on the sale of tickets. The seating will be at round tables accommodating ten persons. Members who desire entire tables or who wish to sit together, but do not require an entire table, will so state when ordering tickets, the price of which is eight dollars.

NOMINEES FOR ELECTION TO THE BOARD OF DIRECTORS

NEW YORK, December 7, 1920.

To firm members:

The terms of the following named directors of The Rubber Association expire with the annual meeting in January, 1921: F. A. Seiberling, H. T. Dunn, C. J. Davol, W. J. Kelly, C. W. McLaughlin.

The Constitution and By-Laws of the Association provide that the Nominating Committee shall submit to firm members, at least thirty days in advance of the annual meeting, the names of nominees selected by that committee, to be voted upon at the annual meeting for election to the Board of Directors for a term of three years, viz.: January, 1921—January, 1924.

In accordance with the provisions of the Constitution and By-Laws, your Committee on Nominations herewith submits the names of ten firm representatives of firm members of the Association as nominees, five of whom are to be elected at the annual meeting on January 10, 1921; F. A. Seiberling, president, The Goodyear Tire & Rubber Co.; H. T. Dunn, president, The Fisk Rubber Co.; John J. Watson, Jr., president, Lee Tire & Rubber Co.; F. H. Jones, treasurer, Tyer Rubber Co.; W. O'Neil, vice-president, The General Tire & Rubber Co.; J. W. Thomas, vice-president, Firestone Tire & Rubber Co.; Tracy S. Lewis, president, Beacon Falls Rubber Shoe Co., Horace De Lisser, chairman Board of Directors, Ajax Rubber Co., Inc.; J. H. Kelly, vice-president, Hewitt Rubber Co.; F. R. Henderson, F. R. Henderson & Co.

It should be noted that as a result of the policy determined upon by the Board of Directors there are submitted the names of ten firm representatives (which is twice the number of vacancies in the Board of Directors) in order that there may be opportunity for selection.

Attention is directed to the fact that five of the major branches of the rubber industry are represented by the list of ten nominees, to wit: tires, mechanical goods, sundries, footwear and crude rubber, and it is suggested that in determining upon the nominees for whom their votes will be cast at the annual meeting, firm members give consideration to the desirability of electing a representative of each of the branches of the industry referred to.

The vote at the annual meeting will be conducted by the use of regular ballots which will be distributed at the proper time.

B. G. WORK, F. C. HOOD,
H. S. FIRESTONE, H. C. PEARSON,
G. B. HODGMAN, Committee on Nominations.
A. L. VILES, General Manager.

VOTING AND PROXIES—SUGGESTED REVISION OF THE CONSTITUTION

NEW YORK, December 7, 1920.

To firm and affiliated members:

Under the provisions of the Constitution and By-Laws of the Association each firm member is entitled to a vote at the annual meeting, to be cast by the registered firm representative only, unless his power is delegated to some one in the employ of or acting for the firm member and holding a written proxy.

The Constitution and By-Laws of the Association provides that affiliated members may not vote for the election of directors nor upon questions which relate solely to the rubber industry itself. On all other matters each affiliated member is entitled to a vote, to be cast by its registered firm representative only, unless his power is delegated to some one in the employ of or acting for the affiliated member and holding a written proxy.

In view of the fact that at the annual meeting on January 10, balloting for the election of directors will be necessary because ten firm representatives have been nominated by the Committee on Nominations to fill five vacancies in the board, the use of a signed proxy in the event of the inability of any firm representative to attend becomes a more important matter than heretofore. It is hoped that our members will bear this in mind and will be certain to make use of the enclosed proxy, if necessary, delegating authority to the general manager of the Association or to some other representative to vote for them in the event of their inability to be present.

An important change in the Constitution and By-Laws, involving Section 2 of Article XI, concerning the annual dues, is proposed, with the approval of the Board of Directors of the Association, to be voted upon at the annual meeting. The suggested substitute and the present Section 2 are shown on the attached memorandum, for the purpose of comparison.

The effect of the proposed modification of this section relating to annual dues is to require manufacturing firm members, as a condition to their holding membership, to agree to contribute to the income of the Association on the basis of a pro-rata fee of a specified number of cents per 100 pounds of crude rubber purchased by them, in addition to the annual basic membership fee and the initiation fee now in effect. In other words, it is proposed to make permanent, as a part of the By-Laws, the equitable basis which has been in effect for the past two years under an arrangement for the voluntary contribution of the fee by manufacturing firm members. The exact amount of and method of collection of the fee is to be under the control of the association membership and subject to change at the regular annual or a special meeting of the Association.

It is believed that the proposed change is justified by the equitable and satisfactory operation of the plan which it is now desired to establish on a permanent basis by making the fee a part of the regular membership dues of manufacturing firm members.

A. L. VILES, General Manager.

SUGGESTED AMENDMENTS OF ARTICLE XI, SECTION 2, OF THE CONSTITUTION AND BY-LAWS

PRESENT

Article XI. Section 2

ANNUAL DUES. The annual dues for the firm members shall be fifty dollars ($50) per annum, for affiliated members twenty-five dollars ($25) per annum, and for associate members five dollars ($5) per annum payable in advance. All dues for members shall become payable on January 1 in each year. Members elected after January 1 in each year shall pay a proportion of the annual dues for the balance of that year beginning with the first of the month following election. Members who fail to pay their entrance fees, annual dues, or other indebtedness within thirty days after the same become due, shall be notified by the treasurer, and if payment is not made within the next succeeding thirty days, shall be reported to the Executive Committee as in arrears, and may, at the discretion of the Executive Committee, be dropped from the membership rolls.

PROPOSED

Article XI, Section 2

ANNUAL DUES. The annual dues for affiliated members shall be twenty-five dollars ($25) per annum and for associate mem-

bers five dollars ($5) per annum payable in advance on January 1 in each year. The annual dues for firm members shall include a basic fee of fifty dollars ($50) per annum payable in advance on January 1 in each year and for all manufacturing firm members an additional pro rata annual fee based upon the amount of crude rubber purchased by each of such members. The rate upon which such pro rata fee shall be based for each year or any portion thereof and the time and method of payment of such fee shall be determined by the Association at its annual meeting or at any special meeting duly called for that purpose. Members elected after January 1 in each year shall pay a proportion of the annual dues for the balance of that year beginning with the first of the month following election. Members who fail to pay their entrance fees, annual dues or other indebtedness within thirty days after the same become due, shall be notified by the treasurer, and if payment is not made within the next succeeding thirty days, shall be reported to the Executive Committee as in arrears, and may, at the discretion of the Executive Committee, be dropped from the membership rolls.

ASSOCIATION NOTES

For convenience in accounting, membership in the Association will be for the calendar year instead of the year from the first of the month following the date of election. To make this rule effective January 1, 1921, bills rendered will be for an amount which represents that portion of the membership dues earned during 1920; thus, if a membership account is due on April 1, bill will be rendered for an amount which represents the proportion which nine months bears to one year, or $37.50. Accounts due at other times during the year will be billed proportionately, so that on January 1, 1921, all membership accounts may be billed for the full membership dues for one year from that date.

The proposal of Secretary Houston, of the Treasury Department, for a revision of the excise tax should not disturb tire manufacturers at this time, for the Tax Committee of the Association is closely in touch with the situation.

The Rubber Association will contribute $10,000 to the support of the Highway & Highway Transport Education Committee, with the understanding, however, that it is to cover the year 1921 and that the Association is not obligated to any greater extent than that.

The following members were elected November 30, 1920: Firm member, Raymond Rubber Co., R. N. Agnew, firm representative, Titusville, New Jersey. Associate members: P. Lawrence Munch, Hood Rubber Co., Watertown, Massachusetts; Fred B. Peterson, Chas. T. Wilson Co., Inc., 59 Pine street, New York.

NEW YORK HIGHWAY TRANSPORTATION SHOW

The New York Highway Transportation Show will be held under the auspices of the Motor Truck Association of America, Inc., in the Twelfth Regiment Armory, 62nd street and Columbus avenue, and the First Field Artillery Armory, 68th street and Broadway, New York City, from January 3 to 8, inclusive, the week preceding the New York Automobile Show. The show will be conducted by motor truck people for motor truck users, and not only to sell motor trucks and accessories, but to educate the public in the economic advantages of motor truck transport and to demonstrate the necessity for a national highway system.

The leading motor trucks and commercial vehicles will be on exhibit, together with trailers and accessories, including tires. There will be numerous educational exhibits, and a continuous tableau depicting the evolution of transportation in all lands; also model truck terminals and traffic control.

The program will be as follows: Monday, "Opening Day"; Tuesday, "Army Day"; Wednesday, "Motor Accident Prevention Day"; Thursday, "Highway Transportation Day"; Friday, "Farmers' Day"; Saturday, "Motor Truck Association Day." There will be prize contests, educational addresses by transportation authorities, and motion pictures showing the advantages of motor trucks, the abuses of pneumatic and solid tires, and the methods of overcoming such abuses. A slow-moving section of one film shows what happens to the tires, springs, frame, body and load when a truck traveling at high speed hits an obstruction and rebounds on the level road.

GOOD ROADS CONGRESS AND SHOW AT CHICAGO

The American Road Builders' Association, which includes in its membership the highway and street officials, engineers and contractors, together with the manufacturers of road machinery, materials and transportation equipment throughout the United States and Canada, will hold its Eighteenth Annual Convention, Eleventh American Good Roads Congress, and Twelfth National Good Roads Show at the Coliseum, Chicago, February 9 to 12.

More than 40,000 square feet of floor space will be devoted to the exhibits which many manufacturers of road materials, road building machinery and highway transportation equipment are preparing to send. A large attendance is assured, including government, state and municipal authorities, together with road, automotive and chemical engineers, contractors, agriculturists, motorists and large users of trucks, tractors and other highway transportation equipment.

INVOICE FORMS STANDARDIZED

After two years of intensive work in cooperation with associations, trade papers and leading business houses, a standard form of invoices has been adopted by the National Association of Purchasing Agents that will avoid the need of private forms, the use of rubber stamps to provide special spaces, and will greatly simplify the work of purchasing agents and auditors. The basic size is 8½ by 7 inches, the same as the standardized voucher, to facilitate filing together, and the same width as the standardized 8½ by 3½ inch check. The invoice may, however, be from 7 to 14 inches from top to bottom, anything over 7 inches being folded back on a dotted or ruled line for filing. The paper stock used is 17 by 22 or 17 by 28 and a tolerance of ⅛-inch is allowed so that invoices when padded can be trimmed.

STANDARD OCEAN BILL OF LADING NEEDED

Owing to the great losses and hardships which have been incurred by its members engaged in import trade, through improper handling of merchandise by steamship companies, the National Association of Waste Material Dealers, Inc., has taken the initiative in a movement looking toward standardization of ocean bills of lading which promises to gain the support of trade organizations throughout the country.

A circular letter issued by the association includes numerous extracts from ocean bills of lading to show the arbitrary attitude of many steamship lines which ignore the rights of shipper and consignee, and points out the need of a standard bill of lading comparable to that used by the railroads, also congressional action to frame harbor laws equitable to all parties concerned.

Harbor laws are favored that clearly set forth the duties of ocean carriers, consignees and local carriers in connection with loading, unloading, segregating and removing goods from the pier. The obligation of the carrier to deliver in good condition the identical goods received is specially emphasized because the average merchant draws and accepts drafts with an ocean bill of lading as security. It is recognized that varying port conditions in certain countries or in certain harbors may render one uniform ocean bill of lading impracticable and that several standard forms may be necessary.

It would seem that in the long run steamship companies as well as merchants would benefit by a clean-cut code of procedure avoiding the misunderstandings, shortages and litigation bound to follow in the wake of present methods.

News of the American Rubber Industry

FINANCIAL NOTES

To conserve its cash resources The Fisk Rubber Co., Chicopee Falls, Massachusetts, has passed the quarterly dividend of 75 cents a share on common stock, due January 1, 1921, although it has been more than earned during the past year. The regular quarterly dividend of 1¾ per cent on the first preferred stock has been declared payable February 1 to stockholders of record January 21, 1921.

The financial position of the company is sound, with quick assets in the ratio of two to one to liabilities. Sales for the twelve months ended December 21 were approximately $42,000,000 against $43,600,000 in 1919, the company's biggest year. While inventories are larger than normal, finished tires consist of standard salable sizes, mostly four-inch and under. At the end of the year stocks of cotton fabric, rubber and other materials are to be marked down to sound values, the readjustment being effected out of 1920 earnings without drawing on the previously accumulated surplus. Spring business to date is reported fully up to that of last year, being little affected by the present condition of the automobile industry, as less than 25 per cent of total sales are for original equipment.

Sales of The Mason Tire & Rubber Co., Kent, Ohio, for its fiscal year ended October 31, were $6,598,000.00, being 95 per cent greater than last year. Net earnings, after heavy charge offs, to reduce inventories and raw materials from original cost to present market values, amounted to $524,000.00, being 135 per cent increase over the preceding year. Comparative sales and earnings for the past four years are as follows:

Year	Sales	Earnings
1917	$1,200,000.	$104,457.60
1918	2,324,000.	203,406.47
1919	3,468,000.	223,705.52
1920	6,598,000.	524,742.73

The Mason company does not have a pound of high-priced fabric or rubber on undelivered contracts, and its inventories of finished tires in stock at factory and its twenty-two branches are less than normal. Sales, which gradually declined until October, have since gone steadily upward, and January sales will almost be normal.

The report of the Firestone Tire & Rubber Co. for the last fiscal year shows total sales of $114,980,260 compared with $91,078,514 for the preceding year, an increase of 26 per cent. The report states that the high peak of production was reached in April when the daily average was 28,000 tires. Net earnings were $9,396,912. The company set aside $8,151,750 for depreciation of inventory. Total current assets exclusive of investments in other companies and in securities, as well as investments in land, machinery and equipment, were $73,732,502. Total assets were $107,404,200, against which there were total current liabilities of $32,684,569.

The financial statement of the Boston Woven Hose & Rubber Company as of August 31, 1920, disclosed total assets of $10,448,348 contrasted with $7,340,409 the same time a year ago. Merchandise is carried at $4,926,299, against $2,675,255 last year; and cash and debts receivable contrast $2,506,938 with $1,809,192 in the previous year. Accounts and notes payable are placed at $3,336,352. compared with $1,460,026; and the surplus is reported at $2,161,996 against $2,030,383 in 1919.

Plans for $40,000,000 financing and the selection of a new board of directors for The Goodyear Tire & Rubber Co., Akron, Ohio, had virtually been completed when suit for receivership was filed in the Common Pleas Court at Columbus, Ohio, by Frank S. Monnett as a stockholder. This suit was subsequently dismissed by the court.

The directors of The McGraw Tire & Rubber Co., East Palestine, Ohio, in order to conserve cash resources have voted to omit the quarterly dividend on the preferred stock. This action was taken in view of the general trade and credit conditions throughout the country.

DIVIDENDS DECLARED

Company	Stock	Rate	Payable	Stock of Record
American Chicle Co	Pfd.	1½% q.	Jan. 3	Dec. 18
Apsley Rubber Co	Pfd.	3½% s.a.	Jan. 1	Dec. 27
Bergougnan Rubber Corporation	Pfd.	1¾% q.		
Boston Woven Hose & Rubber Co.	Com.	$3 q.	Dec. 15	Dec. 1
Boston Woven Hose & Rubber Co.	Pfd.	$3 s.a.	Dec. 15	Dec. 1
Brunswick-Balke-Collender Co	Pfd.	1¾% q.	Jan. 1	Dec. 20
Canadian Consolidated Rubber Co., Ltd.	Pfd.	1¾% q.	Dec. 31	Dec. 22
Dayton Rubber Manufacturing Co.	Com.	1¾% q.	Jan. 1	Dec. 15
Delion Tire & Rubber Co	Pfd.	2% q.	Jan. 1	Dec. 24
du Pont, E. I., de Nemours & Co.	Com.	2% q.	Dec. 15	Nov. 30
du Pont, E. I., de Nemours & Co.	Com.	2½% stk.	Dec. 15	Nov. 30
du Pont, E. I., de Nemours & Co.	Deb.	1½%	Jan. 25	Jan. 10
Firestone Tire & Rubber Co	Com.	6% a.	Dec. 30	.....
Habirshaw Electric Cable Co., Inc.	Com.	$0.37½		
Hood Rubber Products Co., Inc.	Pfd.	1¾% q.	Dec. 1	Nov. 20
Kelly-Springfield Tire Co	6% Pfd.	$1.50 q.	Jan. 1	Dec. 17
Pennsylvania Rubber Co	Com.	1½% q.	Dec. 31	Dec. 15
Pennsylvania Rubber Co	Pfd.	1¾% q.	Dec. 31	Dec. 15
Salmon Falls Manufacturing Co	Com.	2½% q.	Dec. 1	Nov. 15
United Shoe Machinery Corporation	Com.	$0.50 q.	Jan. 5	Dec. 20
United Shoe Machinery Corporation	Pfd.	$0.37½ q.	Jan. 5	Dec. 20

NEW YORK STOCK EXCHANGE QUOTATIONS

December 23, 1920

	High	Low	Last
Ajax Rubber Co., Inc	25½	24½	24½
The Fisk Rubber Co	10⅜	10⅛	10¼
The B. F. Goodrich Co	33½	28	33½
The B. F. Goodrich Co., pfd	70½	70	70½
Kelly-Springfield Tire Co	32¾	29	32¾
Kelly-Springfield Tire Co., pfd	..	..	..
Keystone T. & R. Co., Inc	7¼	6¼	7
Lee R. & T. Corp	17	16½	17
United States Rubber Co	58½	53	58¼
United States Rubber Co., pfd	98	97	97

CLEVELAND STOCK EXCHANGE QUOTATIONS

The following quotations on the Cleveland Stock Exchange, December 20, of stock of the principal rubber companies were supplied by Otis & Co., Cuyahoga Building, Cleveland, Ohio.

	Last Sale	Bid	Asked
Firestone T. & R. Co	80	..	82
Firestone T. & R. Co., 1st pfd	81¾	80	81¾
Firestone T. & R. Co., 2d pfd	74	..	74
General T. & R. Co., pfd	89	..	..
The B. F. Goodrich Co	35¾	..	..
The B. F. Goodrich Co., pfd	75½	..	75½
The Goodyear T. & R. Co	26	21	22
The Goodyear T. & R. Co., pfd	52½	45½	46
Kelly-Springfield T. & R. Co	49	..	..
Kelly-Springfield T. & R. Co., pfd	120	..	..
The Miller Rubber Co	75	71	75
The Miller Rubber Co., pfd	76	..	78
Portage Rubber Co	20	17	22½
Portage Rubber Co., pfd	49	..	50
Star Rubber Co	350¾	..	..
Swinehart T. & R. Co	39	..	..
Victor Rubber Co	15	12	28

NEW INCORPORATIONS

A. C. G. Sales Co., Inc., December 13 (New York), $100,000. A. C. Geraci, Buffalo, New York; P. Lisi, McIntyre; J. Isgro, Punxsutawney—both in Pennsylvania. To sell tires.

Barker Insulation Co., Inc., December 8 (New York), $1,000. W. P. and J. H. Barker; C. A. Barner—all of 27 William street, New York City. To manufacture waterproof and insulated fabrics.

Burlock Non-Skid Tire Corp., The, November 29 (Delaware), $250,000. J. E. Burlock; C. E. Speigel; W. D. Beardsley—all of Nyack, New York. To manufacture tires.

Cigol-Behrens Rubber Mfg. Co., The, November 10 (New Jersey), $350,000. J. H. Behrens, president and treasurer; L. G. Davenport, secretary Principal office, Lodi, Bergen County, New Jersey. To manufacture molded rubber goods, etc.

Collins Puncture Proof Tube Co., November 26 (New Jersey), $200,000. J. Kinzley, Jr.; W. B. Mackay, Jr.; J. W. Mercer—all of Hackensack, New Jersey. Principal office, Hackensack, New Jersey. To manufacture tires and tubes.

Dayton Rubber Mfg. Co., December 3 (Delaware), $200,000. C. T. Cohee; C. B. Outten; S. L. Mackey—all of Wilmington, Delaware. To manufacture rubber tires.

Dixie Tire & Rubber Association, November 12 (Delaware), $500,000. J. E. Mayo; J. D. Youngblood; R. T. Meadow—all of Dallas, Texas.

Eureka Tube Protector Co., November 8 (Maine), $200,000. G. H. Keyes, president; B. F. Carroll, treasurer—both of Boston, Mass.; J. F. Dana, Clerk, Portland, Maine. Principal office, Portland, Maine. To manufacture and sell automobile tube and tire protectors.

Hoffman Tire & Rubber Co., D. R., December 6 (Delaware), $400,000. M. M. Lucey; V. P. Lacey; L. S. Dorsey—all of Wilmington, Delaware.

Miamisburg Vulcanizing Co., The, July 30 (Ohio), $5,000. J. E. Kohl, president, Xenia; R. L. Eminger, vice-president, Miamisburg; C. L. Deniston, secretary, treasurer and general manager, Dayton—all in Ohio. Principal office, 129 North Main street, Miamisburg, Ohio. To sell solid and pneumatic tires, automobile accessories, etc.

Miller Rubber Co., R. E., December 3 (New York), $2,000,000. H. C. Hand; S. B. Howard; R. K. Thistle—all of New York. To manufacture tires, etc.

North American Process Co., Inc., December 3 (New York), $500. J. A. Wade; F. J. Eldred; H. C. Wilder—all of Malone, New York. Principal office, Malone, New York. To manufacture rubber products.

Northern Rubber Products Co., December 10 (Delaware), $500,000. T. L. Croteau; M. A. Bruce; S. E. Dill—all of Wilmington, Delaware. To manufacture tires, tubes, etc.

Old Hickory Tire Co., December 1 (New Jersey), $3,500,000. J. Q. Frey; J. D. Fischbeck; F. Child—all of 790 Broad street, Newark, New Jersey. Principal office, 790 Broad street, Newark, New Jersey. Agent in charge, F. Child. To manufacture rubber goods of all kinds.

Rotterdam Oversea Trading Corp., December 15 (New York), $25,000. V. E. Cartz; D. A. J. Kessler; H. A. S. Van Daalin, 97 Kenmore Place, Brooklyn, New York. To export and import sugar, rice and rubber.

Rubber Association of Canada, The, March 17 (Canada), without share capital. C. H. Carlisle, president; A. D. Thornton, vice-president; C. N. Candee, treasurer; J. Westren, assistant treasurer. Principal office, 808 Royal Bank Building, Toronto, Ontario, Canada.

Rubber Fusing Process Corp., November 15 (Delaware), $1,000,000. C. A. Cole, Hackensack; R. A. Van Voorhis, 77 Oak street, Jersey City—both in New Jersey; A. R. Oakley, Pearl River, New York. Principal office with the Registrar & Transfer Co., 900 Market street, Wilmington, Delaware.

S. & M. Tire Co., November 1 (Pennsylvania), $100,000. S. Broida, president; S. Edelstein, vice-president; G. A. Burchell, secretary and treasurer. Principal office, New Castle, Pennsylvania. To distribute tires, tubes and accessories.

Sona Corporation, December 3 (New York), $500. S. Mattison; C. P. Stewart; N. G. Wixon—all of 43 Exchange place, New York City. To manufacture waterproof paper and cloth.

Superior Tire Co., Inc., December 8 (New York), $2,000. N. Levy, 124 West 115th street, New York; B. E. Steineck, 1216 38th street, Brooklyn; B. Bass, 974 Freeman street, Bronx—all in New York.

Sure-Foot Heel & Rubber Co., The, September 1 (Pennsylvania), $150,000. O. J. McNitt, president; H. T. Weaver, vice-president; S. F. Snyder, secretary and treasurer; R. M. McKey, general manager. Principal office, Gettysburg, Pennsylvania. To manufacture rubber heels.

Surprise Ladies Garter Co., The, November 20 (New York), $25,000. J. Voskamp, 821 West 178th street; I. A. Lyons, 18 West 107th street; L. B. Boigas, 4 West 109th street—all in New York City. To manufacture garters, etc.

Two Seventeen Front Street Metal & Rubber Corp., December 8 (New York), $3,000. B. C. Ribman, 125 Prospect Park West; I. Ribman, 925 St. Marks avenue, both of Brooklyn; M. Moran, 15 East 184th street, Bronx—both in New York. To deal in waste materials.

Universal Gum Corp., November 8 (Delaware), $1,500,000. T. L. Croteau; M. A. Bruce; S. E. Dill—all of Wilmington, Delaware. Principal office with the Corporation Trust Company of America, duPont Building, Wilmington, Delaware.

Vulcanizing Machine & Supply Co., September 23 (Michigan), $25,000. M. Merrimam, president; H. S. Reynolds, vice-president; H. S. Blackman, secretary and treasurer; M. J. Hobin, sales manager. Principal office, Jackson, Michigan. To manufacture "Universal" vulcanizing machines.

Vulcweld Rubber Co., December 6 (Delaware), $1,000,000. M. M. Lucey; V. B. Lacey; L. S. Dorsey—all of Wilmington, Delaware. To manufacture tires.

BUSINESS STANDS FOR HIGHER ETHICS

Six formulas adaptable to business men who are now passing through the temporary process of readjustment and contraction were recommended by Thomas W. Lamont, member of the banking house of J. P. Morgan & Co., in the following statement read at a convention last week:

"We are all feeling the discomfort of this process. No one can foretell the duration of this process or estimate accurately its immediate and final results. Necessarily this period of uncertainty renders it most difficult in business to make today decisions that have a bearing upon the long future. Fixed formulas of conduct, policy and future engagements are hard to write. There are, however, some things every man engaged in active business can do:

"We can resolve not to be frightened into panic by the wolf that may not come.

"We can meet our contracts to the utmost limits of our resources.

"We can take our losses like good sportsmen.

"We can unfailingly be fair to our clients and customers.

"We can adhere just as rigidly as ever to good ethics and fair business practice.

"We must be just to our fellow workers and employes and consider their welfare as an integral part of our own."

Mr. Lamont expressed the opinion that, fundamentally, in the way of business, there is not very much wrong with America.

NEW YORK CONFERENCE OF MOTOR AND ACCESSORY ADVERTISING MEN

"How Advertising Can Turn the Tide in the Automotive Industry" will be considered at the meeting of the Advertising Managers' Council of the Motor and Accessory Manufacturers' Association to be held at the Hotel Astor, New York, on Friday, January 7, 1921. E. C. Tibbetts, advertising manager of The B. F. Goodrich Co., Akron, Ohio, who has been chairman of the Council and its Executive Committee from its inauguration last March, will preside at the meeting.

A comprehensive program has been arranged, including an open-forum discussion on "My Best Advertising Bet for 1921," which will be an exchange of ideas and experiences on increasing the efficiency of the advertising dollar. "Selling the Automotive Industry to America—The Spirit of Transportation," will be the title of a paper by E. W. Clark, advertising manager of the Clark Equipment Co., Buchanan, Michigan. Alfred Reeves, general manager of the National Automobile Chamber of Commerce, will discuss "The Outlook for the Automotive Industry in 1921—Cooperation Between the Advertising Managers of the Car Manufacturers and the Parts and Unit Makers." "A Review and Forecast of Business," with particular reference to the automotive industry, will be presented, with detailed statistical charts, by C. C. Parlin, manager of the commercial research department of the Curtis Publishing Co., Philadelphia.

A novel feature will be an exhibit of members' advertising. The various advertising executives have been invited to mount on suitable frames specimens of their significant and particularly interesting advertising material, including campaign layouts, posters, dealer-helps, broadsides, and booklets.

Plans for the meeting have been formulated by a committee, consisting of E. C. Tibbetts, advertising manager, The B. F. Goodrich Co., Akron, Ohio (chairman); S. E. Baldwin, advertising manager, Willard Storage Battery Co., Cleveland, Ohio; E. W. Clark, advertising manager, Clark Equipment Co., Buchanan, Michigan; J. C. McQuiston, manager, department of publicity, Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania; W. C. Huff, advertising manager, Detroit Pressed Steel Co., Detroit, Michigan; and M. Lincoln Schuster, Motor and Accessory Manufacturers' Association, New York City.

WINTER MEETINGS OF THE SOCIETY OF AUTOMOTIVE ENGINEERS

The annual meeting of the Society of Automotive Engineers will be held in the Engineering Societies Building, 29 West 39th street, New York City, January 11, 12 and 13, 1921. Recognizing that automotive engineers must accept the responsibility of increasing the sales appeal of automotive products by effecting economies in their design and manufacture which will justify price reduction, the program for the several sessions is being planned in a larger and more comprehensive way than ever before, and a large attendance is anticipated.

Tuesday, January 11, will be devoted to the standards meeting, with an aeronautic session in the evening.

Wednesday, January 12, there will be the annual business meeting, at which the engineer's place in the industry will be defined, followed in the afternoon by simultaneous body engineering, aeronautic and chassis sessions. In the evening will occur "The Carnival" of music and dancing.

Thursday, January 13, will be devoted to fuel and highway sessions, the latter dealing chiefly with the effect of heavy automotive vehicles on highway surfaces. The annual dinner will occur in the Hotel Astor at 7 p. m.

The Chicago meeting of the S. A. E., to be held at the Hotel Morrison, February 2, 1921, will be devoted chiefly to truck design, followed by a dinner in the evening.

The Columbus meeting, to be held at the Hotel Deshler, February 10, 1921, will be devoted to farm power engineering and tractor design, with a dinner in the evening.

TIRE AND RIM DIVISION OF THE S. A. E.

On November 22, the Tire and Rim and the Truck Divisions of the Society of Automotive Engineers held a joint meeting in Cleveland at which there was discussed the advisability of revising the present S. A. E. standard for pneumatic tires for passenger cars and motor trucks so as to include, with the exception of the 30 by 3½ and 31 by 4-inch clincher tires, only straight-side tires having 24-inch rim-seat diameters in the 31 by 3½, 32 by 4, 33 by 4½, 34 by 5, 36 by 6, 38 by 7, 40 by 8, 42 by 9, and 44 by 10-inch sizes. The possibility and desirability of obtaining interchangeability of the 6, 7 and 8-inch pneumatic tire rims was also discussed.

PERSONAL MENTION

Owing to impaired health, Van H. Cartmell has retired as president of the Kelly-Springfield Tire Co., New York City, and Frederick A. Seaman, formerly secretary of the company, has been elected his successor. Arthur Sachs, of Goldman, Sachs & Co., has been elected a director.

Joseph C. Weston has been elected president and general manager of the Ajax Rubber Co., Inc., New York City. Mr. Weston went to the Ajax company as vice-president about a year and a half ago from the United States Rubber Co., with which organization and its subsidiaries he was connected in executive capacities for more than twenty years. Horace DeLisser, chairman of the board of directors, had recently been filling the active presidency as well.

Charles Lyman Rand, secretary and chief chemist of the Mitchell-Rand Manufacturing Co., New York City, manufacturer of electrical insulation specialties, has relinquished his duties as factory superintendent to devote his entire time to important research work in the chemical and allied fields for his company. He will be succeeded as factory superintendent by Joseph T. Lawrence, chemical engineer, formerly associated with E. I. du Pont de Nemours & Co.

W. V. Logan, formerly manager of pneumatic truck tire sales for the United States Tire Co., New York City, has been appointed manager of distributers' sales, with full charge of the sale of distributer brands. Mr. Logan, who served as lieutenant in the flying corps of the Navy during the war, is a native of Missouri and is well known in tire circles in St. Louis and throughout the country.

The United States Tire Co., New York City, has appointed C. K. Whidden, formerly manager of solid tire sales, to be manager of truck tire sales, with full charge of the sales of both solid and pneumatic truck tires. The rapid development of truckportation makes Mr. Whidden's new position one of especial importance.

Thomas G. Richards, president and majority stockholder of the Quabaug Rubber Co., North Brookfield, Massachusetts, has resigned his office and the management of the company. Mr. Richards founded the B. & R. Rubber Co. fourteen years ago and later reorganized it as the Quabaug Rubber Co. in which he was active as president and works manager. He retires to enjoy a period of well-earned rest and will doubtless in the near future reenter the rubber trade in a managerial capacity.

Thomas M. Rector, has been appointed director of the department of industrial chemistry of The Pease Laboratories, Inc., successor to the Lederle Laboratories, 39 West 38th street, New York City. He was formerly in charge of the division of food technology of the Institute of Industrial Research, Washington, D. C.

Anthon Berg of Christiana, Norway, who is well known in the United States as an expert in balata belting and asbestos sheet packing manufacture, returned to Norway last month after a brief visit to Akron, Ohio. Mr. Berg is in charge of the erection of a belting and packing plant for De-Erste Nederlandsche Balata Drijfriemenfabriek, Delft, Holland.

JOHN B. TUTTLE, CONSULTING CHEMIST

John B. Tuttle, consulting chemist, was born in Philadelphia, Pennsylvania, May 25, 1882, and received his education in the public schools and University of Pennsylvania, graduating in 1908 with the degree of Bachelor of Science. On leaving college he joined the staff of the Bureau of Standards, Washington, District of Columbia, at first working on printing inks, oils and gums. Three years later he took up rubber chemistry and was in charge of that department up to 1918, when he resigned to engage in chemical research work for the Firestone Tire & Rubber Co., Akron, Ohio. In 1919 he was made chief chemist of the Firestone Plant No. 2, but recently resigned that position to go into business for himself in New York City.

John B. Tuttle

Mr. Tuttle is an authority on rubber chemistry and is the author of a number of technical articles on this subject.

In 1911 he was appointed on the United States Navy Department Committee on Rubber Goods Specifications and in the same year made a member of the Joint Rubber Insulation Committee. He also served on the specifications committees of the National Fire Protective Association and the Society of Automotive Engineers for gasoline hose, gasoline hose for airplanes, rubber goods and balloon fabrics.

He is secretary of the Rubber Section of the American Chemical Society which he reorganized in 1916, and a member of the Chemists' Club of New York and the Cosmos Club of Washington, D. C.

A BOOM IN RUBBER HEELS AND COMPOSITION SOLES

One of the results to which the low price of crude rubber has contributed in large measure is a boom in rubber heels and fiber soles. For a time it looked as though the peak of popularity in rubber-soled leather footwear had passed. The present season, however, has witnessed a renewed demand for these goods, and judging from the announcements of shoe manufacturers featuring rubber heels and composite soles for both men and women, all indications point to their use during the coming year on a larger scale than ever. Some of the earlier productions did not stand the test of wear nor hold nailing and stitching well, but experience has led to better methods and compounds, and at

present prices higher grade rubbers can be used. Meanwhile the public has been won to the comfort of walking on resilient footwear and will give greater consideration to this quality in the future. Rubber companies generally report a largely increased demand both from manufacturers and retailers.

Sales of sport shoes thus far have not altogether met manufacturers' expectations, owing, they believe, to dealers holding back their orders on account of the upset condition of the shoe market generally. Retailers assert that advanced prices on this class of footwear have deterred them from placing large orders and point to a drop of some 15 per cent on leather footwear. Sport shoes are still more attractive in price than similar shoes in leather and manufacturers are inclined to await the outcome.

THE RUBBER TRADE IN THE EAST AND SOUTH

By Our Regular Correspondent

NEW YORK AND EASTERN NOTES

Additions to the Utica Spinning Co.'s mill at Utica, New York, recently purchased by the Dunlop Tire & Rubber Corporation of America, are progressively rapidly, and approximately $2.500,000 will be spent in enlarging the plant to a 36,000-spindle capacity. The additions will cover 150,000 square feet of floor space, or nearly four acres, and include a warehouse covering 35,000 square feet. This plant, which will employ 1,000 hands, will manufacture cord tire fabric exclusively, producing at the rate of 344,000 pounds each month.

Frederick C. Walcott, president of the Dunlop Tire & Rubber Corporation, is also president of the Utica Spinning Co.; P. D. Saylor is vice-president and general manager of both companies. Other officials include James J. Boyle, superintendent of the Utica Mill in charge of manufacturing operations, and Richard E. Hatfield, assistant treasurer in charge of commercial operations.

The Walters Rubber Co. of New York, Mineola, New York, wholesale distributer of Federal tires and tubes and Walters red tubes, has increased its capital from $20,000 to $100,000.

The American Chicle Co., New York City, which has completed its new $2,000,000 factory in Long Island City, of which a preliminary description appeared in The India Rubber World, July 1, 1919, for the purpose of economy in production will concentrate its manufacturing operations under the one roof instead of maintaining a number of smaller plants. In accordance with this plan, the company's properties in Cleveland, Ohio, and Kansas City, Missouri, have been sold; the factory in Portland, Maine, has been closed and is for sale; and the factory at Rochester, New York, has been closed. The new plant at the Degnon Terminal occupies the entire block, being 200 by 600 feet, six stories high, and is built of reinforced concrete.

At a meeting of the board of directors of the National Aniline & Chemical Co., Inc., New York City, held December 21, Orlando F. Weber offered his resignation as president and F. M. Peters resigned from the board. J. W. Newlean was elected president of the company. Mr. Weber continues as chairman of the board of directors of the National Aniline & Chemical Company, Inc., and has accepted the presidency of the Allied Chemical Dye Corporation. E. L. Pierce, president of the Solvay Process Co., was elected a director, and B. A. Ludwig, C. F. Weber and Dr. L. H. Cone, vice-presidents, of the National Aniline & Chemical Co., Inc.

The highway experts representing every field of interest in modern road improvement who have consented to act on the Lincoln Highway Association's technical committee to determine the final specifications for an ideal section to be financed by the United States Rubber Co., which the Association will construct on the Lincoln Highway next year, comprise some of the best-known highway engineers and commissioners in the United States. The final decision to be reached by the committee is expected to have a far-reaching influence on the future of American road construction.

The General Tire & Rubber Co., Akron, Ohio, has appointed W. A. Young representative for New York State, with offices at 1778 Broadway, New York City.

Recent additions to the personnel of the Syracuse Rubber Co., Syracuse, New York, maker of the Syra-Cord tire, include E. R. Caldwell, general manager; J. B. Losey, assistant general manager; and George C. Mecklin, head of the calender department. Associated with Mr. Mecklin is W. F. Fike, both men being well known for their success in tire building and calendering. G. R. Loggie, formerly general manager, has resigned to become distributer for central New York State.

The Holly-Wood Chemical Co. has removed its office from 101 Beekman street, New York City, to its plant at 2005-2009 Palmetto street, Brooklyn, New York.

The Kelley Tire & Rubber Co., Inc., New Haven, Connecticut, whose factory at West Haven is nearing completion, expects to start production in February, with an initial output of 500 tires per day.

SOUTHERN NOTES

The Standard Rubbers Finance Co., 708 Common street, New Orleans, Louisiana, recently incorporated to manufacture automobile tires, inner tubes and a general line of mechanical goods, intends to break ground for the first unit of its new factory after the first of the year. Officers of the company are: L. C. St. Germain, president; G. W. Gish, vice-president and general manager; John T. Powers, Jr., secretary; J. M. Olivier, treasurer; John R. Hunter, general counsel. Mr. Gish, the vice-president and general manager, has been active in the rubber industry for the past fifteen years, and has been connected with the Quaker City Rubber Co., the Ehman Tire & Rubber Co., and other prominent rubber companies.

PENNSYLVANIA NOTES

The new Philadelphia sales branch of The Mason Tire & Rubber Co., Kent, Ohio, will cover eastern Pennsylvania, part of Delaware, and southern New Jersey. It is in charge of Leslie W. Weir associated with E. J. Stoeser.

The Plexus Tire & Rubber Co., Inc., Tacony, Philadelphia, has installed new machinery in its factory at State road and Levick street that will enable it to increase production to 2,000 tubes per day. The company reports most encouraging sales of its "Tuf" tubes, and is also developing a line of small molded goods, including druggists' sundries, plumbers' supplies, rubber tubing, windshield rubber and channel rubber.

Recent additions made by the Westinghouse Electric & Manufacturing Co. to its works at South Philadelphia, Pennsylvania, include a new foundry building of the "daylight" design, 120 by 200 feet, which will be used to make castings weighing from one-half pound to one-half ton; also a three-story warehouse, with 86,650 square feet of floor space; two pattern storage buildings, 30 by 256 feet; and two garages to accommodate a total of 60 cars. The new extensions will practically double the employed force, which now numbers 3,500 workers.

The Belmont Packing & Rubber Co., 133-35 North Second street, Philadelphia, is negotiating with the George Kessler Contracting Co., Drexel Building, for the erection of an addition to its factory. The new building will be 130 by 120 feet, one story and basement, and will be used for the storage of raw materials and to take care of increased production in the flax spinning and asbestos textile departments.

A. F. Alexander has been appointed district manager of the Philadelphia branch of the Owen Tire & Rubber Co., Cleveland, Ohio, with offices at 719 North Broad street. This

branch will look after distribution and sales in a territory extending north to New York State and south to the Carolinas.

The Rogers Rubber Co., Inc., Century Building, Pittsburgh, Pennsylvania, manufacturer and distributer of the Rogers revolving rubber duplex heel, on which patents are pending, has the following officers: B. M. Anderson, president; B. D. Cochran, vice-president, and H. Woodward Rogers, treasurer and general manager, who is also the inventor of the Rogers heel.

THE RUBBER TRADE IN NEW JERSEY

By Our Regular Correspondent.

TRENTON NOTES

THE RUBBER MANUFACTURERS of Trenton continue to feel the slump in business, general throughout the country. Both the Bergougnan and the Joseph Stokes Rubber companies are practically closed down. The Joseph Stokes Co. employs about 1200 hands, and all except a few have been laid off temporarily. Other Trenton rubber plants have also laid off a number of employes, including the Whitehead Brothers' Rubber Co. It was believed that the depression would not affect concerns making mechanical goods; however, the slump in this line is due largely to the slackening up of all manufacturing industries.

At the annual meeting of the Trenton Rubber Manufacturers' Association held at the Trenton Country Club on December 13, the name of the organization was changed to the Rubber Manufacturers' Association of New Jersey, for the purpose of widening its scope and admitting to membership all rubber concerns in New Jersey. There are about fifteen rubber manufacturers in New Jersey, outside of Trenton, who will eventually become members of the state body. Previously the membership was confined to Trenton rubber concerns and a few others near by. The New Jersey Car Spring & Rubber Co. and the Voorhees Rubber Manufacturing Co., both of Jersey City, have already become affiliated with the new association.

The following officers were elected: president, John S. Broughton, president of the United & Globe Rubber Co.; vice-president, Charles E. Stokes, of the Home Rubber Co.: treasurer, A. Boyd Cornell, of the Hamilton Rubber Manufacturing Co.; secretary, Henry Sayen, of the Mercer Rubber Co., Mercerville, New Jersey. Mr. Broughton has held the office of president for some time. Following the business meeting a banquet with music was served.

The Thermoid Rubber Co., Trenton, has completed the erection of a building to be used for the manufacture of brake lining for automobiles. The structure is one story, 50 by 80 feet. Several other additions were recently added to the plant.

Harry Knoebel, a traveling salesman for the Thermoid Rubber Co., Trenton, has resigned to join the sales forces of the Neidt-Ertel Motor Co., Trenton.

The Hamilton Rubber Manufacturing Co., Trenton, has completed a brick building on Mead street, to be used as an entrance for employes. The new entrance is provided with time clocks.

Charles Howell Cook, treasurer of the Hamilton Rubber Co., Trenton, has again been elected president of the Mercer County Health League, which was organized two years ago to fight tuberculosis. Mr. Cook devotes considerable time to this work and also to Boy Scouts of Trenton. He is frequently called upon to give talks on health at various rubber factories.

Samuel E. Lovery, for a number of years connected with the Fineburg Auto Tire Co., Trenton, has resigned to follow another line of employment.

The City Rubber & Supply Co. has leased the Ashton building at 13 North Warren street, Trenton, and is handling fabric and cord tires.

The Nearpara Rubber Co. recently completed a new plant at East State street and Whitehead's road, Trenton. A year ago the plant in East Trenton was destroyed by fire, and later Hyman A. Rosenthal, the owner, purchased two and one-half acres in the eastern section and erected a more modern plant. The company makes reclaimed rubber for the hard rubber and wire trade.

H. W. Kugler was elected president of the Globe Rubber Tire Manufacturing Co., Trenton, at the last meeting of the board of directors.

MISCELLANEOUS NEW JERSEY NOTES

The recently incorporated Old Hickory Tire Co., with a capitalization of $3,500,000, and a principal office at 790 Broad street, Newark, New Jersey, will manufacture automobile, motor truck and motorcycle tires and tubes; also automobiles, motor trucks, motorcycles and other vehicles and rubber goods of all kinds. The capital stock is divided into 140,000 shares of the par value of $25 each, while 40,000 shares are to be preferred stock and 100,000 shares are to be common stock. The holders of the preferred stock will not enjoy any voting privileges, but will receive dividends of eight per cent. The new company contemplates the erection of a factory.

The Common Council of Vineland, New Jersey, has a proposition in hand for the location of a large rubber manufacturing concern at that place. It is reported that the new company has purchased a plot of ground on the Oak road and will erect a plant there.

The Uneeda Tire Co. has removed from No. 261 to No. 266 Halsey street, Newark, New Jersey, where it has leased a portion of the building.

Four departments of the American Hard Rubber Co.'s plant at Butler, New Jersey, have been placed on a four-day-a-week schedule.

The Cigol-Behrens Rubber Manufacturing Co., Lodi, New Jersey, which was recently incorporated to manufacture molded rubber goods, plumbers' supplies, toy balls and hollow rubber goods of every description, has purchased the plant and equipment of the Lodi Corporations, which manufactured under the names of Mattson Rubber Co. and E. J. McCormick Rubber Co. The officers include J. H. Behrens, president, and Louis G. Davenport, secretary.

The Atlantic City Tire & Rubber Co., Atlantic City, New Jersey, has secured a factory site comprising an entire block on Virginia avenue, from Mediterranean to Drexel avenues, and will erect the first unit of its factory for the production of high-grade cord tires and tubes. The officers are: A. Lincoln Pearce, president; Robert M. Pearce, vice-president; Charles P. Hill, treasurer; A. C. Pritchard, secretary.

For the purpose of conserving the assets of the companies, application has been made by the officers of the Stanwood Rubber Co., Elizabeth, and the Hardman Rubber Corporation, New Brunswick, New Jersey, for the appointment of receivers. John H. Kirkpatrick of New Brunswick was appointed receiver of the Stanwood Rubber Co. and Edmond A. Hayes, also of New Brunswick, was appointed receiver of the Hardman Rubber Corporation. Negotiations are said to be nearly consummated for a merger of these two companies with two large solvent companies in the Mid-West, one condition being that the obligations of the Stanwood and Hardman companies shall be discharged as they mature.

THE SERIAL NUMBERS APPEARING ON THE SIDE-WALLS OF AUTOmobile tire casings should be kept on record by their owner just as carefully as he keeps the number of his watch. Casings lost or stolen can often be traced by this means. Repair men will cooperate by keeping these records for their customers. Such records are also useful in keeping mileage and service data.

AMERICAN DUNLOP FACTORY NEARLY COMPLETED

One of the finest modern tire factories in the country is the new plant of the Dunlop Tire & Rubber Corporation of America, at Buffalo, New York, the completed buildings now covering over 35 acres of the 214-acre site purchased by the company, one mile north of the city. According to the London *Financial Times*, a letter from P. D. Saylor, vice-president and general manager of the Dunlop Tire & Rubber Corporation of America, in reference to the company's position, has recently been issued by the Dunlop America Trust Co. The latter is the pool which controls the disposition of the American company's shares, and the Dunlop Rubber Company's 25 per cent ordinary interest is vested in that concern. The letter gives a full account of the scope of the American company's activities and is quoted in part below:

"The contract for the erection of the factories was placed with the Foundation Company of America on January 24, 1920. The buildings contain a floor space of 1,250,000 square feet—28 acres—and such progress has been made that the buildings will be completed before the winter sets in.

"The buildings under construction will afford facilities for manufacturing the following weekly output: 30,000 automobile pneumatic tires of the straight-side type; 6,500 automobile pneumatic tires of the clincher type; 5,000 automobile pneumatic truck tires; 2,500 solid rubber tires; 40,000 tubes.

"Starting at zero, January 1, 1920, production will gradually be increased until by the end of 1921 approximately full production will be reached. The value of this year's output is estimated at $25,-000,000. As the factory is expected to be in full production by the end of 1922, it is estimated that the value of the output for the year will approximate $96,000,000.

"There is a steadily increasing demand for tires of cord construction all over America, and no great difficulty is anticipated in disposing of the entire output of our plant, as the company's will be the only large factory in America devoted exclusively to the manufacture of this type of tire.

"We feel justified in saying that never in the history of the tire industry has any company started with greater prospects than the Dunlop Tire & Rubber Corporation of America."

FIRESTONE TRUCK TIRES EQUAL TO SEVERE TEST

The contention of tire builders that insertion of gum between the plies in pneumatic truck tire treads reduces friction resulting from hard usage was admirably supported in a recent truck test run made on the Indianapolis motor speedway by a Duplex stock truck equipped with Firestone cord tires, according to experts from the Firestone company who witnessed the test. A machine weighing 4,300 pounds and carrying a 3,300-pound load was driven around the speedway for a continuous 24-hour period at an average rate of 39 miles per hour. Including 150 miles in preliminary tests, the truck traveled 1,085 miles and on the concluding lap reached a speed of 44.5 miles per hour. The average weight borne on each tire was 1,570 pounds front and 2,562 pounds rear, and each tire was inflated to 100 pounds' pressure. The slight temperature increase indicated the value of gum between the tread plies and showed that higher than ordinary pressures aid to prevent heat generation. At the finish of the run the 35 by 5-inch ribbed front tires showed cross wear at an angle with the tread caused by turning corners in the same direction; the 38 by 7-inch nonskid rear tires showed no trace whatever of wear.

THE LEE TIRE & RUBBER CO.

In order to establish a successful business the founder must be possessed of three things—faith, hope and capital, and most business men will assert that the greatest of these is capital. J. Ellwood Lee possessed all three requisites when he was twenty-three years of age, so he severed his connection with the establishment of William Snowden & Co., Philadelphia, and setting to work in an attic at Conshohocken, Pennsylvania, he began the manufacture of surgical rubber goods. His faith and hope were limitless; his capital, $28.35.

Five years later, Mr. Lee secured articles of incorporation for a permanent organization with a capital of $75,000, which by 1894 was increased to half a million. By the end of the next decade the J. Ellwood Lee Co. had reached a high place in the trade, second only to the firm of Johnson & Johnson, New Brunswick, New Jersey, with which company it later merged, although each company retained its own identity.

Plant of the Lee Tire & Rubber Co., Near Philadelphia, Pennsylvania

When the automobile industry began Mr. Lee was quick to see a promising future for tires, and in 1909 he installed complete tire-making machinery in the factory. The next year his great success and increasing business warranted the organization of a new company under the name of the Lee Tire & Rubber Co. A plot of 27 acres was obtained in Spring Mill, Pennsylvania. Modern buildings were erected, including a four-story concrete building, 80 by 400 feet, for offices, assembling, receiving and shipping purposes, and a two-story brick building of the same dimensions for manufacturing and power plant. Here 900 people are now employed and 2,500 tires daily can be produced when the plant is running to capacity.

The death of Mr. Lee, which occurred April 8, 1914, was a great loss to the company, of which he was then president, as his inventive genius and organizing and executive ability had done much to further the success of the firm.

Anyone who has visited Atlantic City will probably recall the huge illuminated signboard, 75 feet in length, set at the head of the boardwalk, on which is reproduced in miniature the beautiful Lee factory in its picturesque setting in the valley of the Schuylkill, fourteen miles from Philadelphia.

The Lee Tire & Rubber Co. specializes in its puncture-proof tire (that "smiles at miles"), in addition to manufacturing all regular styles of automobile and truck tires.

THE RUBBER TRADE IN MASSACHUSETTS

By Our Regular Correspondent

As elsewhere throughout the country, the rubber trade in Massachusetts remains quiet, especially tire manufacture. Footwear production has been more nearly normal, but with advance orders for rubbers and arctics taken care of and a mild winter in prospect, factories are now running on part time schedules or have shut down for inventory taking, repairs and the holiday season. Increased activity is anticipated, however, after the new price-lists for tennis lines are issued about January 1, 1921. Meanwhile, wage schedules are undergoing readjustment in conformity with the slump in the raw material market and the public demand for lower price levels.

Massachusetts rubber manufacturers are optimistic regarding the future, the recent statement of M. M. Converse, president of the Converse Rubber Shoe Co. in the *Boston Evening Record*, typifying the consensus of opinion among them. He writes:

While it is a fact that in many industries there is at the present time a slacking up in the demand for goods, it is not due to conditions that should cause apprehension. Instead, it is quite the reverse. The present situation means a liquidation of surplus stocks that the manufacturer, the wholesaler, and the retailer have all felt obliged to carry for the past three years to overcome the shortage of merchandise and the lack of transportation facilities, thereby enabling them to serve their customers. This created an abnormal situation, and abnormal situations are always dangerous. However, everything is now working back to normal, and this means a healthy situation in 1921. We should see during the year the stabilization of industry that has been freely predicted and that has been inevitable since the beginning of abnormal times. I believe 1921 will be one of the most prosperous years in the history of the country.

The New England Tire & Rubber Co., which started business in Holyoke, Massachusetts, last June, has placed its Holyoke cord tire on the market. The New York City salesroom is located at 43 East 47th street, and the Boston distributer is the City Rubber Co., 288 Columbus avenue. F. E. Powers is Boston representative with an office at 161 Devonshire street. The firm's new plant at Holyoke is about one-third completed. The officers and directors of the company are: president, John Kearns, vice-president and general manager of the Lee Tire & Rubber Co.; vice-president and production manager, E. J. Kearns, formerly with the Fisk, Lee and Dunlop companies; treasurer and general manager, C. S. Huntley, president of the Midco Tire Co. and organizer of the Delion Tire & Rubber Co.; directors, the foregoing and George K. Culp, of the United States, Mid-Continent and other companies, W. C. Van Brunt, Joseph F. Granger, T. F. Morris, F. W. Callahan, J. Sidney Bernstein and Frank J. O'Neil.

The plant of The Fisk Rubber Co., Chicopee Falls, Massachusetts, like numerous others in this state, has been operating for several weeks past on a schedule of three days a week in order to find partial employment for as many operatives as possible.

A reduction of 15 per cent in wages, effective December 6, has been accepted by the employes of the Tyer Rubber Co., Andover, Massachusetts. Full time, following several weeks of a three-day week schedule, is a possibility in the near future.

Owing to the belief that prices of foodstuffs, already falling rapidly, will soon return to normal, the Hood Rubber Co., Watertown, Massachusetts, has closed its cooperative grocery store established in 1916 which often served 2,000 customers daily.

The plant of the Cambridge Rubber Co., Cambridge, Massachusetts, which closed December 15, resumed operations December 27. The footwear department of the business has been idle for a longer period.

The Insurance Commissioner has recently approved a new schedule of manual rates for Workmen's Compensation in the State of Massachusetts effective at midnight December 30, 1920, and applying to policies expiring in January or February, 1921. The classifications of interest to the rubber trade follow:

	Old Rate	New Rate
Rubber goods manufacture	$1.97	$1.60
Rubber boot and shoe manufacture	.83	.76
Rubber garments manufacture (including rubber mill)	.69	.76
Rubber garments manufacture (no mill)	.45	.25
Rubber belting manufacture	1.35	1.60
Rubber reclaiming	4.10	1.85
Rubber tire manufacture	1.23	1.30

Under the disability insurance plan effective since June 1, 1920, in the plant of the Converse Rubber Shoe Co., Malden, Massachusetts, compensation is on the following basis: employes rated as foremen will be given full pay for any period up to twenty-six weeks from date of disability; assistant foremen and all other salaried or "straight time" employes full pay for two weeks from date of disability and thereafter 90 per cent of their pay for any period up to and including twenty-five weeks.

As an incentive to thrift, *Converse Folks*, the factory magazine of the Converse Rubber Shoe Co., Malden, Massaschusetts, is starting a savings bank account to the amount of $5.00 in the name of every baby born whose father or mother is at the time in the company's employ, *Converse Folks* acting as trustee. On the child's first, second, third, fourth and fifth birthdays *Converse Folks* will deposit to the account $1.00, $2.00, $3.00, $4.00 and $5.00 respectively, so long as the parent is in the company's employ, and provided the parent adds at least $5.00 to the amount every year. In the event of the parent's failure to pay the specified amount before the child's first birthday, the original deposit reverts to *Converse Folks*. Similar neglect in any subsequent year closes the account as it stands, the parent becoming trustee of the amount on deposit. Should the parent leave the company's employ before the child's first birthday, the original $5.00 deposit reverts to *Converse Folks*. After the child's first birthday the entire account may be withdrawn if the parent wishes. On the child's fifth birthday, if the account has been maintained, the parent becomes trustee of the account, which amounts to at least $45.

The Hood Rubber Products Co., Inc., Watertown, Massachusetts, has been awarded the contract by the Bureau of Supplies and Accounts, Navy Department, to furnish 30,000 pairs of rubber overshoes for various naval stations at $30,000. Bids for these were opened on November 23.

Frederic C. Hood, treasurer of the Hood Rubber Co., Watertown, is one of the directors of the newly organized Association for the Promotion and Protection of Savings, Inc., for helping employes to learn and practice the principles of thrifty living, systematic saving and wise investment. The Associated Industries of Massachusetts has been the prime mover of the organization. Membership is open to individuals, firms, corporations and associations, all of whom are entitled to the use of films, slides and literature for plant meetings of employes and material for shop publications, all of an educational character regarding savings and investments prepared by the Association.

George A. Torrey, sales manager of the Tyer Rubber Co., Andover, is making his annual trip to the Pacific Coast.

The Tyer Rubber Co., Andover, reports very satisfactory results from its employment and service department, which was organized in July, 1919. A very marked reduction of the labor turnover was maintained under the generally trying labor conditions of the past year. One of the chief accomplishments of the department has been the organization of the Tyrian Service Association, the plan of which was outlined in The India Rubber World of February 1, 1920. It has been responsible for numerous social events which have promoted good fellowship among the employes, and for the organization of athletic activities. It has assisted in the installation of a plan for savings, conducted a plan for cooperative buying, and created a fund to bring comfort to sick employes, known as the Happy Thought Fund, from which ninety-five gifts were made during the year.

The work of the health department of the company has also been effective, and by its efforts lost time through illness and accident has been much reduced.

BOSTON NOTES

George Green, formerly associated for many years with Samuel Grow, has returned as general sales manager of the George Grow Tire Co., Boston, and director of the automobile end of this fast-growing business. Mr. Green is well known throughout the New England automobile and accessory trade. With Mr. Grow he regards the enlargement of the Canton Junction plant to a capacity of 800 tires a day as necessary to meet the Spring boom which dealers here believe is certain to come.

The Atlantic Rubber Co., formerly at Atlantic, Massachusetts, has opened offices at 88 Broad street, Boston. A few more lines of rubber goods are being added.

Archer S. Pratt, for fourteen years associated with T. C. Ashley & Co., 683 Atlantic avenue, Boston, manufacturers of rubber substitutes, has retired from that firm, which will be continued by Thomas A. Ashley.

Some fifty prominent automobile dealers and other business acquaintances at the Hotel Kenmore, Boston, recently tendered a farewell banquet to W. E. Dermody, for three years Boston branch manager of The Goodyear Tire & Rubber Co., who has been transferred to a more important position at the Akron, Ohio, factory. The dealers presented him with a beautiful silver service, while close associates gave him a platinum and gold watch chain. Mr. Dermody was held in high esteem by many friends who, while rejoicing in his well-earned advancement, regret his leaving.

The C. C. C. Fire Hose Co., maker of fire hose and mechanical rubber goods, 209 Washington street, Boston, Massachusetts, at a recent meeting elected James J. Clifford president of the company. Mr. Clifford was for three years president of the Plymouth Rubber Co., resigning from that office in July, 1920. Previously he had been for nine years connected with the Boston Woven Hose & Rubber Co. Other officials of the C. C. C. Fire Hose Co. are: Royal K. Abbott, vice-president and treasurer; William J. Bingham, secretary; Charles M. Olcott, assistant treasurer. The directorate includes, besides the officers mentioned, Horatio Gilbert, Luther S. Newell and W. Lloyd Allen.

THE RUBBER TRADE IN RHODE ISLAND

By Our Regular Correspondent

The year 1920 comes to a close with practically every line of industry at a low ebb for the first time since the beginning of the World War in August, 1914. As a result of this general business depression, which has apparently reached its lowest point, there is the largest number of employes idle that has been reported in many months. Whereas, since the summer of 1914 there has been a dearth of men to fill the jobs, there is now a dearth of jobs for the men who are out of employment. In New England the textile industry is one of the hardest hit and all kinds of productions are affected, including the manufacture of fabrics for automobile tires. In keeping with other lines of industry the rubber manufacturing plants have felt the influence of the downward trend and most of them, especially those manufacturing footwear, have reduced their working forces, curtailed the weekly schedule of production and several have been closed down for varying periods during the past month. In consequence of these curtailments the outlook was far from encouraging, especially as the continued pleasant weather has had a tendency to restrict sales of rubber footwear.

Just after the middle of the month, however, a more optimistic atmosphere began to prevail because of the brighter outlook for the industry that was forecasted in the report that the United States Rubber Co., the parent concern, was receiving large seasonal orders for the products manufactured in its various plants in this State. These reports were that the company was receiving daily substantial orders for rubbers and the lighter arctics, and it is believed that these orders should materially assist in tiding over the Rhode Island mills for the next few months and avert any further shut-downs. During the month of December the plants of the National India Rubber Co. at Bristol, the Alice Mill of the Woonsocket Rubber Co. at Woonsocket, and the Millville plant of the same concern at Millville were closed from one week to three, and the Revere Rubber Co.'s plant in Providence was forced to lay off several hundred of its employes for varying periods. At the American Wringer Co.'s plant at Woonsocket, there was also a curtailment of working forces and a partial shut-down.

In the course of a tour of inspection of New England fabric mills that are furnishing fabric for Firestone tires, a party of officials of the Firestone Tire & Rubber Co. arrived in Providence, December 2, and looked over the local Firestone branch of which Harry J. Aitken is manager. In the party were H. S. Firestone, president; J. W. Thomas, vice-president in charge of production; L. G. Fairbanks, vice-president in charge of sales, and S. G. Carkhuff. The party were on their way from New York to Boston.

Suit brought against the Kokomo Tire Co., of 205 Hoppin Homestead building, Providence, by Emile Bresse, of East Providence, for alleged broken promises, for which the original damage of $200,000 was reduced by Justice Tanner, of the Superior Court for Providence County, to $50,000, is expected to go to trial soon. The plaintiff claims that the defendant agreed, in return for the sole patent rights of a certain article, to pay the plaintiff $1,000 in cash, $5 weekly and a royalty of 50 cents each on not less than 15,000 of the articles to be manufactured each year for at least five years. The plaintiff claims the contract provides that if the article was not satisfactory the contract was void. The defendant contends that it did not make the agreement as represented by the plaintiff.

The Firestone Tire & Rubber Co. has entered suit in the Superior Court, Providence, against the International Truck Co. of Rhode Island, Abraham Luff, and the Industrial Finance Corporation, to recover the proceeds of five notes, each for $1,000. The damage is placed at $10,000. The first note was made July 10, 1920, and was payable September 10, it is alleged, and by the terms of each of the series of five notes, all became due immediately after any one was defaulted. Mr. Luff and the Industrial Corporation are indorsers on the notes.

According to a statement filed with the Secretary of State last month, the Joseph Banigan Rubber Co. of Woonsocket, a Rhode Island corporation, has amended its charter, reducing its capital stock from $1,250,000 to $1,000. In order to accomplish this object, the company has voted to purchase at par and retire 12,490 shares of capital stock. This is one of the subsidiaries of the United States Rubber Co. and Walter S. Ballou is president.

The Rubber Boot and Shoe Workers' Protective Association of Providence, created for moral and social advancement, has received a charter under the laws of Rhode Island. The incorporators are Edward E. Colebert, Emil Schall, A. Henry Vincent, Mathew H. Brennan, James H. Liddy, Herman Carlson and John Ginnette.

THE RUBBER TRADE IN OHIO

By Our Regular Correspondent

AKRON NOTES

Under the refinancing plans of The Goodyear Tire & Rubber Co., approved at the postponed stockholders' meeting December 24, the capitalization of the company was decreased from $100,000,000 to $50,000,000, and the outstanding common stock with a par value of $100 per share will be exchanged for

common stock of no par value, while the outstanding preferred stock will be exchanged for new preferred stock with the same rights and privileges as those now carried by the preferred stock, together with the additional exclusive right for voting, or controlling the board of directors.

At the same time the stockholders, including the preferred stockholders, authorized the issuance of first mortgage bonds to the extent of not more than $50,000,000, which will be taken over by bankers and sold to finance the reorganization of the company.

The new mortgage bonds will carry 8 per cent interest and will run for a term of twenty-five years. It is understood that in addition to the 8 per cent interest the bankers will receive 2½ per cent of the net profits of the company during the life of the bonds.

W. E. Palmer has retired as treasurer of the company to become secretary, and T. Jackson, representative of the new banking interests, has been elected treasurer. H. J. Blackburn and H. H. McClosky, Mr. Palmer's assistants, will be given other positions in the company.

In a letter to the stockholders, F. A. Seiberling, president of the company, stated that the refinancing of the company was made necessary by the fact that the company's annual budget was made up to meet a production of $250,000,000 worth of goods, and when the financial depression came the company was caught with large supplies of raw material purchased at war and post-war prices, making the inventory unduly high.

This rendered it impossible to meet the credit demands of the company and necessitated borrowing $28,800,000 until February 15, 1921, to carry the inventory and give bankers and company officials time to make plans for the permanent refinancing of the company.

Although the details of these plans are not yet complete, the New York bankers who are making the negotiations have let it be known that they will control 51 per cent of the stock of the company for a term of years, and through the newly appointed treasurer will control the financial operations of the company.

The manner in which Akron bankers and business men have stood by Mr. Seiberling during the dark hours through which the company has passed is a wonderful tribute to their confidence in his business ability and hopes for the future.

The Firestone Tire & Rubber Co., Akron, has elected the following officers: H. S. Firestone, president; A. C. Miller, and Thomas Clements, vice-presidents; S. G. Carkhuff, secretary; and J. G. Robertson, treasurer. The former directors were reelected. Plans for improving plant facilities include a railroad system connecting all factory units and cooperating with the trunk line now running parallel to the Firestone factory.

The announcement of the Firestone Tire & Rubber Co. that quarterly dividends will be reduced from $2 to $1.50 per share, in order to conserve cash resources during the present readjustment period, and salaries of the office force cut 10 per cent was anticipated, and similar action on the part of other concerns will not be a surprise. Factory employes have been working on part time schedule, and this fair-minded method of meeting the financial crisis by sharing the burdens as the prosperity has been shared in the past is a typical Akron view of the matter. It is for this reason that practically no protest has been heard from the salaried employes or stockholders regarding the decrease in the earnings or investment returns. Salaries were increased 20 per cent during the past year in order to meet rising living costs.

The numerical factor regulating the production of tires will hereafter be changed from the theoretical six tires consumed a year per automobile in the United States to probably four or five, according to rubber men in Akron.

Much of the present difficulty in which the tire industry finds itself is due to the fact that production was hitherto based upon an assumption which experience has shown to be no longer correct. Upon this basis plants were expanded and raw materials purchased, but when trade slackened the fact that consumption had been overestimated became painfully apparent.

The decrease in the number of tires used by each automobile is due largely to the better quality of tires manufactured during the last two or three years. The cord tire travels perhaps twice as far as the former fabric tire, and the fabric tire itself is better built. Then, too, rubber companies have educated motorists so efficiently and so persistently in the care and use of tires that longer average service has resulted.

Chester A. Graham, formerly Americanization secretary of the Young Men's Christian Association, has been named Americanization director of the public schools, succeeding E. C. Vermillion, who resigned recently to take a similar position at Pittsburgh, Pennsylvania. The Americanization department has felt the slackening of industries here, more than 25 per cent of the men and women who registered early this fall having failed to make their appearance at classes.

The public schools, under the new administration of C. R. Reed, have entered into the field of occupational education. An automobile school has been established, where the repairing and driving of automobiles is taught by four teachers to classes numbering more than 300 boys and girls or men and women.

The plant of the B. & W. Rubber Co., located at Holmes and East Tallmadge avenues, Akron, will be ready for operation in approximately ninety days, according to officials, and will employ approximately 100 persons. Mechanical rubber goods will be manufactured, and a specialty made of rubber heels. The officers are: H. A. Backderf, president; D. B. Campbell, vice-president; Eric Richards, treasurer, and Mary E. McGowan, secretary and assistant treasurer.

W. A. Johnston, president of the Rubber Products Co., Barberton, has been elected president of the recently organized Chamber of Commerce of Barberton. This organization of rubber and other business men is assisting to solve some of the important problems resulting from an increase of more than 99 per cent in population during the past ten years.

Akron rubber concerns look upon the success of the community chest plan to raise $500,000 for Akron's charity and welfare organization as a new vote of confidence by the people.

When the workers, headed by T. E. Smith, editor of the *India Rubber Review*, entered the campaign they did not fail to realize that the temporary business depression had greatly decreased the giving power of the people of Akron.

But the charities had to be supported, and when the chest was filled the officials of the community chest and rubber men generally felt that the people who know the rubber industry from an intimate view-point had stated in no uncertain terms that the future of the industry is bright, although at present there are only the faintest beginnings of a revival in tire manufacture.

News comes that Edward S. Babcox, formerly advertising manager for the Firestone Tire & Rubber Co., has acquired a substantial interest in the *India Rubber Review*, of Akron, Ohio To those who do not know this latest recruit in rubber journalism, the name and the state he lives in may suggest the last Democratic aspirant for the president. Mr. Babcox, however, is not a politician. On the contrary, he is a past master in the art of industrial advertising, a forceful writer, a keen critic, and withal a live, energetic and very likable gentleman. We wish him all success.

The Rubber Engineering Co., Akron, formerly at 46 South Broadway, will be located at its new offices at 437 First Second National Building after January 1, 1921. The officers are W. F. Ridge, president; W. E. McCormish, secretary.

On its twentieth anniversary, the Firestone Tire & Rubber Co. issued a statement in which total sales of $114,980,969 for the

past year were made public, of which $9,396,912 represent net profit after $8,151,749 have been charged off as inventory shrinkage. The volume of business done during the past year is 26 per cent over the business done during the previous year, in spite of the business depression which has been felt in the tire industry during the past five months. Current assets are given as $73,732,503 and total assets as $107,404,200.

The Canadian plant was not completed during the past year because of the inability of the company to obtain contractors to do the work, but will be finished early next year. The rubber preparation plant at Singapore is now in operation, and the steel plant and the mechanical building in Akron will be put into operation when business demands their use.

H. S. Firestone, president of the company, is confident that the ensuing year will see the company grow in strength and stability. Regarding the rubber industry and its future, Mr. Firestone said: "Our industry has become fundamentally sound through its close affiliation to proven automotive transportation, and its scope will broaden with nation-wide good roads projects financially assured through legislation."

At a recent meeting of the industrial assembly of The Goodyear Tire & Rubber Co., Akron, N. P. Woodward was elected president of the senate by a vote of 11 to 3. J. P. Long was reelected speaker of the house. A full membership was present in the house and 19 members of the senate were present. The Goodyear industrial republic was described in The India Rubber World for November 1, 1920, page 124.

Arthur Ostman has been appointed head of the testing department of the motor division of the Wellman-Seaver-Morgan Co., Akron.

Arthur E. Warner was recently appointed chief chemist of the Firestone Tire & Rubber Co., Akron.

CLEVELAND NOTES

The Safety Equipment Service Co. has moved from 215 St. Clair avenue to its new building at East Eleventh street and Hamilton avenue, Cleveland, Ohio. In its larger quarters it will carry more stock and render a service adequate to the needs of America's industrial safety requirements.

The Ramsdell Bros. Co., formerly at 2102 Euclid avenue, has removed to 3430 Superior avenue, Cleveland, Ohio. C. R. Johnson, who was manager of the development department of The Goodyear Tire & Rubber Co., Akron, has been elected vice-president of the company, in charge of truck tire service.

MISCELLANEOUS OHIO NOTES

The Mason Tire & Rubber Co., Kent, Ohio, has appointed J. J. Flynn purchasing agent, succeeding C. D. Rockwood, and J. B. Paltz assistant purchasing agent. Mr. Flynn, who has been assistant purchasing agent for the past fifteen months is well equipped with experience, having been with the Northern Ohio Traction & Light Co., Akron, as acting purchasing agent, where he also organized that company's valuation department and operated the stores department. Previously he was connected with the Cleveland Railway Co.'s valuation department for about three years. Mr. Paltz was formerly connected with the purchasing department but for a number of months had been in charge of the salvage department.

The factory engineering department of The Mason Tire & Rubber Co., Kent, Ohio, which was organized in August of this year with H. W. Sidnell in charge, has made several changes in personnel. D. D. Williams is now in charge of raw materials, Lee Clough in charge of tire design, and E. B. Harvey is at the head of the planning department.

The Maumee Tire & Rubber Co., 705 Madison avenue, Toledo, Ohio, has purchased fifty-one acres of land upon which will be constructed a tire manufacturing plant with facilities for the production of 5,000 tires a day.

The Rotary Tire & Rubber Co., Zanesville, Ohio, has appointed as agents Courtland P. Ely, 1339 Linwood avenue, and H. F. Van Etten, 194 North Oakley avenue, Columbus, Ohio.

The Eclat Rubber Co., Cuyahoga Falls, Ohio, which specializes in rubber tubing, is now entering into production of high quality red and gray automobile inner tubes made circular ring shape in sizes from 3 to 5 inches.

The Toycraft Rubber Co., Ashland, Ohio, which was incorporated September 26, 1919, with a capital of $25,000 to manufacture and market toy balloons for the trade and also for advertising purposes, has been operating at full capacity. In its first year it has built up an excellent sales record and earned the good will of some of the best trade in the country. The officers are: Howard D. Winbigler, president; Charles C. Spies, vice-president and sales manager; Ralph T. Scantlebury, secretary and treasurer.

J. W. Eldred has resigned from his connection with The Swinehart Tire & Rubber Co., Akron, Ohio, to become Ohio representative of the Rubber Corporation of America, New York City, with headquarters at Columbus, Ohio.

Edward J. Brown, of Trenton, New Jersey, formerly western traveling salesman in the employ of the Acme Rubber Manufacturing Co., Trenton, has been made general manager of the branch of the Hood Rubber Products Co., Inc., at 227 Sheedy avenue, East Liverpool, Ohio.

THE RUBBER TRADE IN THE MID-WEST

By Our Regular Correspondent

The Minneapolis branch of the Firestone Ship-by-Truck Bureau, Akron, Ohio, occupies spacious quarters in the new building at 444 Stinson Boulevard on the Northwestern Terminal, Minneapolis, Minnesota. The terminal consists of a group of modern industrial buildings, centrally located, especially equipped for the economical handling of merchandise. Each building has its own system of side tracks served by the consolidated service of all the nine railroads entering Minneapolis and is connected by tunnel service with the only freight station in the city served by all railroads. The Northwestern Terminal represents the latest development in buildings devoted to transportation.

The Miller Rubber Company, Akron, Ohio, has appointed S. M. Barber manager of its branch at Grand Rapids, Michigan.

The Ilg Electric Ventilating Co. has recently moved from its old quarters at Whiting and Wells streets to its new modern building at 2850 North Crawford avenue, Chicago. This company is profit-sharing and a large per cent of its employes are large stockholders. Its officials are: S. W. Weis, president; J. M. Frank, vice-president and general sales manager; Robert A. Ilg, treasurer and general manager, from whom the company takes its name.

The Monroe Tire Corporation, 1825 South Michigan avenue, Chicago, has recently been incorporated with Harold Samuels, president, and Leroy Eschner, treasurer. Both men are well known in the tire sales trade and their experience fits them to understand dealers' requirements. The company publishes each month an illustrated catalog called "Tire Dealers' News," which lists a variety of the best known makes of tires and also gives a review of market conditions gathered from reliable sources.

The Blekre Tire & Rubber Co., Wabash and Vandalia streets, St. Paul, Minnesota, was incorporated under the laws of Iowa, October 7, 1917, to manufacture tires and tubes and rubber goods. The officers are: E. O. Blekre, president; S. E. Blekre, vice-president and treasurer; G. W. Wells, secretary; B. A. Rheinstrom, vice-president and general sales manager. G. O. Ludcke is advertising manager and W. E.

Greer, superintendent. The Automobile Tire Owners' Tire Corporation, a $3,000,000 corporation having the same officers as the Blekre company, is building in the Midway district the first tire factory in St. Paul, for the manufacture of the Blekre tire. This factory will employ 250 men and it is expected that it will be ready for operation about January 1. It will produce cord and fabric tires and inner tubes and have a capacity of 2,000 tires daily.

The Progressive Shoe Machinery Co., Minneapolis, Minnesota, manufacturer of shoe machinery, is now manufacturing tire repair shop equipment including vulcanizers, under the name of the P. S. M. Co., at 3116 Snelling avenue, Minneapolis. The officers of the company are: J. H. Martin, president; L. J. Bedard, vice-president; A. C. Bedard, secretary, and S. O. Abrams, treasurer.

The Minneapolis Tire Dealers Association, Minneapolis, Minnesota, organized a short time ago, has the following officers: E. P. Farley, president; F. W. Van Sant, vice-president, and H. F. Lundberg, secretary and treasurer. Mr. Lundberg is with the J. N. Johnson Co., Inc., 1018 Nicollet avenue, Minneapolis, jobber and wholesaler of rubber tires, supplies, fire department equipment, hose, and mechanical rubber goods.

James E. Johnson and Harry Blackman have purchased the interest of W. F. Richley and James F. Brown in the Harmon Rubber & Manufacturing Co., Minneapolis, Minnesota, and will continue the business as a partnership under the name of the Harmon Tire & Repair Co. Mr. Johnson has been an interested and active member of the company since 1915.

The Federal Rubber Co., Cudahy, Wisconsin, has appointed J. J. Williams production manager.

T. J. Hennessy, formerly manager of the accessory and mechanical goods department at the Firestone plant, and A. H. Nellen, formerly chemist and compounder for the accessory and mechanical goods repair materials, are now connected with the Premier Tire & Rubber Co., Montgall and Nicholson avenue, St. Louis, Missouri, as general manager and assistant manager, respectively. R. L. Stealey, recently foreman in the heel press-room of the Goodyear Tire & Rubber Co., Akron, Ohio, now holds a similar position with the Premier Tire & Rubber Co., which manufactures Premier Supertires and tubes, and rubber specialties.

The Ajax Rubber Co., 218-222 West 57th street, New York City, has appointed L. M. Van Riper western sales manager, with headquarters at Chicago. Mr. Van Riper is well known in midwestern tire circles, as he has been district manager at Detroit in charge of Ajax business in Michigan. He is a man of pleasing personality and well qualified to handle the business of the organization.

The India Tire & Rubber Co., Akron, Ohio, has appointed F. W. Abbott distributer for the Minneapolis, Minnesota, territory of the company. Mr. Abbott's contract covers a period of years and involves a large amount of business.

The Mid-West Rubber Manufacturers' Association

Second Annual Meeting and Banquet

THE BANQUET

About 100 members and guests attended the banquet of the Mid-West Rubber Manufacturers' Association that was held in the evening, December 14, at the Chicago Athletic Association, Chicago, Illinois. In the absence of John T. Christie, the president, John W. Maguire, the former president, occupied the chair. Mr. Christie, however, arrived later in the evening and addressed the assemblage. The principal speaker of the evening was Albert N. Eastman, a Chicago lawyer, who gave an interesting talk on the subject of cooperation in general. A high-class vaudeville enlivened the evening and all departed feeling that they had been well repaid for coming.

THE MEETING

A luncheon was held at noon at the Chicago Athletic Association, followed by the annual meeting at which the following directors were elected under the newly adopted by-laws, increasing the number from seven to twelve, to serve terms of one, two and three years:

Terms Expire 1924

D. M. Mason, The Mason Tire & Rubber Co., Kent, Ohio.

George B. Dryden, Dryden Rubber Co., Chicago, Illinois.

Paul P. Parker, president, Parker Tire & Rubber Co., Indianapolis, Indiana.

W. W. Wuchter, Nebraska Tire & Rubber Co., Omaha, Nebraska.

Terms Expire 1923

Harry J. Smith, president, Achilles Tire & Rubber Co., Binghamton, New York.

M. J. Flynn, treasurer, Inland Tire & Rubber Co., Chicago, Illinois.

D. L. Spraker, Kokomo Rubber Co., Kokomo, Indiana.

Thomas Follen, president, Lion Tire & Rubber Co., La Fayette, Indiana.

Terms Expire 1922

J. B. Gabeline, president, Standard-Four Tire Co., Keokuk, Iowa.

Charles J. Venn, president, Century Rubber Works, Chicago, Illinois.

Walter R. Denman, general manager, Denman-Myers Cord Tire Co., Cleveland, Ohio.

Julius Balke, 2nd vice-president, Brunswick-Balke-Collender Co., Chicago, Illinois.

Among those who addressed the meeting were: H. R. Whitehead, textile division, The Mason Tire & Rubber Co., Kent, Ohio; Edward S. Babcox, vice-president, *India Rubber Review*, Akron, Ohio; Dr. S. P. Woodard, president, Gillette Rubber Co., Eau Claire, Wisconsin; J. E. Grady, general manager, Archer Tire & Rubber Co., Minneapolis, Minnesota.

The report presented by H. S. Vorhis, secretary and general manager, was as follows:

As secretary of the Association I wish to report briefly regarding the work of the past year. The first annual meeting and dinner of the Association was held at the Chicago Athletic Association on December 9, 1919, which brought to a close what might well be called the organization year. You all know the service our first president, John W. Maguire, performed during the first formative year, which was instrumental in launching the organization on what is confidently hoped will be a career of usefulness. The dinner last December was attended by 83 members and their guests, and a thoroughly good time was enjoyed by all. At that time there were 38 regular members and 38 associate members—a total of 76 members.

At the January meeting of the Board of Directors, the writer was invited to come to Chicago as secretary and general manager of the Association, an arrangement which went into effect February 1, 1920. Up to July 1 it was possible to increase the membership of the Association in quite a satisfactory manner, but since that time it has been up-hill work, especially as the trade has fallen on such difficult times. In spite of the condition of the trade, however, our membership has increased to 69 regular members and 84 associate members—a total membership of 153 firms—an increase of 31 regular members, or a total of 77 new members. I believe that under ordinary normal conditions it would have been possible to more than double our membership.

Our work as it is being conducted today is two-fold—our monthly meetings in Chicago and our bulletin and information service. The acquaintances and spirit of good fellowship that have been fostered by the monthly luncheon and meeting have been of undoubted benefit to all who have attended, as there is nothing an association can do that equals in value the bringing together in social relations the competing members of the same trade. The discussions that have been held at the manufacturers' meetings as well as at the general meetings after the luncheons have resulted in valuable information being exchanged, and trade conditions gone into carefully. It is hoped that the manufacturers themselves will take more advantage of these meetings in the future, for they can make them most valuable to themselves. Despite the conditions, not a monthly meeting has been omitted during the past year, and the attendance has varied from 40 to 60. The summer outing at Cedar Point, Ohio, in August was a disappointment in respect to attendance, due to the conditions of the trade.

The other important department of our work is the bulletin and information service, which, I hope, the members find of value and will provide the funds to continue it. The principal point we have to face is that our fixed income from dues is too small to carry on the kind of work we are attempting. Our plan to ask our regular members to pay to the Association a fee of 3 cents per 100 pounds on crude rubber purchased by them since July 1, 1920, fell through, as only 15 of our regular members agreed to the plan and as a matter of fact very little crude rubber has been purchased by any manufacturer since the time mentioned. We need a permanent plan of finance if the work of the Association is to be continued along present lines. We should try to raise a sum not less than $15,000 annually. Evidently this must be done by increased subscriptions among our present members and additional efforts to increase the membership.

After the adjournment of the annual meeting the newly elected directors met and elected officers, as follows:

President

D. M. Mason, general manager, The Mason Tire & Rubber Co., Kent, Ohio.

First Vice-President

W. W. Wuchter, general manager, Nebraska Tire & Rubber Co., Omaha, Nebraska.

Second Vice-President

M. J. Flynn, treasurer, Inland Rubber Co., Chicago, Illinois.

Treasurer

George B. Dryden, president, Dryden Rubber Co., Chicago, Illinois.

Secretary and General Manager

Harry S. Vorhis, 332 South Michigan Avenue, Chicago, Illinois.

Special committees were appointed as follows:

Committee on Cooperation

S. P. Woodard, Chairman, Gillette Rubber Co., Eau Claire, Wisconsin.
Ashton W. Caney, Achilles Rubber & Tire Co., Binghamton, New York.
John W. Maguire, The Portage Rubber Co., Akron, Ohio.
W. G. Brown, The Consulting Co., Cincinnati, Ohio.
Wesley E. Wilson, Akron Rubber Mold & Machine Co., Akron, Ohio.
W. E. Myers, Denman-Myers Cord Tire Co., Cleveland, Ohio.
William L. Burgess, Surety Tire & Rubber Co., St. Louis, Missouri.

Ways and Means Committee

John T. Christie, Chairman, Hawkeye Tire & Rubber Co., Des Moines, Iowa.
Edward E. Allen, Allen Machine Co., Erie, Pennsylvania.
Stanley W. Harris, Akron Rubber Mold & Machine Co., Akron, Ohio.
T. M. Gardner, Brighton Mills, Inc., Passaic, New Jersey.
T. J. Carroll, Brunswick-Balke-Collender Co., Chicago, Illinois.
Paul A. Bloom, Fred Stern & Co., Chicago, Illinois.
Charles F. Sawyer, Sioux City Tire & Rubber Manufacturing Co., Sioux City, Iowa.

Committee on Research and Statistics

Ole Hibner, Chairman, Cleveland Rubber Corporation Co., Cleveland, Ohio.
W. F. Harrah, National-Standard Co., Niles, Michigan.
Edward T. Meyer, F. R. Henderson & Co., Chicago, Illinois.
P. E. Finlay, Bibb Manufacturing Co., Macon, Georgia.
J. Matthias, Jr., Mineral Point Zinc Co., Chicago, Illinois.
E. S. Babcox, *India Rubber Review*, Akron, Ohio.
Robert Wishnick, Wishnick-Tumpeer Chemical Co., Chicago, Illinois.

Credit Committee

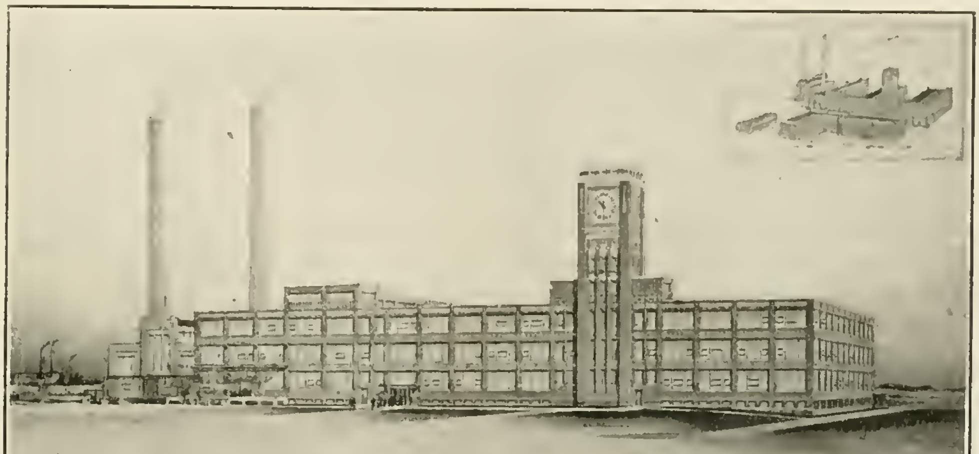
J. E. Grady, Chairman, Archer Tire & Rubber Co., Minneapolis, Minnesota, together with representatives from the following companies: Gillette Rubber Co., Brunswick-Balke-Collender Co., The Mason Tire & Rubber Co., The Portage Rubber Co.

Second Annual Banquet of the Mid-West Rubber Manufacturers' Association, Held at the Chicago Athletic Association, December 14, 1920.

Model Plant of The Wildman Rubber Co.

An industrial plant that embodies the latest developments in tire factory construction is that of The Wildman Rubber Co. at Bay City, Michigan. Every problem relating to routing of material and product has been intelligently considered and the buildings when completed will permit the most efficient operations in tire making. All the buildings will be strictly fireproof and in addition will be equipped with sprinkler systems.

The main building will be 365 feet long by 160 feet wide, built of reinforced concrete with brick facing, asphalt mastic floors and composition roof, and will consist of three stories and basement. The basement and first floors will cover the entire area above mentioned, while the second and third floors will be composed of a main connecting building with three wings pointing south, thus making the building look somewhat like a large capital E. The entire building will be lighted by modern type of steel sash and saw-tooth skylights. Entrances, toilets, stairways, elevators and such utilities will be grouped at two points in the main wing of the building.


PLANT·OF·THE·WILDMAN·RUBBER·COMPANY· ·BAY·CITY·MICHIGAN·
THE OSBORN ENGINEERING CO

The basement of the easterly wing will be used for washing, drying and storing crude rubber. The basement of the balance of the building will be utilized for machine shops, pipe shops, electrical shops, carpenter shops, etc.

The main floor of the building will be devoted to the major preliminary operations in the manufacture of automobile tires. Here will be located two lines of four mixing mills, each placed under saw-tooth skylights between the easterly and middle wings. In a similar position between the westerly and middle wings will be located the tubing machines, calenders and warming mills.

The first floor of the westerly wing will be used for fabric storage and the handling, cleaning and rerolling of calendered liners. On the second floor of the easterly wing will be the finishing department where the finished tires will be finally inspected, buffed, wrapped and prepared for shipment. In the middle wing will be located the compound room and the storage for compounds, while the westerly wing will be entirely occupied by the manufacture of inner tubes.

On the third floor in the westerly wing stock will be received from the calenders and tubing machines and cut and prepared for the tire builders, located in the middle wing on the same floor. Here the tire building machines will perform the earlier operations in tire building, followed by finishing operations on finishing wheels. The tires will then be passed by automatic carriers into the easterly wing to the heaters that will be located in a manner to facilitate operation, singly or in groups, and also later permit the use of automatic equipment.

Over the calenders, mills and heaters will be placed electric traveling cranes to facilitate installation, repairing when necessary and handling of materials to and from the machines.

Following the manufacturing processes from raw materials to finished product, all raw materials will be received at the first floor in the easterly wing, which will be used as a receiving and shipping room. The crude rubber will be prepared for compounding in the basement of the easterly wing, thence elevated to the first floor, where it will be compounded and mixed on the mixing mills. The compounds stored on the second floor will be dried and sifted when necessary, and placed in bins provided with chutes for delivering the various ingredients to the compounding room on the floor below.

Leaving the mixing mills, the batches will pass into a small storage room to await their turn in the calender room, where they will be kneaded to the proper consistency on the warming mills. Here the various types of rubberized fabrics and the rubber sheets for side wall, inner tubes and other stock will be calendered. From the calenders the tube stock will be elevated to the second floor in the westerly wing, which will contain complete equipment and machinery for the manufacture of inner tubes. All stock from the calenders required for the tires will be elevated to the third floor. The tread stock, having been warmed, will pass through tubing machines and thence elevated directly to the middle wing of the second floor. Other stock will be passed to the westerly wing of the third floor, there to pass through bias cutters, stripping machines, etc., and thus be prepared on reels or in books ready for the tire building machines.

From this point all of the product will pass easterly through the middle wing, where the tires are built, to the easterly wing, where the tires will be cured, stripped from their cores and dropped to the second floor for finishing, as above described. Automatic carriers provide for the handling of materials and the movement of the unfinished product from one department to another.

The building as laid out will have a capacity of 2,500 to 3,000 finished tires and tubes per day, and its construction will permit increasing the capacity without interfering with the operations of the various departments.

Immediately east of the main building will be located the boiler plant, consisting of a modern boiler installation, with pumps, accumulators, air compressors, etc., to provide steam and hydraulic pressure for tire building and for heating the buildings. All machinery will be operated by electric power. Service and employment and executive buildings as well as reclaiming and fabric plants are all included in the future aims of the company and may be constructed as its business requires. The company has an ample acreage of land for future expansion.

RUBBER FEET ON THE "KLERADESK"

A time-saving upright desk file is called the "Kleradesk." It is made of sheet steel, in interlocking sections, handsomely enameled, and is equipped with highest quality patent solid-rubber feet so no metal can scratch the desk. Its use obviates unsightly wire baskets and metal trays, and its simple system of filing promotes efficiency.—Ross-Gould List & Letter Co., Tenth and Olive streets, St. Louis, Missouri. New York representative, Condon Sales Co., 200 Fifth avenue, New York City.

THE RUBBER TRADE ON THE PACIFIC COAST

By Our Regular Correspondent

Rubber manufacturers on the Pacific Coast from Seattle to San Diego do not share the pessimism of many in the same line in the East and Mid-West. Most of them regard the slowing down in the industry as quite natural after a too rapid expansion, and very few are said to hold large surplus stocks that may necessitate much price reduction to sell them. Trade reports are that there was very little, if any, overloading with raw rubber or fabric at the high prices prevailing early in 1920. To a few of the smaller concerns a lack of ample capital proved a blessing in disguise, otherwise they might have been tempted to overstock with raw material when it was much dearer. Inquiries for quotations on tires, tire repair stocks, belting, and miscellaneous rubber goods are steadily growing more numerous, indicating, as the manufacturers say, an early and active revival of business. Stocks of retail dealers are said to be exceptionally low for this season of the year.

A strong effort will be made at the January session of the California legislature to secure the repeal or amendment of the law requiring motor trucks on solid tires to present an inch in width of tire surface to the road per 800 pounds of load, at the point where the tire is in contact with the road. The law in most states requires that the load carried be computed on the measurement of the width of the tire at its base, which automotive engineers declare to be more in accord with the efforts being made everywhere at road preservation. Tire manufacturers are much interested in the proposed legislation, and they are preparing considerable data on the subject.

LOS ANGELES NOTES

A new sales branch has been opened at 1232 South Grand avenue, Los Angeles, by The Mason Tire & Rubber Co., Kent, Ohio, in charge of J. W. McCoy associated with M. W. Mitchell. Mr. McCoy was formerly assistant district manager of the northwestern territory for The B. F. Goodrich Rubber Co. and coast manager for the Portage Rubber Co.

The Goodyear Tire & Rubber Co. of California, Los Angeles, announces a reduction in prices of both fabric and cord tires, and also tubes, effective November 15. It ranges from 7½ per cent on straight side cord tires to 15 per cent on tubes. A 10 per cent cut in the price of solid truck tires was made October 29.

A. F. Osterloh, vice-president and general manager of the Goodyear Tire & Rubber Co. of California, states that the company is looking forward to a very prosperous new year. Despite a general slowing down in business throughout the country, the Goodyear California concern increased its gross business from $15,000,000 in 1919 to $17,000,000 for the fiscal year ended October 31, 1920. In the twelve western states comprising the company's territory there are 5,420 Goodyear service stations selling its tires and tubes.

The Lobel punctureless tire, which the inventor, N. Lobel, has just perfected, will be manufactured in Michigan, Ohio, New York, Missouri and Texas on a royalty basis. The general offices in Los Angeles are at 504 Mason Building, G. W. Cochrane being in charge, and from this source dealers in New England and abroad are being supplied.

The new headquarters of the Western Auto Electric Corporation at Sixteenth and Hope streets, Los Angeles, has been recently opened for sales and service for Willard batteries. A. J. Tobey is president of the concern.

John F. Scanlon, advertising manager of the United States Compression Inner Tube Co., which is making rapid progress with its plant at Burbank, near Los Angeles, has been recalled to the company's home plant at Tulsa, Oklahoma. The company plans to supply eight western states, the Orient, New Zealand, Australia and part of South America from its Burbank plant.

Los Angeles interests identified with the Southwest cotton-growing industry are renewing their efforts to have the city designated as one of the spot cotton markets of the United States by the Secretary of Agriculture. The city claims to be the natural cotton market in Southern California, Arizona, New Mexico, and large areas in Texas; that it is a concentration point, a port of export, has ample banking facilities, fair transportation rates, and a municipal high density baling press.

SAN FRANCISCO NOTES

A particularly good demand for rubber belting is reported by the Pioneer Rubber Works, San Francisco, which is still enlarging its plant at Pittsburg, Contra Costa County. Several heavy belting presses have just been installed. Some of the departments are working 24 hours a day. Many of the products are considerably oversold. The company has just received an order for 17,000 feet of heavy fire hose for Los Angeles.

The Seibel Air Spring Co., 785 Market street, San Francisco, California, is contemplating the construction of a new plant at San Mateo, California. Officers of the company are: Henry Seibel, president; A. W. McNulty, vice-president; C. A. Shelhamer, treasurer; W. F. Gormley, assistant treasurer; E. M. Massey, secretary.

SOUTHWESTERN NOTES

The long-staple cotton growers of the Salt River Valley, Arizona, whose product is almost entirely supplied to tire manufacturers in California and the Mid-West, are being liberally financed by local banks. The latter have loaned over $9,000,000 on this season's crop.

Business is reported unusually good by the Spreckels "Savage" Tire Co., of San Diego, despite the dullness in tire trade of the country. Practically no changes have been made in the working force and the management is anticipating a marked increase in sales in the near future. Social welfare of workers is strongly stressed by the "Savage" concern, and labor troubles are a negligible quantity at the big tire works.

Tire dealers on the Coast report a marked improvement in sales and inquiries following the recent reduction in prices, and state that when automobile owners are satisfied that no further reductions will be made the market will quickly stabilize and active buying follow. J. M. Magee, general manager for the Southern California and Arizona branches of the United States Rubber Co., believes there will be a lively demand for standard tires on the coast during the early spring, and it is possible there may be a shortage.

C. C. Gumm has been appointed receiver of the Hibbs Rubber Co., Fort Worth, Texas, manufacturer of tire-building machinery, dating from December 9, 1920.

The Good-Wear Tire & Belt Co., 322 Bedell Building, San Antonio, Texas, has purchased a 25-acre factory site five miles south of that city, and expects to begin the erection of the first unit of its plant before the end of the year. The factory will produce rubber goods entirely, including a patent harness tug and a patent fan belt. H. L. Fullerton is president of the company.

The Miller Rubber Company, Akron, Ohio, has appointed J. L. Adams manager of its branch at Houston, Texas, and L. Crain manager of its San Antonio branch in the same state.

NORTHWESTERN NOTES

The Victory Rubber Co., 646 New York Block, Seattle, Washington, is officered by George P. Endert, president; Dr. Carl Hoffman, vice-president; H. C. Eagles, secretary-treasurer. The factory operated by the company at East 38th and Brooklyn streets, Seattle, will enter into the productive stage about the first of the year, manufacturing mechanical rubber goods, in-

cluding soles and heels, silent floor tiling, contractors' sundries, etc.

The Olympic Tire & Rubber Co. manufacturer of tires and tubes, has offices at 217 Lyon Building, Seattle, Washington. R. G. Nelson, who is president of the company, is also president of the Olympic Textile Corporation with offices at the same address.

A sales branch of The Mason Tire & Rubber Co., Kent, Ohio, was opened November 1 at 82 North Broadway, Portland, Oregon, in charge of Catlin L. Wolfard, John M. Bruhn and J. H. Callahan.

The New York Belting & Packing Co. recently opened an office at 313 Felt Building, Salt Lake City, Utah, with a warehouse adjacent in which is carried a complete line of mechanical rubber goods. This office will be in charge of George N. Le Roux, who has sold this line of goods for eighteen years, starting as a Chicago city salesman. For the last ten years he has specialized in selling the mining industry.

Pacific Coast distributers of Racine tires have recently been in conference with the executives of the Racine Rubber Co. at Racine, Wisconsin. There they were advised of the company's intention to open on December 15 a large addition to the plant and to make a considerable increase in the operating force on January 1. The Pacific Coast agents say their surplus stocks are quite cleaned up, and they are concerned most about getting enough tires to meet the large demand expected within a month or two.

CANADIAN NOTES

The Oak Tire & Rubber Co., Limited, has removed from 19 Dundas street to 258 Victoria street, Toronto, Ontario. At a recent meeting of the company the capital stock was increased from $400,000 to $2,000,000, half preferred and half common. A stock dividend of 100 per cent was paid to the old shareholders in addition to the usual cash dividend of 6 per cent, which has now been increased to 8 per cent. Frank Law, managing director, reports that $250,000 of the new 8 per cent stock is now being sold, the proceeds of which will be devoted to extending the company's plant and providing a larger working capital. Sales for the first ten months of 1920 are said to have been more than double the sales for the entire year of 1919.

V. O. Phillips & Sons, Limited, Kitchener, Ontario, manufacturer of garage equipment, air compressors, retreading and vulcanizing equipment, etc., have taken over the manufacturing rights in Canada of the "Dri-Kure" tire repair equipment formerly manufactured only in the United States by the Western Vulcanizer Manufacturing Co., Chicago, Illinois. The officers of the Phillips company are: V. O. Phillips, president and general manager, and H. M. Phillips, secretary and treasurer.

THE RUBBER INDUSTRY OF CANADA

Canada has not only become "self-supporting" as far as articles manufactured of rubber are concerned but the export trade in rubber articles of the Dominion has greatly increased in the last five years. This is a natural development in view of the fact that the total capital invested in the Canadian rubber industry amounts to $42,787,594. Of this sum $33,005,888 is found in Ontario, which is the center of the industry and boasts of 18 plants producing miscellaneous rubber goods, and 5 turning out rubber boots and shoes. Quebec has 3 plants producing rubber goods and 5 in the rubber boot and shoe industry, supported by capital amounting to $9,763,333. British Columbia's one rubber plant produces miscellaneous rubber goods, representing an investment of $18,373.

Canada's rubber industry furnishes employment for 12,677 persons, with 9,334 men and 3,343 women workers. Rubber goods plants employ 6,835, rubber boot and shoe factories, 5,842. The wages paid during 1919 totaled $11,547,817, of which $7,004,028 was paid to rubber goods employes and $4,543,789 to rubber boot and shoe makers.

The cost at the works of materials used during 1919 in the rubber goods factories is returned as $19,671,453, while the value at the works of rubber goods produced during the year is given as $38,651,640; similar figures for the rubber boot and shoe factories give costs as $7,862,961 and products valued at $19,351,794.

The increase in exports of Canadian rubber products is an index to the vitality of the Dominion's rubber industry. In the fiscal year 1914-15 rubber exports were valued at $722,905; 1915-16, $3,081,874; 1916-17, $2,911,505; 1918-19, $5,829,590; 1919-20, $10,069,963. In the last mentioned year tires to the value of $7,391,777 were included in the exports, of which $3,-547,601 went to the United Kingdom.

THE RUBBER ASSOCIATION OF CANADA

A new organization of Canadian rubber manufacturers known as The Rubber Association of Canada has been organized during the past year, its scope and plan of operation being similar to those of The Rubber Association of America.

Its authority lies in a charter issued by the Canadian Government, March 17, 1920, the association being incorporated under the provisions of the Canadian Joint Stock Companies Act, without share capital. Organization did not really begin, however, until early in May, but so effectively has it been carried out that all the rubber manufacturers of Canada are now included in the active membership.

The by-laws authorize four classes of membership, viz., firm, associate, affiliated and honorary. Committees and divisions have been created to serve the special interests of members in transportation, legislation, foreign relations, industrial relations, as well as in questions relating to the manufacture of tires, footwear, mechanical goods, heels and soles, druggists' sundries, proofing and insulated wire.

The officers are: president, C. H. Carlisle, managing director of the Goodyear Tire & Rubber Co. of Canada, Limited; vice-president, A. D. Thornton, director of the Canadian Consolidated Rubber Co., Limited; treasurer, C. N. Candee, managing director of Gutta Percha & Rubber, Limited, Canada; assistant treasurer, John Westren, managing director of the Dunlop Tire & Rubber Goods Co., Limited, Canada. The directors are the foregoing with W. H. Miner, managing director of the Miner Rubber Co., Limited; F. E. Partridge, head of the F. E. Partridge Rubber Co., Limited; and Victor van der Linde, of the Van der Linde Rubber Co., Limited. The manager and secretary is A. B. Hannay, for many years a member of the Parliamentary Press Gallery of Canada at Ottawa. Offices have been established at 808 Royal Bank Building, Toronto.

Many Canadian firms are members of The Rubber Association of America, but owing to the growth of rubber manufacturing in Canada and to the fact that Dominion companies operate under different laws and tariffs, and have to meet special transportation, production, financial and marketing conditions, an independent Canadian organization became desirable.

SANITARY PACKAGES OF TOYS AND BALLOONS

Parents who hesitate to buy their children the rubber toys and balloons hawked about in the dust of street or store will welcome the "Faultless" sanitary balloon or toy packages which have recently been placed on the market. The contents of these packages of rubber toys and balloons are not touched from factory to child, thus eliminating many sources of contamination and possible disease. The balloons are sealed in transparent envelopes; the toys come assorted in three sizes of boxes, to retail at different prices according to size. To dealers each box represents a unit of sale that is easily checked up, stocked, displayed and sold.—The Faultless Rubber Co., Ashland, Ohio.

The Rubber Trade in Great Britian

By Our Regular Correspondent

The coal strike duly came to an end without, except in a few cases, having caused any serious dislocation in the rubber industry. Trade, especially in the proofing department and in the making-up of garments, is quiet, almost to stagnation, and a good deal of short time is being worked.

Next to shilling a pound rubber, a prominent topic of conversation is the tightness of money. Leading firms with regular weekly pay days are now asking for a month's grace, and all around one hears of the difficulty of collecting accounts; a state of affairs which is accentuated by the chariness of the banks in granting loans. Naturally, the names of various firms get hawked about as likely to find themselves in trouble, and altogether the Christmas outlook is not particularly cheerful. The scarcity of money is attributed by many to the excess profits tax, but probably there are many other factors of equal, if not more importance.

Cessation of buying on the part of the public has proved a serious setback to trade, and now that in certain branches of trade, such as clothes and boots, prices have come tumbling down owing to forced realization, there is a tendency to wait until everything else comes down. It is a subject of comment, that while some noted tire firms advertised a cut in price to follow the fall in rubber, others have made no reduction. Another item which has caused comment is that masticated hard Pará rubber is quoted at *6s. 6d.* per pound, which is *2s.* more than four years ago.

From what I hear, the November motor show in London has not been a success financially, from the exhibitor's point of view, as sales were few and far between; indeed, some of the exhibitors' staffs were sent home before the end of the show. General tightness of money is the explanation of the slump in buying, and doubtless this is correct.

THE PEACHEY VULCANIZATION PROCESS

The statutory meeting of the Peachey Process Co., Limited, was held in London on October 25. The chairman, Sir John Hewett, K.C.S.I., presided. From statements made by A. Herring-Shaw, one of the directors, it appears that the experimental laboratory is being established in London, and not in Manchester, as was originally proposed. Mr. Peachey has given up his post of lecturer at the Manchester Municipal College of Technology, and will take charge of the London laboratory. It does not appear to be the purpose of the company to manufacture any articles for sale, but merely to demonstrate the manufacture of various articles on a working scale, and to issue licenses to manufacturers. As no patents had yet been granted in foreign countries, nothing could be said at the moment regarding foreign rights.

Last March Mr. Peachey was to have read a paper descriptive of his process at the Manchester section of the Society of Chemical Industry, but for obvious reasons found himself unable to do so. The paper was, however, given at the meeting of November 5, with the name of A. Skipsey added as joint author. Naturally, in the interval, the subject matter has lost a good deal of its novelty as far as readers of the rubber technical press are concerned, though the large attendance at the meeting showed that those outside the fold were anxious to get some first-hand information. Under the circumstances it does not seem necessary to quote the paper at any length, the opinions of the author elicited in the discussion being probably of greater interest.

H. L. Terry said that a piece of cut sheet rubber in his possession had been cured by the process six months ago, and showed no signs of deterioration. So far, he knew of no rapid test to replace the tedious aging test of time, though he was hopeful that something useful would result from the attention being paid to the matter by the Rubber Section of the American Chemical Society. As caustic alkali removed nothing but a little free sulphur, it was evident that reclaimers must look upon this cold cured rubber as similar to the ordinary hot sulphur cured rubber, and not as similar to the ordinary cold cured rubber in which the ready removal of the chlorine by alkalies left a practically soluble rubber.

A question was put by F. J. S. Gray, of the St. Helens Cable & Rubber Co., as to how the process was to be applied to solid tires and solid goods in general, the reply being that solid goods would be built up of vulcanized sheets, although in somewhat heavily compounded rubbers there was a very good penetration of the gases. As regarded solid tires, referred to also by other speakers, he might say that they would probably be the last rubber goods to tackle. It was too much, he said, to expect of a new process that it should be able to supplant older processes in every direction. The speaker, who said that he had tried the process and had found that sulphuric acid was produced, was informed by Mr. Peachey that he had evidently not carried out the process properly. There should always be an excess of hydrogen sulphide, and this would prevent oxidation of the sulphur dioxide.

Asked as to the effect of the free sulphur, which was a normal constituent of golden sulphide of antimony and ultramarine, Mr. Peachey said that free sulphur was undesirable, and bodies containing it would not be used in his manufactures. There was always a little free sulphur produced, but, by careful working, the amount could be kept very low. The sulphur which caused the rapid cure in the cold was in the atomic form and no doubt any free sulphur would be in the molecular condition. The question as to what was the effect of the water produced in the gaseous reaction was answered to the effect that the amount was very small and that it dissipated as a mist without condensing to water.

Among the exhibits on the table were samples of reformed leather for shoe soles, upholstery, etc., and floor coverings made of wood, meal, cork, etc., vulcanized with rubber as a binding, or a binding agent. A complete galosh made by the process was also shown. The vulcanized rubber and leather dust soles had been shown in practice to have two and a half times the wearing power of new leather, this being probably due to the greater resiliency.

SHALE NAPHTHA

In the October issue of The India Rubber World appeared an interesting editorial entitled "Solvent Naphtha from Oil Shale." It is interesting to hear the claims of American oil shale urged, and on grounds of ascertained cost, which may, of course, prove in practice to be exceeded. It is noteworthy that, although shale spirit has been used in Scotland for thirty or forty years, it is only to a limited extent. In England its use has generally been at times when the ordinary solvent was difficult to obtain. This is as regards proofing works. For one or two purposes in the mechanical branch, where balata is used, it has been preferred to solvent naphtha. In shale products sulphur is always the bugbear, and in the old days if one were anywhere near a Scotch proofing works, the smell of shale naphtha could always be detected if it were being used. Of late years, however, a great improvement has been made in the quality of shale naphtha, not only as regards smell, but also in freedom from high boiling constituents. A year or two ago the writer had the opportunity of inspecting the works of the Pumpherston Oil Co., Midlothian, and, on inquiring about shale naphtha, he was told that there was not much for sale, as it was going for motor spirit. Of course, if the large and progressive rubber companies of America do take to distilling oil shale, as the editorial suggests, they will be

able to prevent its application as motor spirit, otherwise the supply may fail if there is dependence on distilling companies outside the rubber trade. Probably the Americans before embarking on their shale distillation scheme in Colorado and Utah will note what success attends the company now developing oil shale fields in Norfolk.

THE RUBBER TRADE IN EUROPE

By a Special Correspondent

The rubber sole business has experienced considerable activity during the last few months and promises to be as important and profitable as rubber heels.

Before the war few rubber soles were sold in Europe owing to the low price of leather soles. During the war, however, the shortage of leather changed the situation in favor of the rubber sole.

The soles made during the war were mostly inferior owing to the lack of good materials, which detracted from the reputation of the rubber sole and it has taken some time to regain the confidence of the buyer with the better quality of soles now being manufactured.

Much of the revival of this business is due to the improved methods of manufacture. Formerly each sole had to be cut to size by the boot maker, which required much time. Now they are supplied in a variety of sizes that can easily be applied to every form of shoe. In Germany the soles are packed two in an envelope including the nails for attaching them to the shoes, and are sold not only to shoe repairers but to general stores.

BRITISH NOTES

In accordance with the contemplated change of name of Explosives Trades Limited, noted in our issue of October 1, 1920, this British concern has become Nobel Industries, Limited.

The American consulate at Swansea, Wales, keeps a file of American trade catalogs for the benefit of local inquiries, and requests American firms dealing in raincoats and druggists' supplies to send their latest catalogs, and also, where possible, price lists and trade discounts. These latter are important, even though they be only approximate.

FRANCE

The Office du Commerce Exterieur, Paris, France, has recently been reorganized on a more ambitious scale. This department is a practical link between official France and the general public at home and abroad, aided by the new Foreign Commerce Bank. It controls the service of French commercial agents, and is responsible for organizing trade exhibits in France and other countries.

The department supplies trade information in the form of loose-leaf pamphlets, responds to verbal and written inquiries, and helps foreign traders seeking information as to the French market. The publication of a periodical similar to the British *Board of Trade Journal* will soon be begun.

The commercial exhibition plans include a "touring fair" for Canada, the Colonial exhibition at Marseilles in 1922, and an inter-allied exhibition to be held in Paris in 1925. Permanent exhibitions are being provided for branch offices of the department in the principal countries of the world, and have already been opened in Spain, Switzerland, Czecho-Slovakia, the Balkan States and in London.

HOLLAND

The Dutch rubber trade was fairly satisfactory last summer and the sales of most rubber goods have been better than expected under the circumstances. Mechanical goods have been in demand since the beginning of 1920 and a good business in druggists' sundries was reported. Exports suffered under the irregularities of the foreign exchanges, and manufacturers complain that many countries which in former years have bought rubber goods from Holland have issued import restrictions which make export to these countries difficult, while Holland itself is open to foreign competition in the same articles. The tire business increased materially during the Summer but it is severely handicapped by foreign competition. During the second quarter of 1920 exports of tires amounted to 556,000 florins while imports were valued at 3,265,000 florins. During the second quarter of 1920, 2,869,000 kilograms of plantation rubber were imported, 2,772,000 of which were from the Dutch East Indies. The export of plantation rubber during the same time amounted to 1,448,000 kilograms. Germany was the best customer, taking 759,000 kilograms, followed closely by the United States with 642,000 kilograms. Of balata, 7,608 kilograms were imported and 20,000 kilograms exported. The general situation of the industry has improved as compared with last year but complaints are still heard about irregularity in the supply of coal and supplementary materials.

At the Secondary Colonial Agricultural School, Deventer, Holland, a course in rubber has now been commenced. The director of this school, Dr. H. D. Tjeenk Willink, has been commissioned by the government to make a trip through Java and Sumatra during 1921, and subsequently to introduce into the curriculum, the information thus gained.

SPAIN

The quantity and value of imports of india rubber and gutta percha and manufactures imported into Spain during the years 1918 and 1919, are given in the following table. A peseta nominally equals $0.195 United States currency.

Articles	1918 Metric Tons	1918 Pesetas	1919 Metric Tons	1919 Pesetas
India rubber, gutta-percha, and substitutes, and manufactures of:				
Unmanufactured	842	5,474,661	3,765	24,471,050
Tires	132	2,568,127	709	18,830,589
Other manufactures	331	3,758,752	657	6,614,704

PORTUGAL

Imports of rubber and gutta percha manufactures into Portugal during 1919, together with chief countries of origin, are given in the following table, amounts being estimated in kilos of 2.2 pounds each and values in escudos, one escudo at par being $1.08 in United States currency:

Articles and chief countries of origin	Kilos	Escudos
Rubber and gutta percha manufactures	308,190	12,834,434
England	123,397	605,088
France	91,947	248,510
United States	48,932	232,758
Spain	30,852	130,675
Belgium	2,416	11,600
Oriental Africa	1,260	4,000
Germany	47	140
Wire, metallic (except gold, silver, or platinum) covered with rubber	208,208	324,353
United States	86,929	150,123
England	46,976	71,981
Spain	36,332	62,903
France	31,187	28,806

SWEDEN

The Helsingborgs Gummifabriks Aktiebolag at Helsingborg reports a total profit of 3,223,000 crowns and has distributed a dividend of 20 per cent. This is the best year ever had by this company.

A new firm has been founded in Stockholm for the distribution of rubber goods under the style Gummi-Engroslagerer Star, Herbert Carlson.

DENMARK

The United States Rubber Export Co., Limited, has opened offices in the Axelborg Building in Copenhagen. The building is a modern structure facing the railroad station.

The Oestasiatiske Industriog Plantagekompagni of Copenhagen which owns rubber plantations in the Malacca peninsula

has distributed a net profit of 8,410,000 crowns upon its capital of 20,000,000 crowns. This is a dividend of 40 per cent against the 25 per cent of last year. The company has 14,000 producing acres and obtained a harvest of 4,700,000 pounds of rubber, 800,000 pounds more than the previous year. The average price obtained was 2*s.* 1.06*d.*, with a production cost of 1*s.* 8.91*d.*

BELGIUM

The formation of a new company is under way in Brussels to deal in Brazilian rubber. The capital is said to be 30,000,000 francs.

GERMANY

The depression in German rubber industry continues unabated. There are few orders coming in and it has been necessary to lay off more men. Many factories are compelled to reduce working hours and in some cases only 12 hours are worked each week. According to reports of the Demobilization Commission there are now 419,000 men in Germany who receive full out-of-work compensation, which is a heavy increase against the last report. Most of the men out of work are unskilled laborers and the Trade Unions which comprise mostly highly skilled trades report less unemployment.

The Hamburg rubber market reacted sharply with the leading rubber markets of the world during the last few months and business was very irregular all through October and November. Forced sales in London had their effect upon Hamburg, where prices remained very weak but showed a strengthening tendency at the end of November when London sales became less frequent.

The sale of German army goods which is still proceeding has had a very depressing influence upon many branches of the rubber industry, especially the surgical goods trade. These sales lacked organization and goods were often marketed where there was little or no use for them. They were then sold at very low prices and sent elsewhere, swamping the market and causing a drop in retail prices. These army goods now seem to have come to an end, however; they have had their share in preventing profiteering.

Manufacturers and dealers in rubber hose have endeavored to keep prices but find it impossible and large sales have taken place during the last few months leading to considerable reduction in prices. The dealers blame the manufacturers for this condition.

The German industry apparently regards the intended nationalization of the coal mines as only a partial blessing. Former experience does not seem to justify the claims that are made on behalf of full nationalization. The principal objections are: National operation does not result in additional production; strikes are as frequent under national management; private management has the advantage of individual initiative. As the miners have a very great influence upon the conduct of governmental affairs it is almost certain that some attempt of nationalization will be made.

The Mitteland Gummiwerke Akt-Ges., Hanover, has increased its capital 300,000 marks. This step was taken to eliminate the danger of foreigners getting control of the management of the concern by buying up a majority share of the 4,500,000 marks of ordinary capital. To prevent this the new capital of 300,000 marks is issued in the form of preferential shares carrying a five times voting power.

The so-called Eastern Trading Fair which has taken place in Koenigsberg was more successful than the Leipzig fair, although it is not as important as the latter. The object of this fair was to create a trading center on German soil for Eastern Prussia, the free state of Danzig and the newly formed Baltic republics. Approximately 1,700 firms were represented, including a great number of rubber manufacturers.

The "hole in the West" is a source of considerable trouble to the German rubber industry, as many English and French tires are smuggled into Germany. To stop this practice the German Government has decided to make all foreign tires found in the possession of dealers and private users subject to confiscation. But the German tire industry is not quite satisfied that this expedient will work and therefore an appeal has been issued by the *Gummi-Zeitung* of Berlin to induce German tire users not to use foreign-made tires but to patronize German firms.

The German Belting Organization, in its market report for July and August, 1920, takes a bleak view of prevailing conditions. There is little demand for belting in Germany and many manufacturers have been compelled to sell stocks, which, together with similar sales by dealers, has had a very depressing influence upon the price situation. All price arrangements between manufacturers and dealers are breaking down.

The German cable industry has not prospered as might have been expected following the good beginning during the early part of past year. Orders have fallen off rapidly since the completion of reconstruction business and during the first half of the present year production has declined to approximately 30 per cent of the normal peace output. There are indications that the second half of the year will be even less satisfactory. The reason lies principally in the complete destruction of the German oversea cable business and in the lack of construction work in Germany. In view of the increase in the use of wireless telegraphy it is expected that Germany will not return to oversea cable service, which would mean a practical cessation of this part of the business of the German cable industry.

The rubber coat manufacturers of Germany have agreed to a new list of minimum prices and selling conditions. Credit terms, freight rates, payment for packages and similar other points have been regulated. The new terms apply from August 1.

A German manufacturer, the SB-Automobil-Gesellschaft m. b. H., 33 Sophienstrasse, Berlin, has recently put on the market a small one-passenger electric runabout, believed to be a novelty in the automobile field. A trailer for an additional passenger or for light delivery purposes can be attached. The car has a wheel base of 57.12 inches and a tread of 33.45 inches and weighs 440 pounds. The body is of wood with imitation leather upholstery. Electric current is furnished by two 24-volt lead-acid batteries permitting a speed up to 13 miles per hour. Wire wheels with clincher rims are employed, the tire size being 26 by 2½ inches. At the factory, a car of this type equipped with pneumatic tires can be purchased for 13,300 marks. Solid rubber tires bring the price up to 14,800 marks, while a trailer so equipped costs 4,500 marks. The company has produced and sold approximately 300 cars in the six months of its existence and claims an output of 100 cars a month at the present time.

The Gummiwerke Elbe A.-G. in Hamburg has increased its capital to 1,500,000 marks.

The Dunlop Rubber Co., Hanau-on-the-Main, has increased its capital to £2,000,000. A stock dividend of three shares for each existing share was distributed.

The Vereinigte Gummiwarenfabriken Harburg-Wien, Harburg-Wien, has issued a prospectus indicating a distribution of a 10 per cent dividend for the present year.

The Anhalter Gummiwerke has started a new factory in Zerbst.

NEW FIRMS

Gummi Handelsgesellschaft "Liga," Carl Peter & Co., Hamburg.

Auto Reifen Co., G. m. b. H. Konstanz. Dealer in tires.

Norddeutsche Gummiwaren Fabrikation, Erich H. Krause, Berlin.

Helga-Gummiabsatz-Compagnie G. m. b. H. Berlin. Manufacture and sale of rubber heels and similar articles.

Metropol-Gummi-Gesellschaft, Dortmund. Sale of rubber heels.

Sueddeutsche Gummi-Maentel Industrie Louis Kahn, Frankfurt-on-the-Main. Manufacture of rubber coats.

Hanowa, Gummiwaren-Fabrik A. C. Plötze & Co., Nowawes. Manufacture of rubber goods.

Gummiwerke Sterbfritz, Sterbfritz (Hessen-Nassau). Manufacture of rubber goods.

"Haguma" Hannoversche Gummi-Absatz-Fabrik G.m.b.H. Hildesheimerstrasse 144, Hanover, Manufacture and sale of rubber heels.

Gebr. Poersch Gummiwarenfabrik, Engelbostelerdamm 26, Hanover. Manufacture of rubber goods.

Wuertt. Gummiwarenmanufactur Anna Czeczowitzka, Heidenheim a. Br. To manufacture rubber goods.

Gummiwarenfabrik Berg Co., Hainstrasse 16, Leipzig. Manufacture of rubber goods.

Vogtlaendische Gummiwaren-Manufactur Emil Sengewald, Pausa. Manufacture of rubber goods.

Mettmanner Gummigesellschaft Schneider & Theuerkauf, Mettmann, Rheinland. Manufacture of rubber goods for shoe factories.

Gummi-Werke Rhenus Heinrich Stuemges, Rheydt, Bezirk Duesseldorf. Manufacture of rubber goods.

AUSTRIAN NOTES

The rubber industry was an important branch of the industrial life of Austria before the war, and during 1913 more than 5,000,000 pounds of rubber goods were consumed. The production was not only sufficient to supply the domestic market but considerable quantities of soft rubber goods were exported. There are four factories situated in the present-day German Austria which produce approximately three-fourths of the rubber goods formerly manufactured in Austria-Hungary. Until a few months ago the industry was very busy and sometimes unable to execute all orders, but recently new business has been noticeably lacking. Manufactured rubber goods are imported from Germany only in small quantities as export licenses are not easy to obtain and the Austrian government also is reticent in giving import licenses. The principal difficulty faced at the present time is lack of coal, benzol and other chemicals of which the supply is very small and which can be obtained only in small quantities.

The Semperit, Oestreichisch Amerikanische Gummiwerke-Akt.-Ges. in Vienna contemplates the increase of its capital from 16,000,000 crowns to 32,000,000 crowns. Nine million crowns of the new issue will be issued immediately.

RUBBER IMPORTS OF BRITISH SOUTH AFRICA

The year 1919 was one of undiminished prosperity for the Union of South Africa. There were unusually heavy imports of manufacturing machinery used in the production of india rubber goods. The following table shows the value of imports of rubber manufactures into the Union of South Africa during 1913, 1918 and 1919:

Articles	1913	1918	1919
Footwear, not leather	....	$237,461	$333,983
Hose, conveying	$326,186	278,188	366,238
India rubber, and manufactures of	172,251	2,112,718	2,838,670

The principal countries of origin of rubber manufactures imported in the years mentioned, together with values, were:

Articles and Principal Countries of Origin	Value
Rubber boots and shoes	$295,691
United States	204,212
United Kingdom	67,017
Rubber tires	2,343,248
United Kingdom	964,000
United States	714,718
France	400,702
Canada	241,958
Italy	78,316
Rubber, other manufactures of, n e.s.	420,255
United Kingdom	222,618
United States	154,015
Canada	23,021

FOREIGN TARIFFS

SPAIN

Effective December 1, 1920, the Spanish import duties on articles classed as luxuries will be materially increased. Duty on solid rubber tires with metallic mountings will be increased 150 per cent. An increase of 300 per cent will be made in the duty on manufactures of ebonite, also on rubber tires and inner tubes for carriages and other vehicles, and on rubber fabrics made into clothing.

PORTUGAL

According to the *Diaria do Governo* for November 12, 1920, Decree No. 7104 modifies the schedule of surtaxes applied to articles of luxury imported into Portugal, the duty on india rubber or gutta percha in waterproof or elastic silk fabrics being placed at one escudo per kilo (1 escudo equals $1.825; 1 kilo equals 2.2 pounds). Fabrics of silk combined with gutta percha or india rubber, made up into articles not specially mentioned are taxed at three escudos per kilo.

LATVIA

The Latvian Consulate, 162 West 31st street, New York City, announces the following tariff regulations concerning imports to Russia through the Latvian ports of Riga, Libou and Windou: The import duty on crude rubber is 5 per cent and rubber goods pay 15 per cent.

GUATEMALA

On and after January 1, 1921, radical changes are to be made in import duties on articles entering the republic of Guatemala, according to Decree No. 765 recently signed by President Herrera. By the provisions of this decree miscellaneous articles listed in section 14 will pay 100 per cent of the duty in gold. Section 14 includes manufactures of rubber and gutta percha and rubber boots and shoes.

PERU

The new Peruvian customs tariff which went into effect October 15, 1920, contains increases of duty on articles of rubber (Item No. 264). Soft rubber articles, including bicycle tires, formerly taxed at 1.50 sols per kilo (1 sol = $0.486; 1 kilo = 2.2 pounds), now pay a duty of 1.60 sols per kilo. Automobile tires, formerly dutiable at 1.00 sol per kilo, now are taxed 1.60 sols per kilo.

AMERICAN DRESS SHIELDS IN FRANCE

American manufacturers will find a market in France for many commodities, but it is important that the exporter should first ascertain the demand for his particular commodity, and also take into consideration the French import restrictions. A particular instance is a shipment of dress shields recently made by an American manufacturer. The American article is in considerable demand by French women when fashion makes them desirable. These dress shields, though substantially of rubber, are covered with silk. A composite article is dutiable in France, as in many other countries, at the highest tariff applying to any one of its components. In this case the silk came under the higher tariff, which was charged on the whole article by weight. But the American exporter had calculated the duty according to the tariff on rubber and therefore had to increase his price considerably. Under the present system of arriving at tariff charges such a mistake might mean considerable loss.

THE VALUE OF MANUFACTURED RUBBER GOODS IMPORTED INTO Hankow, China, during 1918 and 1919 is given in the following table:

Articles	1918	1919
Electrical materials:		
Wire, insulated and vulcanized	$49,387	$58,098
Garters and suspenders	$36,273	232,153
Hose, canvas and rubber	16,551	18,046

The Rubber Trade in the Far East

By a Special Correspondent

THE STORAGE OF PLANTATION RUBBER

The slump in the rubber market and the rapid accumulation of stocks have raised the question of the possible effect storage for any prolonged period will have on crude rubber. Owing to the lack of shipping space in 1918, the subject became one of commercial importance, and investigations were initiated by the Agricultural Department of the Federated Malay States. Numerous samples had been stored for periods varying up to five years, after parts of them had been vulcanized and tested, the results indicating that considerable deterioration results from storage in the tropics, especially in crêpe samples. This deterioration is attributed to surface oxidation.

A few old samples of stored slab rubber, containing about 15 per cent of moisture, showed that little or no deterioration had taken place. This was attributed to the presence of moisture and to the small amount of surface exposed to oxidation.

The tensile curves of stored samples are of a different type to their original ones, and resemble those of poor quality lower-grade rubber. Whether the effect is entirely due to oxidation or to a degradation of the caoutchouc molecule to another polymer requires investigation.

Another feature observed was that the rate of cure of samples after storage tends to even up. Fast-curing crêped samples tend to cure more slowly, while slow-curing crêpes generally cure more rapidly. Slab rubber, cured as such, did not show this feature. Until further investigations have been made, it is not possible to formulate definite theories as to the cause of the change.

Considerable interest has been shown in slab rubber, especially by several American manufacturers. Consignments of 2½ tons per fortnight for a period of three months were sent to one of the largest firms through the F. M. S. Agricultural Department, and excellent results were obtained. One interesting feature is that approximately 250 pounds of slab, representing about 212 pounds of dry rubber, could be packed in the same space as about 170 pounds of crêpe. The chief disadvantage is that slab rubber has to be crêped at the mills, where the cost of labor is higher than in the producing countries. Crêped slab requires more drying than rubber shipped dry, and so more drying space would be required.

The best method of preparing rubber of this type for shipment would be to convert the slab into thin worms, which would be dried, pressed into dry blocks, and so exported.

MALAYAN NOTES

At a recent meeting of the Federal Council, Federated Malay States, R. C. M. Kindersley asked whether land would be granted to Americans in the Federated Malay States, and if so what approximate acreage and what labor conditions would be attached to the grants. The answer was that no distinction between nationalities would be made except in the case of recent enemies of the British Empire. The area to be granted to any particular applicant depends upon several considerations, among others, being his financial ability to open up the acreage given him. As for labor, new rules are under consideration and if approved would be endorsed on all grants of over 200 acres of land.

The Association of British Malaya which takes the place of the old Straits Settlements Association, aims to consider all subjects of public interest in British Malaya, including rubber planting, mercantile interests, shipping and banking as well as the labor question and the welfare of the Malay population.

STRAITS SETTLEMENTS

The import trade of British Malaysia for the past two years reveals a growing market for automobiles, trucks, bicycles and all kinds of motor equipment. Rubber is one of the chief products of the country and the motor truck has become imperative in conveying it from the wharves to the stores, as sales frequently stipulate delivery within two days, which is impossible where ox-carts are employed. It is only within recent months that the motor truck has begun to displace the ox-cart and the coolie in transporting rubber, as the plantation owners have been slow to realize the saving in time and cost that might be effected by a wider use of the motor truck.

Rubber exports from the Straits Settlements during the first six months of the current year were 10,000 tons less than for the corresponding period last year. Rubber decreased in value from $0.50 per pound in January, 1920, to $0.37 in June and about $0.23 in September. At this latter figure a considerable proportion of the rubber growers produced at a loss. Telegraphic reports from London state that unless outputs are restricted there will be a surplus of 34,000 tons at the end of the year.

Imports and exports of inferior gutta and Pará rubber of the Straits Settlements for the quarter ended June 30, 1920, show considerable advance in the trade of the colony in these articles of commerce. Quantity is expressed in piculs of 133⅓ pounds and value is given in United States currency based on exchange at $0.50 (normal value of Straits dollar = $0.5677 United States currency).

	April-June			
	1919		1920	
	Piculs	Value	Piculs	Value
Imports				
Gutta, inferior	50,904	$440,388	58,217	$625,831
Pará rubber	527,994	21,926,465	545,844	27,242,926
Exports				
Gutta, inferior	35,134	$349,168	27,133	$613,196
Pará rubber	739,627	35,316,124	798,755	44,993,870

RUBBER PLANTATIONS IN BRITISH MALAYA

The following figures are official statistics of the rubber industry in British Malaya so far as they refer to estates of 100 acres and over in extent.

Dealing first with the Federated Malay States statistics to December 31 in each year, the following comparison is made between 1918 and 1919:

	1918	1919
Number of estates	1,126	1,221
Acreage in possession	1,094,217	1,167,043
Acreage planted	672,106	736,742
Acreage producing	447,175	490,372
Newly planted	50,484	64,636

Adding the above figures to the statistics for the Straits Settlements, Johore, Kelantan, Kedah and Trengganu, the totals are as follow:

	1918	1919
Number of estates	1,714	1,896
Acreage in possession	1,978,090	2,091,535
Acreage planted	1,124,243	1,236,806
Acreage producing	691,435	751,986
Newly planted	78,423	108,438

In 1919, the rubber crop in the Federated Malay States amounting to 73,684 tons as against 62,517 tons in 1918, and the figures for the whole of British Malaya over a period of ten years were as follows:

1910 . . . . tons	6,414	1915 . . . . tons	51,885
1911	11,117	1916	67,677
1912	18,956	1917	82,319
1913	28,169	1918	92,279
1914	37,403	1919	106,757

These figures represent production, not export. The total export of plantation rubber from the Federated Malay States alone, according to the statistics of the Commissioner of Trade and Customs, amounted to 108,393 tons in 1919 as against 78,283 tons in 1918 and 79,831 tons in 1917. The discrepancy between

a rubber crop for the whole of British Malaya in 1919 of 106,757 tons and an export of 108,393 tons from the Federated Malay States alone may possibly be accounted for by the holding back of part of the previous year's crop owing to the lack of shipping facilities.

Upon estates of 100 acres and over in extent in the Federated Malay States there were 234,195 laborers employed. The composition of the labor force for the rubber estates of the whole of British Malaya was as follows:

	F. M. S.	Elsewhere	Total
Tamils	174,274	53,656	227,930
Chinese	39,871	31,602	71,473
Malays	10,733	15,400	26,133
Javanese	7,935	9,026	16,961
Others	1,382	1,444	2,826
Totals	234,195	111,128	345,323

THE F. M. S. RUBBER CO.

The annual report of the Federated Malay States Rubber Co., Limited, a Belgian concern operating in Malaya, shows that the company owns 7,630 acres of land, 4,690.51 acres of which are under old rubber, 536.56 newly planted and 31 acres cleared; 314.35 acres are devoted to buildings, etc., while the remainder is held in reserve. Since October, 1919, the company has gone over to the alternate-daily system of tapping and at present 4,665½ acres are being tapped on this system. The new method of tapping has resulted in decreased yields. The total crop was 1,588,123 pounds; the f. o. b. costs were 1*s.* 3½*d.*, against 10 9/10*d.* in the preceding year. This difference in costs was due to the decrease in crop. The company paid out total dividends amounting to 110 per cent.

CEYLON

The foreign trade of Ceylon for the six months ended June 30, 1920, shows a decrease of nearly 50 per cent in exports, one of the contributing causes being the decrease in exportations of rubber. This has been accompanied by a general slump in the prices of rubber. Though in September, 1919, rubber had reached a record price of 1.27 rupees Ceylon currency (normal rupee equals 32 cents United States currency), for best-grade crêpe, today's price is 0.067 rupee only. Producing estates have had to contend with increased production costs, which amount to as high as 0.15-rupee a pound. Shares in rubber estates are dropping rapidly and in some cases the Ceylon value of such stocks has already decreased by 50 per cent. The prevalent opinion among exporters is that rubber prices have not yet reached the lowest level.

RUBBER AREAS IN CEYLON

	Estates Over 15 Acres	Small Holdings	Total Acres
Acreage in rubber tapping, September 1, 1919	253,930	13,032	266,962
Acreage in rubber over 5 years of age but not in tapping, September 1, 1919	20,752	3,552	24,304
Acreage in rubber over 1 year and under 5 years of age not in tapping, September 1, 1919	61,416	20,875	82,291
Acreage of one-year-old rubber	13,392	10,945	24,337
Acreage of land cleared ready for planting	7,132	....	7,132
Totals	356,622	48,404	405,026

On small holdings there are sometimes as many as 250 and more trees to an acre. The acreage has been taken as 200 trees per acre as some small holdings have been thinned out in accordance with estate practice.

Of the areas of over 15 acres, some belonged to planters' associations and others did not. Of the former class, the total acreage was 285,539 distributed over 21 planting districts of which the most important are: Galle, 23,858 acres; Kalutara, 52,197 acres; Kandy, 24,885 acres; Kegalle, 18,966½ acres; Kelani Valley, 50,734½ acres; Matale, 39,086 acres; Sabaragamuwa 27,973 acres. The total acreage of estates not members of associations was 71,083, distributed over 11 districts. The Ratnapura district had the highest total acreage, 19,017¼, but Kalutara had the highest acreage in tapping, 7,039½, although its total was but 7,039½ acres.

THE NETHERLAND EAST INDIES

The several things that are worrying Netherland Indies rubber producers are: additional taxes, the proposed change in the labor laws and the low price of rubber. The Netherland Government is considering a proposal to modify the budget for 1920, which would mean an increase in taxes for producers.

The International Association for Rubber Culture in the Netherland East Indies has protested, pointing out that the taxation policy will frighten away needed foreign capital. In fact, not long ago a foreign concern was ready to invest 50 million guilders in rubber plantations on the East Coast of Sumatra, but it backed out chiefly because of the Netherland East Indies' fiscal and general policy.

The proposed measures abolish the so-called "penal sanction" in the laws pertaining to coolie labor, by which "penal sanction" a coolie is bound over to an estate for a certain number of years and the employer has the right to force the coolie to fulfil such a contract and punish him if he fails to do so. The measures under consideration would be severe on Sumatra which has vast undeveloped areas of valuable land and a proportionately small indigenous population. Up to the present the opening up of the island has been made possible by the use of large numbers of indentured Javanese held to their work by the "penalties." The uncertainty of the present conditions is having a bad influence on private enterprises. It has been suggested that the government allow Palembang, Benkoelen and West Coast of Sumatra, 8 years and Tapanoeli, Atjeh, East Coast of Sumatra, Riouw and Djamhi at least another 13 years of this "penal sanction."

The extent of European and American enterprise in Sumatra and particularly Deli, may be gathered from the fact that while exports of rubber in 1914 were about 6,500,000 kilos, this rose to 32,120,000 kilos in 1919, and the estimated output for 1920 is about 42,000,000 kilos.

NEW ESTATES

It is reported that the Anglo-Dutch Plantations of Java, which received the sum of 17 million gilders from the Netherland East Indian Government for their privileged freehold property, have invested a portion of this money in the purchase of some 200,000 acres of land from the Sumatra Land Syndicate.

E. N. Cummins, manager of the Sungei Renching Rubber Co., is said to be in Sumatra at present for the purpose of investigating and reporting on the newly acquired land which, it appears, will be mainly planted to rubber. Only a part of the leasehold rights over the 200,000 acres has as yet been granted by the government. The value of these rights is estimated at fl. 10 per acre. The estates are situated in Bencarlen, Palembang and along the West Coast of Sumatra. The shares of the Sumatra Land Syndicate are held by Mr. Hammond, manager of the Anglo-Dutch Plantations.

CENTRAL RUBBER EXPERIMENT STATION

The new building for the Central Rubber Experiment Station, Buitenzorg, was recently opened. A number of officials and planters were present at the opening. It will be remembered that this experiment station was temporarily housed in the former foreigners' laboratorium in the botanical garden. The laboratorium soon became too small for the constantly growing activities of the station which now has a fine building of its own.

Dr. van Leeuwen, Ph.D., director of the Botanical Gardens at Buitenzorg, Java, is shortly to visit Malaya, Siam, Saigon, Japan, Honolulu and Manila in order to strengthen the relations of the Buitenzorg institutions with similar foreign institutions and to study the progress of botany and zoology in the countries mentioned.

RUBBER AREAS

Official statistics for 1919, regarding the areas devoted to different crops, show that in Java and Madura, 463 rubber

estates together have a planted area of 88,124 hectares (hectare equals 2½ acres), of which 59,613 acres are producing; the outside possessions gave figures of 351 rubber estates with a planted area of 174,712 hectares, of which 109,017 hectares are producing. This shows a total of 814 estates having a planted area of 262,836 hectares of which 168,630 hectares are producing.

THE NETHERLAND GOVERNMENT RUBBER PLANTATION

The Forestry Service of the Netherland East Indies has for a number of years been occupied with the cultivation of rubber-producing plants. In 1886 the first experiments were made with *Ficus elastica*, which is indigenous to Java, while in 1900 the cultivation of *Hevea brasiliensis* was begun. *Castilloa, Manihot* and *Funtumia* also received the necessary attention, but the cultivation of these was not continued after it was discovered that it could lead to no success in Java.

In 1910 the plantings of *Ficus* and *Hevea* had increased to such an extent that it was thought desirable to make separate rubber plantations, and in 1919 these were established apart from the Forestry Service. From the beginning only *Hevea* was planted, for the reason that *Ficus*, through its small production, had not turned out to be profitable. The planting of the latter, therefore, was gradually diminished. The industry now consists of 14 rubber plantations.

GUTTA PERCHA

Exports of gutta percha from Padang, Sumatra, during July, 1920, were 292 piculs (picul = 133 1/3 pounds). For the seven months from January 1 to July 31, 1920, the amount was 5,903 piculs, against 2,517 piculs for the corresponding period during 1919.

JAVA STATISTICS

Imports of Automobile Tires Into Java

	August		Eight Months Ended August	
	1919	1920	1919	1920
From Great Britain ......*number*	140	916	4,270	7,246
France	1,382	3,665	33,216	16,560
Italy	......	440	1,991	8,077
United States	5,251	7,212	35,952	47,710
Singapore	1,358	474	4,738	5,867
Japan	8,967	4,835	64,307	38,594
Australia } Elsewhere }	1,179	1,749	5,065	9,799
Totals	18,277	19,291	149,539	133,853

Imports of Bicycle Tires Into Java

	August		Eight Months Ended August	
	1919	1920	1919	1920
From Holland ....*number*	......	4,182	948	15,966
Great Britain	......	590	441	2,287
United States	......	1,002	3,276	4,074
Singapore	350	410	1,625	11,726
Japan	20,521	33,946	85,877	340,108
Elsewhere	......	3,000	14,210	9,824
Totals	20,871	43,130	106,377	383,985

BRITISH NORTH BORNEO

The British North Borneo (Chartered) Co. has increased its area under cultivation from 40,986 acres to 47,739 acres and the amount of rubber exported was 3,000,000 pounds.

In June, 1920, 579,009 pounds of plantation rubber were shipped from North Borneo. Exports for the first half of 1920 were: 4,436,119 pounds, as against 4,158,979 pounds in the first half of 1919.

The Bolivian Rubber Industry[1]

The rubber industry of Bolivia, which is one of the most important in the republic, is centered in the Amazonian region and dates from the eighties, although the first rubber was taken out along the Mamoré in 1864. The years 1909 to 1911 were golden years for the Bolivian rubber industry, as during that period rubber reached the maximum price of $2.92 per pound. In 1917 the East Indian plantations began bearing and Amazonian rubber took second place in the world's markets, as far as quantity was concerned.

CHIEF RUBBER PRODUCING DISTRICTS

Rubber is found in the four northernmost departments of Bolivia—El Beni, La Paz, Cochabamba and Santa Cruz, and also in the territory of Colonias, which has become the most productive rubber region in the republic. Rubber trees are found in large numbers along all its rivers, including the Acre, Abuna, Orton, Madre de Dios, and their tributaries. The Beni district has steadily declined as its stock of trees has been worked out. Most of the *gomales* or rubber tree areas of this district are along the lower reaches of the Beni and the Mamoré, in the Province of Vaca Diez; there are also important fields in the Itenez basin. San Ignacio and Concepcion are the chief centers of the rubber business of Santa Cruz, the producing districts lying mostly between the San Miguel and the Paraguay rivers. The province of Caupolican is the center of the rubber industry of La Paz, while the comparatively unimportant *gomales* of Cochabamba are situated in the basins of the Chaparé and the D'Orbigny.

RUBBER PRODUCING TREES

Pará fine, the highest grade of Amazonian rubber, is derived from *Hevea brasiliensis*, a tree that grows from 90 to 120 feet in height, with a diameter that often exceeds three feet at the base. The caucho tree, *Castilloa ulei*, yields the inferior grade of rubber sold as caucho, while the rubber known as Ceará is extracted from the maniçoba tree, *Manihot glaziovii*. The caucho tree is generally cut down in order to obtain the latex, while the other varieties yield to tapping. Wild rubber trees do not exist in groves but are scattered through the forest. The areas along the rivers where they occur seldom extend inland more than 10 or 12 miles.

LEGISLATION

Bolivian legislation fixed the unit of rubber concessions as the *estrada* of 150 trees, with a limit of 500 *estradas* to individuals and 1,000 to legally constituted companies. This gave rise to such great abuses because of the scattered location of the trees that in 1905 a law was passed declaring the hectare (2.471 acres) the unit of land measurement, 75 hectares being allowed for each *estrada* by a law passed in 1917. Practically all the rubber-bearing lands of Bolivia are now included in grants to which the titles have been perfected or which are the subject of negotiations with the government. However, many holders of rubber lands have not complied with the requirements of the laws, consequently the government anticipates that on December 31, 1920 (the limit allowed by the law of October 31, 1917), it will have been required to reassume large tracts of land now occupied by the rubber companies.

IMPORTANT RUBBER INTERESTS

According to the report of Trade Commissioner Schurz, the most important of the rubber interests operating in Bolivia include the following:

[1]Commerce Reports, October 25, 1920.

Suarez Hermanos, the most powerful of all the Bolivian rubber companies, has its home offices in London and also has a receiving and forwarding station at Pará. The Bolivian headquarters of the Suarez interests are located at Cachuela Esperanza, a short distance above Villa Bella, on the Beni, at which point are large stores and warehouses. The rubber fields extend along the Beni to Riberalta and up the Madre de Dios to the Peruvian frontier. In addition the company has nearly 2,000,000 hectares on the Orton and its tributaries, besides large properties on the Acre and the Abuna. Altogether it possesses nearly 10,000,000 hectares. About 60 per cent of the rubber sent through Villa Bella is consigned by it. The total resources of this firm are said to aggregate about 50,000,000 bolivianos.

The German firm of Alfredo W. Barber & Co. has its central office in Cochabamba, with branches in Trinidad, Guayaramerin, and at several points in the Itenez country, where it possesses large *gomales*. It also has properties in the Abuna and Mamoré districts.

A long-established German company, Zeller, Villinger & Co., has rubber properties scattered from the Beni country to the upper Itenez region. It has houses at Riberalta, Guayaramerin, Baures, and Magdalena (Itenez), Santa Cruz, Trinidad, and Puerto Suarez (Rio Paraguay).

Brailard & Co., a French company, with headquarters at Riberalta, owns *gomales* in the Beni and along some of the rivers of the Territory of Colonias.

Another French company, known as Société Picollet, was founded in 1910 with a capital of 2,500,000 francs (1 franc = 19.3 cents normal exchange), which has been increased to about 3,500,000 francs. The center of operations of this firm is in the Abuna district, with a trading house at Manoa, at the mouth of the Abuna.

The trading house of Guillermo Demmer is located at Riberalta and owns *gomales* in northern Colonias.

The Sociedad Comercial Matto Grosso y Bolivia, which is the German firm of Stoffen, Schuack, Müller & Co., has trading stations at Guayaramerin, Santa Cruz, Puerto Suarez, Corumba (Brazil), and at certain points in the Itenez region. Most of its rubber properties are situated in the Itenez.

Still another German firm, Komarek & Bruckner, owns *gomales* in the Itenez and trading houses at Magdalena and Baures.

The rubber lands of the English Anglo-Bolivian Rubber Estates (Limited) are situated in the basin of the Rio Blanco, in the northern part of the Department of Santa Cruz. Its chief center of operations is Concepcion, in the Province of Velasco. It formerly took out most of its rubber through Puerto Suarez and the Rio Paraguay, but recently closed the former post.

The Bolivian, Nicanor G. Salvatierra, has large *gomales* in the Madre de Dios, Abuna, and Beni.

Besides these interests, there are scores of others with rubber estates, some of them aggregating over 200,000 hectares of land.

METHODS OF GATHERING

The methods of gathering the rubber used by the Bolivian *seringueiro* (extractor and coagulator) have become too familiar to the reading public to need further explanation in these columns. Daily tapping is generally practised and either hatchet or knife is used. The herring-bone system in which the knife is used is generally believed to be better for the tree than the deep incision made when using the hatchet. The chief trouble in the rubber country has sprung from labor questions. There has been a manifest improvement in the condition of the rubber gatherers in the past few years, though they have suffered from the rise in prices of necessities.

CLASSIFICATION OF RUBBER

On the arrival of a consignment of rubber at Manáos or Pará, a *bolacha* or sample ball is cut through several layers with a knife for the purpose of classifying the lot. Although the rubber is generally shipped as of two classes, fine or ordinary, there are eight classes in this preliminary inspection, namely: fina, fina fraca, entrefina, entre-fina-fraca, sernamby en rama, sernamby virgen, sernamby de caucho, and caucho. The rubber known as fine hard Pará is the prime product of the latex of the *Hevea* tree. Sernamby is second-quality rubber, although a product of the *Hevea*, as it contains impurities which decrease its value. It is sometimes made of the residue after the preparation of the fine Pará, or if rain has fallen in the cups with the latex the product will be classified as sernamby. Caucho is the product of the caucho tree and is an altogether lower grade of rubber.

PLANTATION COMPETITION

The rapid development of the East Indian plantations has seriously threatened the Amazonian rubber industry, which includes, of course, that of Bolivia, but the South American rubber interests have done little to meet it, only a few prominent rubber growers having planted trees to replace the gradually disappearing wild growth. Owing to their more economical methods the plantations have rapidly gained control of the world rubber market; since 1912 the price per pound of plantation rubber has been consistently a little lower than that of fine hard Pará.

EXPORTS OF RUBBER

The exports of rubber from Bolivia in 1918 were 2,860,509 kilos (1 kilo = 2.2 pounds) of fine valued at 8,272,579 bolivianos (1 boliviano = $0.389), and 1,427,005 kilos of ordinary, valued 2,765,463 bolivianos. In 1911, rubber exports constituted 22.89 per cent of the total value of exports from Bolivia, while in 1918 the percentage had fallen to 6.04.

The increasing importance of the United States as a buyer of Bolivian rubber is shown by the following table, which gives the percentage taken by the chief countries of destination since 1912:

Countries	1912 Per Cent	1913 Per Cent	1914 Per Cent	1915 Per Cent	1916 Per Cent	1917 Per Cent	1918 Per Cent
United States..	2.30	3.7	9.4	91.7	91.45	83.98	84.22
Germany	30.2	17.8	10.75	.3	.....	.....	.....
Belgium	12.5	8.9	3.5	....	.....	.....	.....
France	9.5	18.15	12.9	1.4	2.27	6.81	7.15
Great Britain ..	45.5	50.9	63.45	6.6	4.08	6.52	3.53

MAPS

Maps which show the location and extent of all rubber properties in Bolivia are in possession of the Latin-American Division of the Bureau of Foreign and Domestic Commerce, Department of Commerce, at Washington, D. C., and loan copies may be obtained from this source by persons or companies interested in the subject.

BALATA IN SURINAM

Recently, subscriptions for balata territory by auction took place for the first time in Surinam. There was no demand for these territories at the usual concession duty of 4½ Dutch cents per hectare. Only two firms bid, the Kersten concern offering 0.6-cent per hectare, and H. G. Bauer, whose bid was 0.5-cent.

The Kersten concern got the territories which are situated between the Coesewyne and the Saramacca and have an area of 154,300 hectares.

During the four months ended April, 1920, the exports of balata from this colony amounted to 107,324 kilograms, as against 113,417 kilograms during the corresponding period of 1919. This shows a decrease of 6,093 kilograms. The rubber exports during the same period in 1920 totaled 1,361 kilograms.

IMPORTS OF INDIA RUBBER AND GUTTA PERCHA INTO THE SERB-Crote-Slovene State during 1919 were 759,031 kilos (1 kilo equals 2.2 pounds), valued at 48,265,630 dinars. The par value of the dinar is $0.193 United States currency.

Recent Patents Relating to Rubber

THE UNITED STATES

GRANTED NOVEMBER 2, 1920

No. 1,357,286 Pressure gage and tire valve. H. Gosstrom, assignor of one-twelfth to H. Gosstrom, one-eighteenth to J. E. Gosstrom, one-eighteenth to S. Gosstrom, and one-eighteenth to E. Gosstrom—all of Chicago, Ill.

1,357,378 Storage battery separator and process of manufacture. H. L. Boyer, assignor to Joseph Stokes Rubber Co.—both of Trenton, N. J.

1,357,601 Apparatus for administering anesthetics. W. P. Walter, assignor by mesne assignments to Safety Anaesthesia Apparatus Concern—both of Chicago, Ill.

1,357,633 Tire charging tube and tester. D. D. Getman, White Butte, S. D.

1,357,701 Hose. H. F. Goodall, Aldan, Pa.

1,357,909 Rubber hoof pad. M. M. Sherwood, Scranton, Pa.

GRANTED NOVEMBER 9, 1920

1,357,982 Chemical fire apparatus with fire hose, chemical tank, chemical hose, etc. A. B. House, Brooklyn, assignor to International Motor Co., New York—both in N. Y.

1,358,133 Rubberized, woolen-lined cover for hot-water bottles. D. S. Applegate, Chicago, Ill.

1,358,195 Washing brush with rubber rollers to regulate pressure. A. Gabryszek, Detroit, Mich.

1,358,279 Gun wad. W. G. Bond, Wilmington, Del.

1,358,285 Fountain pen. E. J. Casper, New York City.

1,358,308 Resilient wheel tire. G. E. Gilmore, Cleveland, O.

1,358,410 Cushion tire. E. E. Bull, Whitwell, Tenn.

1,358,511 Fountain pen clip and cap. C. W. Bowman, assignor to Eagle Pencil Co.—both of New York City.

1,358,523 Fountain toothbrush. J. T. Cook, Astoria, Ore.

1,358,524 Device for automatically inflating pneumatic tires. J. C. Cooper, Hempstead, Tex.

1,358,566 Reinforced pneumatic tire. W. A. Michero, Fort Worth, Tex.

1,358,568 Rubber eraser attachment for pencil. H. Moore, Brooklyn, N. Y.

1,358,576 Rubber composition separator for storage batteries. H. T. Roberg, Castana, Ia.

1,358,598 Cushioned metal French heel. C. Weis, Lancaster, Pa.

1,358,633 Hose mender. F. Hachmann, St. Louis, assignor of one-eighth to D. M. Hutchinson, Ferguson—both in Mo.

1,358,649 Dust cap for valve stems. M. F. Patton, Tuscaloosa, Ala., assignor to A. Schrader's Son, Inc., Brooklyn, N. Y.

GRANTED NOVEMBER 16, 1920

1,358,711 Collapsible tire rim. C. B. Deeds, Savanna, Ill.

1,358,733 Bath device. A. F. Heine, Quincy, Ill.

1,358,753 Elastic shoelace. B. F. Killam and S. Schlesinger, Jr.—both of Denver, Colo.

1,358,775 Infant's garment supporter. A. Oberg, Chicago, Ill.

1,358,803 Demountable rim for tires. W. S. Watson, Cleveland, O.

1,358,852 Raincoat. F. W. Howard, New York City.

1,358,923 Demountable rim for tires. G. G. Barry, Chicago, Ill.

1,358,962 Pneumatic tire. J. W. McElvain, Springfield, Ill.

1,359,073 Respirator. F. W. and W. G. King, New York City, assignors to Julius King Optical Co., a corporation of New York.

1,359,112 Elastic fabric. M. W. Schloss, New York City, assignor to Treo Co., a corporation of New York.

1,359,267 Life preserver. A. Mossovitz, Baltimore, Md.

GRANTED NOVEMBER 23, 1920

1,359,573 Abdominal supporter. S. G. Brennan, Highland Park, Mich.

1,359,650 Shaving brush holder of rubber. L. A. Amis, Muskogee, Okla.

1,359,672 Hose supporter. R. J. Cavalier, Oswego, N. Y.

1,359,689 Balloon and parachute. J. R. Gammeter, Akron, O., assignor to The B. F. Goodrich Co., New York City.

1,359,690 Hard rubber fountain brush. C. A. Garvey, Clayton, Mo. (See The India Rubber World, December 1, 1920, page 184.)

1,359,717 Finger protector. L. J. McCarthy, assignor to Sears, Roebuck & Co.—both of Chicago, Ill.

1,359,805 Rubber-heel retaining device. T. L. Hollingsworth, assignor to The Fay Rubber Products Co.—both of Elyria, O.

1,359,835 Metal platform. F. I. Pease, Akron, O., assignor to The B. F. Goodrich Co., New York City.

1,359,838 Air cushion device. M. Petterson, Long Beach, Calif.

1,359,880 Self filling fountain pen. C. Dunn, Brooklyn, N. Y.

1,359,910 Elastic mailed sleeve for tires. J. Nowakowski, Detroit, Mich.

1,359,985 Bathing apparatus. S. D. Gromer, Tucson, Ariz.

1,359,999 Waterproof coat with inner rubber tubes downward from back collar edge. L. McEvoy, Chicago, Ill.

1,360,024 Water-containing vessel for preserving fruits and vegetables, with elastic socket member at mouth to prevent escape of water around stems of fruit, vegetables, etc., Luis Robichon, Mendoza, Argentina.

GRANTED NOVEMBER 30, 1920

1,360,292 Toothbrush with secondary rubber brush at end of handle. G. E. Hartman, Camden, N. J.

1,360,330 Device for detecting and locating subaqueous sounds. A. F. Sykes, New Barnet, and J. T. MacGregor-Morris, Hampstead, London—both in England.

1,360,588 Hose coupling. W. E. Sanderson, Los Angeles, Calif.

1,360,647 Fountain pen. C. R. Keeran, assignor by mesne assignments to Autopoint Pencil Co.—both of Chicago, Ill.

1,360,715 Waterproof coat. B. A. Bittan, Philadelphia, Pa.

1,360,811 Cushion heel with inserted diagonal calks. L. Stein, Washington, D. C.

1,360,893 Nipple and washer for feeding bottle. J. T. Cowie, Nanaimo, B. C., Canada.

1,360,907 Rubber tire having recessed rubber tread vulcanized to metal base. P. J. Ernenwein, New York City.

THE DOMINION OF CANADA

GRANTED NOVEMBER 2, 1920

205,217 Rubber tire having spaced closed air cells. J. C. Anderson, Washington, D. C., U. S. A.

205,325 Parachute fastener. The E. R. Calthrop's Aerial Patents, Limited, assignee of E. R. Calthrop—both of London, Middlesex, England.

GRANTED NOVEMBER 9, 1920

205,396 Resilient tire. V. L. Buchman, Trenton, New Jersey, U. S. A.

205,409 Tire rim for automobiles. T. W. Costello, San Francisco, California, U. S. A.

205,410 Tire rim for auto trucks. T. W. Costello, San Francisco, California, U. S. A.

205,414 Air hose stand. B. J. Daly, Oshkosh, Wis., U. S. A., administrator of the estate of L. J. Monahan, deceased.

205,424 Automobile wheel combining wheel having solid tire with auxiliary one having pneumatic tire. Oscar Englebert, Liège, Belgium.

205,539 Tire bead. The Fisk Rubber Co., Chicopee Falls, assignee of T. Midgley, Hampden—both in Massachusetts, U. S. A.

GRANTED NOVEMBER 16, 1920

205,641 Low-pressure alarm for pneumatic tires. W. A. Harris, Greenville, South Carolina, U. S. A.

205,692 Cushion tire. C. Warwick, Vancouver, B. C.

205,704 Bathing hat. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of J. T. Brogden, Providence, Rhode Island, U. S. A.

205,713 Rubber hose. Gutta Percha & Rubber, Limited, assignee of C. J. Otto—both of Toronto, Ont.

GRANTED NOVEMBER 23, 1920

205,844 Collapsible nursing bottle with integrally formed nipple. W. E. Goddard, Watertown, Wisconsin, U. S. A.

205,880 Respirator mask. F. L. Miller, Idaho Springs, Colorado, U. S. A.

205,889 Nipple for nursing bottle. M. H. McMann, New York City, U. S. A.

205,974 Vaginal douche of hard and soft rubber tubing with faucet cap. E. F. Ristine, Lexington, assignor of ten per cent each to B. Clark, St. Louis, and C. F. Ristine and C. Lyons, both of Lexington, and nine per cent to S. L. Ristine, Lexington—all in Missouri, U. S. A.

GRANTED NOVEMBER 30, 1920

206,036 Swimming glove. A. Gravel, Chicoutimi, Que.

206,041 Reinforced shoe heel. T. Hand, Orlando, Florida, U. S. A.

206,073 Shoe heel protector with rubber wearing lift. O. W. Peters, Los Angeles, California, U. S. A.

206,106 High rubber boot having lacing portion for adjustment at instep and ankle. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of C. W. Hubbell, Naugatuck, Connecticut, U. S. A.

THE UNITED KINGDOM

PUBLISHED OCTOBER 6, 1920

147,364 Detachable rim for tires. R. F. Roberts, Westcroft, Werlingham, Surrey.

147,392 Detachable rim for tires. E. Oliver, Daytona, Fla., U. S. A.

147,410 Apparatus for flexing book leaves, having rollers covered with vulcanized rubber, etc. T. H. Poynder, 3 Gun street, Reading, Berkshire.

147,419 Urethral syringe and irrigator. E. von Krohn (née Richter), 19 Lutherstrasse, Charlottenburg, Berlin. (Not yet accepted.)

147,420 Submarine signaling apparatus having sound tube insulated by supporting it on rubber rings. A. Behm, 31 Hardenbergstrasse, Kiel, Germany. (Not yet accepted.)

147,521 Golf-ball marker. J. D. Lyon, Cincinnati, Ohio, U. S. A.

147,656 Marine life-saving device of waterproof canvas, etc., stretched over a collapsible metal framework. J. G. M. Poterin du Motel, 64 rue de Saussune, Paris. (Not yet accepted.)

147,717 Pneumatic tires so constructed as to prevent overheating. J. Marc, 8 rue de Helder. Paris. (Not yet accepted.)

PUBLISHED OCTOBER 13, 1920

147,930 Rubber stamp. J. Pritzke, 19 Turkenstrasse, Berlin. (Not yet accepted.)

147,993 Parachute. E. R. Calthrop, Eldon Street House, Eldon street, London.

148,007 Solid tire with gable-like section. E. B. Killen, 27 Queen Victoria street, London.

148,017 Dust cap for tire valves. Dunlop Rubber Co., 14 Regent street, Westminster, and W. C. J. Schlie, Alma street, Coventry.

148,020 Combined metal shank and heel-piece, the latter adapted to hold revoluble rubber heel pad. J. Hesketh, 30 Orleans Road, Old Swan, Liverpool.

148,048 Table football played with miniature hollow rubber football. W. C. S. D. Ford, 278 Upland Road, East Dulwich, London.

148,164 Artificial teeth replaceable permanently on vulcanite denture without revulcanization. S. Myerson, 129 Columbia Road, Boston, Mass., U. S. A. (Not yet accepted.)

148,192 Gas respirator. H. Guillemard, France. (Not yet accepted.)

148,220 Tire with rim enclosing air-tube and band covering tread. Société Anonyme du Pneu Economique, 42 rue de Beffroi, Brussels. (Not yet accepted.)

148,234 Spring wheel with rubber inserted in melted state. J. P. Bem, San Francisco, Calif., U. S. A.

148,244 Tire with rim enclosing airtube. H. de Hooydonck, avenue Edouard VII, Biarritz, France. (Not yet accepted.)

Chemical Patents will be found on pages 253, 254. Machinery Patents on pages 257, 258.

PUBLISHED OCTOBER 20, 1920

148,298 Wheel tire reinforced by rawhide layer between fabric layers. L. Loeb, New York City, U. S. A. (Not yet accepted.)

148,438 Spring wheel with rubber tread. E. F. Erickson, 159 Twenty-fifth street, Brooklyn, New York, U. S. A. (Not yet accepted.)

148,439 Spring wheel with rubber tread. E. F. Erickson, 159 Twenty-fifth street, Brooklyn, New York, U. S. A. (Not yet accepted.)

148,565 Wheel with detachable rim for tires. Baker Wheel & Rim Co., assignees of E. K. Baker—both of 140 Suuth Dearborn street, Chicago, Ill., U. S. A.

148,674 Tire valve. T. A. Low, Renfrew, Ontario, Can.

148,726 Reinforced rubber heel. W. D. Bing, Northampton House, Albion Road, St. Peters-in-Thanet, Kent.

PUBLISHED OCTOBER 27, 1920

148,772 Tire puncture patch. A. Thiele, 99 Potsdamerstrasse, Berlin, assignee of E. Thiele (née Muhleise), 15 Beaumontstrasse, Magdeburg, Germany. (Not yet accepted.)

148,862 Metal reinforced detachable rubber heel. V. B. Greco, 1126 Franklin street, and W. F. Baum, 84 West 11th street—both in Waterloo, Ia., U. S. A. (Not yet accepted.)

149,058 Device for cleaning and repairing drain-pipes consisting of one large central and two smaller end rubber disks clamped between metal plates connected by rods. J. Moakes, 17 Brindley street, Paddington, London.

149,096 Waterproof suit for aviators' wear. W. Peterson, 34 Arlington street, Newark, New Jersey, U. S. A.

149,173 Replaceable rubber-covered button for garters, suspenders, etc. J. Pollard, Rose Cottage, Killiney, County Dublin.

149,183 Revoluble rubber heel. J. T. McNay, 62 Northumberland Road, Old Trafford, Manchester.

149,204 Urethral syringe. Becton, Dickenson & Co., Rutherford, New Jersey, U. S. A., assignees of G. J. Duggan.

GERMANY

PATENTS ISSUED, WITH DATES OF ISSUE

329,926 (October 28, 1919.) Automatic tube connection. W. Baumeister, Herthastrasse 33, Essen.

330,926 (April 24, 1920.) Hygienic nipple for nursing bottle. P. Elzer, Gumberstrasse 81, Düsseldorf-Eller.

TRADE MARKS

THE UNITED STATES

SERIAL NUMBERS PUBLISHED SEPTEMBER 28, 1920*

No. 106,414 The word Kno-Bind—garters. D. M. Worth, Bucyrus, O.

124,429 Representation of an alligator bearing an alligator-skin hand-bag in his mouth and having the word Alligator on his side—tire patches. Alligator Grip Co., Dallas, Tex.

124,964 Representation of a shield surmounted by a wreath enclosing the initials W. S.—rubber and fabric tires, tubes, tire boots and patches. Washington Tire & Rubber Co., Spokane, Wash.

127,350 The word Merlin—rubber tires and tubes. The Batavia Rubber Co., Batavia, N. Y.

128,105 Representation of a cross-section of a tire surrounding the letters O'N—solid and pneumatic tires of rubber and rubber reinforced with fabric, and rubber inner tubes. The Owen Tire & Rubber Co., Cleveland, O.

131,953 The word Antelope—rubber hose reinforced with fabric. The B. F. Goodrich Co., New York City.

131,957 The word Diruboo—rubber hose and belting reinforced with fabric. The B. F. Goodrich Co., New York City.

131,960 The word Elk—rubber hose reinforced with fabric and pump-valves wholly or partly rubber. The B. F. Goodrich Co., New York City.

131,962 The word Lynx—belts of fabric combined with rubber. The B. F. Goodrich Co., New York City.

132,017 Representation of a tire through which is thrust an arm and hand wearing a rubber glove and holding an instrument—rubber goods and sundries for hospitals, dentists, druggists, surgeons, etc. The Miller Rubber Co., Akron, O.

133,552 Conventionalized representation of a tire enclosing a shield against which is silhouetted a castle—pneumatic tires and tubes. New Castle Rubber Co., New Castle, Pa.

135,776 The words Mono and Twin separated by the words Trade Mark—solid rubber tires. The United States Tire Co., New York City. (See The India Rubber World, July 1, 1920, page 661.)

SERIAL NUMBERS PUBLISHED OCTOBER 5, 1920*

127,723 The word Kleinert's—rubber or rubberized material, sponge-bags, nursery-bags, bathing-suit bags and diaper-bags, and rubber tourist-cases. I. B. Kleinert Rubber Co., New York City.

127,727 Representation of a Maltese cross bearing the word Kleinert suspended by a ring from a ribbon bearing the words The Best—rubber or rubberized material, sponge, nursery, bathing-suit, and diaper bags, and rubber tourist cases. The I. B. Kleinert Rubber Co., New York City.

SERIAL NUMBERS PUBLISHED OCTOBER 30, 1920*

131,859 Representation of head of a rhinoceros above the word Rhino—golf balls. Cupples Company Manufacturers, St. Louis, Mo.

132,466 The word Dyco within a horizontal ellipse superimposed upon a double-outlined circle—dental, medical, surgical, and sanitary appliances of or containing gutta percha, rubber, elastic fabric, etc. Du Pont Young Corporation, Boston, Mass.

133,663 The word Habirshaw—electric cable. Habirshaw Electric Cable Co., New York City.

*Notice of opposition must be filed with the United States Patent Office at Washington, D. C., within thirty days after this date.

SERIAL NUMBERS PUBLISHED NOVEMBER 2, 1920*

120,715 The word Oldfield, having the letter O represented by a reproduction of an Oldfield tire and all the letters having the appearance of traveling along a road—rubber tires, inner tubes, tire fabrics, accessories, and tire repair gum materials in sheet form. The Oldfield Tire Co., Cleveland, O.

129,201 The word Lox-On—tire valve fixtures. Automatic Safety Tire Valve Corporation, New York City.

SERIAL NUMBERS PUBLISHED NOVEMBER 5, 1920*

121,897 The word Sanital in stenciled letters—belting, hose and packing of rubber, balata, fabric, etc. Imperial Belting Co., Chicago, Ill.

123,259 The words Re-Nu-R—leather and rubber fabric dressing. George W. Roth, Minneapolis, Minn.

124,313 The word Skogum—rubber jar rings. Smalley, Kivlan & Onthank, Boston, Mass.

124,583 The word Sandersoled within a geometric outline—retreaded rubber and fabric tires. D. A. Sanders, Nyack, N. Y.

SERIAL NUMBERS PUBLISHED NOVEMBER 6, 1920*

124,133 The word Bennie having the end letters larger than the others and with them forming an enclosure for the word Springfield—pneumatic tires. Alexander Bennie & Co., Nashville, Tenn.

126,356 Representation of an airplane flying through a tire bearing the words Rubber Ace, the whole above a cloud-bank and the words Master of Air—tire fillers made of spongy rubber. Elgin Rubber Ace Co., Elgin, Ill.

130,026 The word Federal—reliners, tire sleeves or patches, tires, tubes, hose, tubing, balls, gaskets, packing, and valves, of rubber or rubber and fabric. The Federal Rubber Co., Cudahy, Wis.

132,149 The words Syra-Cord—tire casings and shoes. Syracuse Rubber Co., Inc., Syracuse, N. Y.

132,339 The letters A-B-C—brake-lining, clutch facings, fan-belts, packing, radiator hose, tube repair kits, etc. American Brake-Lining Co., Lansdale, Pa.

134,263 The word Eveready—rubber and other kinds of hose. Oxweld Acetylene Co., Newark, N. J.

135,337 Representation of a Marathon runner—inner tubes. The Marathon Tire & Rubber Co., Cuyahoga Falls, O.

135,400 Representation of a hammer poised above a black triangle cutting the upper portion of a circle—belting, hose and packing, etc., of rubber and other materials. C. O. Alexander, Philadelphia, Pa.

135,412 The words Rubber Ace—fillers for tires, made of spongy rubber. Elgin Rubber Ace Co., Elgin, Ill.

135,413 The words Master of Air—fillers for tires, made of spongy rubber. Elgin Rubber Ace Co., Elgin, Ill.

136,326 The word Superite—fountain pens. De Witt-La France Co., Cambridge, Mass.

SERIAL NUMBERS PUBLISHED NOVEMBER 10, 1920*

129,612 The word Tiretex—woven fabrics in the piece for vehicle tires. Thistle Cotton Mills, Inc., Ilchester, Md.

131,601 The word Sansco—infants' sanitary pants and bibs. N. Scoville, St. Louis, Mo.

131,658 Representation of section of a rainbow and the word Rainbow—elastic webbing. The Russell Manufacturing Co., Middletown, Conn.

131,662 Representation of an elk's head within a conventionalized frame bearing the word Elk—elastic webbing. The Russell Manufacturing Co., Middletown, Conn.

131,663 Representation of the rock of Gibraltar and the word Gibraltar—elastic webbing. The Russell Manufacturing Co., Middletown, Conn.

131,747 Representation of an alligator within a circle beneath the word Alligator—elastic webbing. The Russell Manufacturing Co., Middletown, Conn.

131,751 The word Challenge—elastic webbing. The Russell Manufacturing Co., Middletown, Conn.

132,932 The word "Shirlastic"—sanitary belts. I. B. Kleinert Rubber Co., New York City.

134,268 The words Arch Motor Shoes within a rectangle—men's, women's and children's boots, shoes and slippers of leather, rubber and fabrics. Thomas G. Plant Co., Boston, Mass.

134,853 Representation of a globe bearing the words Barnun on Earth—shoes of rubber, fabric and leather combined. Frank Roth, Taylor, Pa.

SERIAL NUMBERS PUBLISHED NOVEMBER 17, 1920*

125,442 Black seal bearing in white letters around the edge the words, R. T. Vanderbilt Co., New York, N. Y. American Products, and in the center the words Blue Ridge Clay—clay used as a filler in rubber compounds. R. T. Vanderbilt, Inc., New York City.

131,665 The word Shamrock above the representation of a shamrock—elastic webbings. The Russell Manufacturing Co., Middletown, Conn.

132,793 The word Knickerbocker—massage shower and bath sprays. Knickerbocker Manufacturing Co., Chicago, Ill. (See The India Rubber World, August 1, 1903, page 381; October 1, 1918, page 18.)

133,044 The letter C containing the letter X, both in outline—tires and tubes. The Converse Rubber Shoe Co., Malden, Mass.

136,228 The words Jim's Tire Jimmys—tire jimmies. The Wallace Barnes Co., Bristol, Conn.

136,561 Conventional representation of a tire containing the words "Our Daddy's Choice"—tire patches. The Jones & Jones Co., Kingman, Kans.

SERIAL NUMBERS PUBLISHED NOVEMBER 23, 1920*

107,945 Representation of a stencilled design consisting of the word Oiltite within a diamond-shaped outline all above the words Jenkins Bros.—rubber packing. Jenkins Rubber Co., Elizabeth, N. J.

121,953 The word Justa arranged in the form of an upright cross above the word Products, all within a conventional outline—tires, patches for inner and outer tubes, and fan-belts of fabric and rubber. C. W. D.-Vance, Oklahoma, Okla.

127,725 The word Kleinert's—rubber household aprons, baby-pants. I. B. Kleinert Rubber Co., New York City.
127,965 Representation of flat section of white hose having black and orange-colored stripes extending lengthwise—rubber-lined fabric hose. The Gutta Percha & Rubber Manufacturing Co., New York City.
134,142 The words Ramo Tires—rubber and fabric pneumatic tire shoes and rubber inner tubes. The Ramo Tire & Rubber Co., Pittsburgh, Pa.
134,144 Shaded representation of a tire containing a shield formed of the words Republic Belting Co.—leather and rubber belting. Republic Belting Co., Inc., Baltimore, Md.
135,376 The word Reversette—rubber coats. W. McPherson, Cambridge, Mass.
135,481 The words "Lion's Paw"—tires and patches. Loeser & Sons, Terre Haute, Ind.
136,431 The word Romanjo superimposed in black letters above an outline representation of a swastika—rubber tires and tubes. Romanjo Tire Co., Chicago, Ill.
137,350 The word Millrite with two small figures of workmen working on end letters—leather, rubber and composition belting. Wayne Belting & Supply Co., Fort Wayne, Ind.
137,462 The word Grainvey—fabric and rubber elevator belts. The B. F. Goodrich Co., New York City.
137,464 The word Orion—fabric and rubber belts. The B. F. Goodrich Co., New York City.

SERIAL NUMBERS PUBLISHED DECEMBER 1, 1920*

106,283 The words Red Line with a broad red line drawn through the words longitudinally—rubber and fabric tires, inner tubes, patches, reliners, etc. C. Palmer, Grand Rapids, Mich.
118,993 Representation of a fish with the word Herringbone on its side—fabric and rubber machinery packings. N. B. Miller, New York City.
125,372 Representation of an Indian's head beneath the word Ninigret—waterproofed canvas or duck covers. Eastern Finishing Works, Inc., Kenyon, R. I.
128,098 The word "Kidnie"—baby-pants. I. B. Kleinert Rubber Co., New York City.
130,668 The word Firestone—pneumatic and solid tires, inner tubes, rubber-impregnated tire-building and rebuilding fabrics, tire accessories, and tire repair gum materials in sheet form. The Firestone Tire & Rubber Co., Akron, O.
137,624 The word Nopcony—preservatives for driving belts of leather, rubber or cotton. Neatsfoot Oil Products Co., New York City.

THE UNITED KINGDOM

PUBLISHED SEPTEMBER 15, 1920

395,121 The words Gomme Daco—erasers. Darras & Cie., 59 rue des Petits-Champs, Paris, France; address for service in the United Kingdom, care of Boult, Wade & Tennant, 112 Hatton Garden, London, E. C. 1.
402,462 The word "Man-Ark"—rubber soles and heels. W. I. J. Oldershaw, trading as W. Oldershaw, 779 Romford Road, Manor Park, London, E. 12.
402,665 The word "Guide"—rubber tires. The F. E. Partridge Rubber Co., Limited, 1 Metcalf street, Guelph, Ontario, Canada; address for service in the United Kingdom, care of Abel & Imray, 30 Southampton Buildings, London, W. C. 2.
404,789 The word Eclipse—ink and pencil erasers. Joseph Dixon Crucible Co., Wayne and Monmouth streets, Jersey City, New Jersey, U. S. A.; address for service in the United Kingdom, care of A. M. & William Clark, 53-54 Chancery Lane, London, W. C. 2.
405,403 Circular design enclosing representation of clouds and lightning shaft darting through a coil of cable, together with the inscription C. C. C. Co.—rubber insulated electric cables. Callender's Cable & Construction Co., Limited, Hamilton House, Victoria Embankment, London, E. C. 4.
B406,504 The word Talmo—bicycle tires and tire covers, and tires and tiring for perambulators and baby carriages. Brown Brothers, Limited, 22-34 Great Eastern street, London, E. C. 2.

PUBLISHED SEPTEMBER 22, 1920

405,374 The letters C and X arranged in a monogram—rubber boots and shoes. Converse Rubber Shoe Co., 392 Pearl street, Malden, Mass., U. S. A.; address for service in the United Kingdom, care of John E. Raworth & Moss, 75 Victoria street, Westminster, London, S. W. 1.

PUBLISHED SEPTEMBER 29, 1920

403,875 Representation of a horse rampant being driven by an elephant, also rampant, riding on his back—rubber soled shoes and galoshes. Kay Bros., 1 Brazil street, Manchester.
403,881 The words Golf Clubs above a representation of a set of four golf clubs enclosed in a wreath formed of two sprays of leaves tied with ribbon bow—rubber soled shoes and galoshes. Kay Bros., 1 Brazil street, Manchester.
404,057 The word Multasbest—electric cables. Ward & Goldstone, Sampson Works, Springfield Lane, Salford, Manchester.

PUBLISHED OCTOBER 6, 1920

395,122 The words Gomme Eclair pierced by representation of a dart of lightning—erasers. Darras & Cie., 59 rue des Petits-Champs, France; address for service in the United Kingdom, care of Boult, Wade & Tennant, 112 Hatton Garden, London, E. C. 1.
402,142 The word Vulcazol—chemical accelerator used in vulcanizing rubber. Ricard, Allenet & Cie, Distilleries des Deux-Sèvres, à Melle (Deux Sèvres), France; address for service in the United Kingdom, care of Abel & Imray, 30 Southampton Buildings, London, W. C. 2.
403,331 The word Beaver—goods manufactured from india rubber, gutta percha, or balata, not included in classes other than No. 40. The Beldam Packing & Rubber Co., Limited, 29 Gracechurch street, London, E. C. 3.
403,804 The letters B E V within a conventional triangular double-outlined border—rubber tires. British Electric Vehicles, Limited, 1 Queen Victoria street, London, E. C. 4.
405,699 Representation of an eagle standing on a section of twisted cable or rope, holding elastic and handle of catapult in bill and claw, respectively—elastic hose, supporters, sleeve and blouse retainers, and hat guards. W. J. Adams & Co., Limited, 20 Mount street, Manchester.

PUBLISHED OCTOBER 13, 1920

403,808 The word Wilbar—goods manufactured from india rubber, and gutta percha, not included in classes other than No. 40. Williams & Bartlett, 147 Corporation street, Birmingham.
405,484 The word Talmak—braces, suspenders, and belts. A. & F. Tallent, Limited, 23-33 Wenlock street, New North Road, London, N. 1.
406,437 The word Rubrax—asphalt and asphaltic compounds (for mixing with rubber), included in Class No. 4. United States Asphalt Refining Co., 90 West street, New York City, U. S. A.; address for service in the United Kingdom, care of White, Langner, Stevens & Parry, Jessel Chambers, 88 Chancery Lane, London, W. C. 2.
B407,498 The word Silvertown—golf and tennis balls. India Rubber, Gutta Percha & Telegraph Works Co., Limited, 106 Cannon street, London, E. C. 4.

THE DOMINION OF CANADA

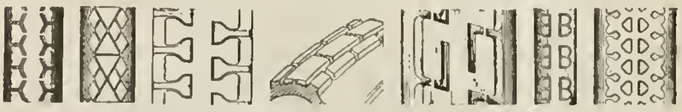
REGISTERED

27,267 Representation of a winged foot between the syllables of the word Goodyear—rubber and balata goods, including waterproofed fabrics, solid and pneumatic tires, inner tubes, accessories, belting, hose and packing, tubing, molded goods, cement, and leather substitutes. The Goodyear Tire & Rubber Company of Canada, Limited, New Toronto, Ont.
27,297 The word Moco associated with the representation of twin monkeys and the words Monkey Grip beneath—tire patches. The Moco Company of America, Oklahoma City, Okla.
27,299 Representation of a globe surrounded by a band bearing the word Dominion—rubber manufacturing machinery, chucks, shafting, cores, molds, etc. Dominion Steel Products Co., Limited, Brantford, Ont.
27,332 The word Adapta—rubber soles and heels. The Micrometer Engineering Co., Limited, 41 Spon street, Coventry, England.
27,348 Representation of a fleur-de-luce bearing the letters S. R. C. surrounded by a circular band bearing the words: The Seamless Rubber Company, New Haven, Conn.—druggists' rubber sundries. The Seamless Rubber Co., Inc., New Haven, Conn., U. S. A.
27,395 The words Klingtite and Good-Year, with representation of a winged foot separating the syllables of the last word—rubber and balata goods, including pneumatic and solid tires, inner tubes, tire accessories, belting, hose and packing, tubing, molded goods, cement, leather substitutes, etc. The Goodyear Tire & Rubber Company of Canada, Limited, Toronto, Ont.
27,419 The letters "U. F. O."—tires and tubes. F. D. Law, Oakville, Ont.
27,486 The words "Maple Leaf"—rubber manufacturers of all kinds, including boots and shoes; automobile, motorcycle, and bicycle tires and tubes; belting, hose, and packing; gaskets; valves; matting; water-bottles; gloves; raincoats, etc. Canadian Consolidated Rubber Co., Limited, Montreal, Que.
27,487 Representation of a maple leaf—rubber manufactures of all kinds, including boots and shoes; automobile, motorcycle, and bicycle tires and tubes; belting, hose, and packing; gaskets; valves; matting; water-bottles; gloves; raincoats, etc. Canadian Consolidated Rubber Co., Limited, Montreal, Que.
27,523 Representation of the ace of spades having thereon the letter A—hard rubber insulation equipment, combs, buttons, cutlery handles, druggists' hard rubber sundries, acid bottles, dental gum, sheets, rods, tubes, pipe, elbows, tees, nuts, cocks, closet seats, penholders, rulers, ink-stands, etc. American Hard Rubber Co., New York City, U. S. A.
27,526 The words Miracle and Blow Out Patch arranged between two concentric circles spaced apart with the legend "It's Rawhide," and a representation of a sheet of rawhide within the inner circle—blow-out and puncture patches, reliners and interliners for tires. Rawhide Products Corporation, New York City, U. S. A.
27,534 The word Topaz in Gothic type—rubber sponges and sponge rubber goods. Featheredge Rubber Co., Inc., Chicago, Ill., U. S. A.
27,549 The word Compression—inner tubes. U. S. Compression Inner Tube Co., Tulsa, Okla., U. S. A.
27,586 The words Tiny Tot and the representation of an infant reclining on a powder puff—druggists' sundries and infants' rubber goods. United Drug Co., Limited, Toronto, Ont.
27,602 The word Sarival—baled cotton. Southwest Cotton Co., Phoenix, Ariz., U. S. A.

DESIGNS

THE UNITED STATES

No. 56,490 Tire casing. Patented November 2, 1920. Term 3½ years. M. S. Ackles, assignor to Lincoln Highway Tire Co.—both of Fulton, Ill.
56,589 Eraser head for lead pencils. Patented November 16, 1920. Term 14 years. Eberhard Faber, New York City.



56,490 56,616 56,620 56,623 56,619 56,688 56,691

56,616 Tire tread. Patented November 16, 1920. Term 7 years. E. C. Hufford and W. S. Bates, Watts, Calif.
56,619 Tire tread. Patented November 16, 1920. Term 14 years. O. J. Kuhlke, assignor to The Amazon Rubber Co.—both of Akron, O.

56,620 Tire. Patented November 16, 1920. Term 14 years. J. W. Mart, assignor to The Cascade Tire & Rubber Co.—both of Ravenna, O.
56,623 Tire tread. Patented November 16, 1920. Term 14 years. W. H. Paull, Birmingham, assignor to The Dunlop Rubber Co., Limited, London—both in England.
56,688 Tire. Patented November 30, 1920. Term 14 years. W. P. Braender, Passaic, N. J.
56,691 Tire. Patented November 30, 1920. Term 14 years. A. L. Breitenstein, Akron, assignor to The Ideal Tire & Rubber Co., Cleveland—both in Ohio.
56,712 Pneumatic-tired wheel for vehicles. Patented November 30, 1920. Term 7 years. R. Stock, Sandusky, O.
56,713 Pneumatic-tired wheel for vehicles. Patented November 30, 1920. Term 7 years. R. Stock, Sandusky, O.

THE DOMINION OF CANADA

4,924 Tire tread. Patented November 9, 1920. W. A. F. Oakley, Hamilton, Ont.
4,925 Tire tread. Patented November 9, 1920. H. Crowder, Toronto, Ont.
4,926 Tire. Patented November 9, 1920. H. H. Hastings, Toronto, Ont.
4,943 Tire tread. Patented November 23, 1920. Canadian Rockland Tire & Rubber Corporation, Limited, Toronto, Ont.

GERMANY

DESIGN PATENTS ISSUED, WITH DATES OF ISSUE

753,388 (September 16, 1920.) Rubber sole and heel. Victor Herkner, Blumenthalstrasse 28, Köln-on-the-Rhine.
753,903 (August 21, 1920.) Device for repairing rubber tubing. Chemische Fabrik Eugen Ganz, G.m.b.H., Frankfort-on-Main.
754,000 (August 30, 1920.) Stretchable rubber sole. August Ullrich, Kaiser Wilhelmstrasse 55, Mannheim-Neckarau.
754,183 (September 11, 1920.) Rubber sole with protector of solid material. Friedrich Theilmann, Waldstrasse 54, Frankfort-on-Main.
754,518 (September 29, 1920.) Rubber heel. Karl Forster, Pirmasens.
754,519 (September 29, 1920.) Rubber heel. Karl Forster, Pirmasens.
754,937 (August 12, 1920.) Cycle tire cover with steel band insertion. Josef Waltl, Daiserstrasse 20, München.
754,979 (September 18, 1920.) Rubber bottle stopper. G. D. Alfred Petersen, Wolfgangstrasse 147, Frankfort-on-Main.
755,188 (May 5, 1920.) Appliance for retaining compressed air in automobile tires. Rudolf Bartz, Jr., Fliethstrasse, München-Gladbach.

RUBBER TRADE INQUIRIES

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

(835) A rubber manufacturer desires to purchase a machine for testing belting and hose friction.

(836) We are asked where chlorinated rubber may be obtained.

(837) An inquiry for a simplified viscometer for rubber cements and solutions has been received.

(838) The address of the maker of an electric machine for cutting sheet rubber is requested.

(839) A reader requests the address of manufacturers of rubber composition polishing wheels.

(840) A rubber manufacturer desires to know where phenanthrene can be obtained.

(841) A subscriber asks for a list of concerns who either use or manufacture an electric cutter for cutting thin sheet rubber.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS

Addresses may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or from the following district or cooperative offices. Requests for each address should be on a separate sheet, and state number.

District Offices.	Cooperative Offices.
New York: 734 Customhouse.	Cleveland: Chamber of Commerce.
Boston: 1801 Customhouse.	Cincinnati: Chamber of Commerce; General Freight Agent, Southern Railway, 96 Ingalls Building.
Chicago: 504 Federal Building.	Dayton, Ohio: Dayton Chamber of Commerce.
St. Louis: 402 Third National Bank Building.	Los Angeles: Chamber of Commerce.
New Orleans: 1020 Hibernia Bank Building.	Philadelphia: Chamber of Commerce.
San Francisco: 307 Customhouse.	Portland, Oregon: Chamber of Commerce.
Seattle: 848 Henry Building.	

(34,086) A commercial agent in Spain desires to secure an agency for the sale of rubber, wire and electrical wares. Correspondence in French or Spanish.

(34,107) A manufacturing firm in Italy desires to secure an agency for the sale of raincoats, rubber shoes, and other rubber articles, chemical products, etc. Correspondence in Italian or French.

(34,114) A commercial agent in Bulgaria desires to secure an agency for the sale of rubber heels and elastic for congress gaiters. Quote c. i. f. port of Varna. Payment one-third in advance with order and two-thirds upon arrival of goods.

(34,134) An inquiry has been received from a man in England wishing to secure the representation of firms for the maintenance of a permanent exhibit of American goods, such as motor fittings for English motor cars, motor car trimmings, electrical goods, toys, dental goods, surgical goods, pens and accessories.

(34,154) A mercantile company in India desires to secure an agency and purchase rubber tires and tubes of good quality. Quote c. i. f. Karachi or Calcutta preferred, also f. o. b. American ports. Payment 60 days' sight draft through any exchange bank.

(34,164) The manager of a mercantile company in China is in the United States and desires to purchase and secure an agency for the sale of rubber goods.

(34,170) A commercial representative in Spain desires to secure an agency on commission for the sale of rubber articles. Correspondence in French or Spanish.

BRAZILIAN NOTES

The rubber firm of Alfredo Valle & Ca., Pará, that failed for 1,000:000$, operated with a fictitious capital of 50:000$, it is said. Surprise is expressed that such institutions as the Bank of Brazil, Mercantile Bank and Banco Ultramarino should have been successfully duped. It is reported that the firm in question gambled in exchange to the extent of 800:000$ and shipped large quantities of rubber by fraudulent means.

Reports from the rubber districts of Brazil claim that that industry is in danger of extinction owing to foreign manipulation. The Brazilian Congress has recently passed a law authorizing an issue of $8,000,000 in paper currency to be lent to the States in order that production may be increased. The currency has depreciated, in terms of American money, over 70 per cent. Labor troubles have been numerous.

Industria Brazileira de Borracha "Berrogain," Limitada, Rua Lima Barros, 71, Santo Christovão, Rio de Janeiro, Brazil, is the successor to Raul Berrogain, rubber manufacturer. Mr. Berrogain will continue as technical director of the new firm.

RUBBER EXPORTS FROM BAHIA

Exports of rubber through the port of Bahia, Brazil, during 1918 were 234 metric tons valued $112,775; during 1919, 301 metric tons were exported, valued $119,717. The following are the declared exports of rubber from Bahia to the United States during 1918 and 1919:

	1918		1919	
	Quantity	Value	Quantity	Value
Rubber:				
Mangabeira ....*pounds*	....	....	40,062	$11,778
Maniçoba	301,800	$77,155	517,885	101,364

FOREIGN TRADE MARKS

The *Diario Oficial* of Uruguay for August 19, 1920, contains notice of an application on August 12 by Juan and José Drysdale & Co., of Buenos Aires, for the registration of the trade mark "Sterling" for a large list of articles, including raw india rubber and rubber and the like in sheets, threads, pipes and tubes, and tents and awnings of waterproofed cloth. In Uruguay ownership of a trade mark is based on priority of registration. However, the owner may challenge its registration by a third party, but to secure annulment, evidence of prior use in Uruguay must be presented and this action taken within two years from the date of the filing of the trade mark. The right of action in such cases is expressly granted to owners of foreign trade marks.

Review of the Crude Rubber Market

NEW YORK

Other than frequent buying of small spot lots and occasional factory orders, the crude rubber market was dull and featureless during the past month. The market continues to be very unsettled with lower prices, not only here but in London and Singapore where futures are declining along with the New York spot and nearby market.

Low records were made for standard plantation rubber—16¾ cents for spot first latex crêpe and 16 cents for spot ribbed smoked sheets, while January-March deliveries for these grades were down to 17½ and 17 cents, respectively.

There are still heavy stocks of spot rubber, and mouldy plantation rubber continues to come into the market, where it sells for two, and sometimes three cents under the prices for spot standard quality. These lots are picked up by dealers who sort them, and by manufacturers who realize that good quality mouldy rubber is a bargain at these prices.

The market for Pará sorts has been practically lifeless, a low mark of 18 cents for upriver fine being recorded.

Crude rubber arrivals continue to fall. Imports for November, 1920, were 6,448 tons, compared with 15,674 tons last year. Total imports for the first eleven months of 1920 were 210,060 tons, compared with 201,557 tons for the same period in 1919. Curtailment of production has already begun at producing centers and if continued according to the plan of the Rubber Growers Association, United States imports of plantations in 1921 may be reduced to 160,000 tons.

Spot and future quotations in standard plantations and Brazilian sorts were as follows:

Plantations. December 1, first latex crêpe, 19 to 19½ cents; January-March, 22½ cents; April-June, 25 cents; July-December, 29 cents.

December 27, first latex crêpe, 16¾ cents; January-March, 17½ cents; April-June, 19 cents; July-December, 23½ cents.

December 1, ribbed smoked sheets, 18 to 18½ cents; January-March, 21½ cents; April-June, 23½ cents; July-December, 28 cents.

December 27, ribbed smoked sheets, 16 cents; January-March, 17½ cents; April-June, 18½ cents; July-December, 23 cents.

December 1, No. 1 amber crêpe, 16½ cents.

December 27, No. 1, amber crêpe, 14 cents.

December 1, No. 1, rolled brown crêpe, 14 cents.

December 27, No. 1, rolled brown crêpe, 11 cents.

South American Parás and Caucho. December 1, upriver fine, 20½ cents; islands fine, 19 cents; upriver coarse, 15 cents; islands coarse, 14 cents; Cametá coarse, 14 cents; caucho ball, 15 cents.

December 27, upriver fine, 18½ cents; islands fine, 18 cents; upriver coarse, 14 cents; islands coarse, 11½ cents; Cametá coarse, 12 cents; caucho ball, 10 to 14½ cents.

NEW YORK QUOTATIONS

Following are the New York spot quotations, for one year ago, one month ago, and December 27, the current date:

	January 1, 1920	December 1, 1920	December 27, 1920
PLANTATION HEVEA—			
First latex crêpe	$0.55 @	$0.19 @	$0.16¾ @
Amber crêpe No. 1	.53 @	.16½ @	.14 @
Amber crêpe No. 2	.52 @	.15½ @	.13 @
Amber crêpe No. 3	.51 @	.14½ @	.12 @
Amber crêpe No. 4	.49 @	.13½ @	.11 @
Brown crêpe, thick and thin	.49 @	.15 @	.10 @
Brown crêpe, specky	.45 @	.15 @.14½	.09 @
Brown crêpe, rolled	.43½ @	.14 @	.11 @
Smoked sheet, ribbed, standard quality	.55 @	.17½ @	.16 @
Smoked sheet, plain, standard quality	$0.50 @	$0.16 @	$0.15 @
Unsmoked sheet, standard quality	.48 @	.15 @	.14 @
Colombo scrap No. 1	.38 @	.13 @	.12 @
Colombo scrap No. 2	.36 @	.12 @	.11 @
EAST INDIAN—			
Assam crêpe	.49 @.50	@	@
Assam onions	@	@	@
Penang block scrap	.38½ @	@	.08 @
PONTIANAK—			
Banjermassin	.13 @	.07½ @	.08 @
Palembang	.14 @	.08 @	.08½ @
Pressed block	.24 @	.15½ @	.12½ @
Sarawak	.12 @	.07 @	.07½ @
SOUTH AMERICAN—			
PARAS—			
Upriver, fine	.50 @	.20 @.21	.18 @.18½
Upriver, medium	@	.17 @	.15 @.16
Upriver, coarse	.37 @	.15½ @	.14 @
Upriver, weak, fine	.40 @	.15 @.16	.14½ @
Islands, fine	.47 @	.19½ @	.18 @.18½
Islands, medium	.47 @.48	*.14 @	.15 @
Islands, coarse	.22 @	.14 @.14½	.11½ @
Cametá, coarse	.24 @.25	.14 @	.12 @
Madeira, fine	.51 @	.24 @.25	.23 @.24
Acre Bolivian, fine	.51 @.52	.20 @.21½	.18½ @.19
Peruvian, fine	.51 @	.18 @.19	.16 @.17
Tapajos, fine	.50 @	.19 @	.17½ @.18
CAUCHO—			
Upper caucho ball	.34½ @	.16 @.16½	.14½ @.15
Lower caucho ball	.29½ @	.10 @.10½	.10 @
MANICOBAS—			
Ceará negro heads	@	.14 @	*.12 @
Ceará scrap	@	.06 @	*.06 @
Manicoba, 30% guarantee	@	.11 @	*.10 @
Mangabeira thin sheet	@	.18 @	*.15 @
CENTRALS—			
Corinto scrap	.34½ @	.12 @	.12 @
Esmeralda sausage	.34½ @	.12 @	.12 @
Central scrap	.34 @	.12 @	.12 @
Central scrap and strip	.32 @	.10 @	.10 @
Central wet sheet	.23 @	.07 @	.08 @
Guayule, 20% guarantee	.28 @	*.20 @	*.20 @
Guayule, washed and dried	.38 @	*.30 @	*.30 @
AFRICANS—			
Niger flake, prime	.18 @	@	.15 @
Benguela, extra No. 1, 28%	@	@	@
Benguela, No. 2, 32½%	@	.09 @	.06½ @
Conakry niggers	@	@	@
Congo prime, black upper	.37 @	@	.14 @
Congo, prime, red upper	@	@	.08 @
Kassai, black	.37 @	@	@
Kassai, red	@	@	@
Massai sheets and strings	.40 @	@	@
Rio Nunez ball	.40 @	@	@
Rio Nunez sheets and strings	.40 @	@	@
GUTTA PERCHA—			
Gutta Siak	.27½ @	.17 @.18	.16 @.17
Red Macassar	2.60 @	2.25 @2.90	2.30 @3.00
BALATA—			
Block, Ciudad Bolivar	.59 @	.70 @	.62 @
Block, Colombia	.53 @	.47 @.48	.40 @
Block, Panama	.45 @	@	.30 @.35
Surinam sheet	.86 @	.72 @.73	.69 @
Surinam amber	.90 @	.80 @	.75 @

*Nominal.

RECLAIMED RUBBER

The point has been passed where the low price of crude rubber influences the demand for reclaimed. The warehouses of the reclaimers are heavily stocked with goods made on contracts and against which no requisitions are forthcoming for shipment to rubber manufacturers.

In many branches of the industry rubber factories are shut down completely, operating on half time or continuously at fractional capacity. This is true of those which are large users of reclaim as well as of tire makers, hence outlets for reclaims are virtually closed and the business is marking time. Nevertheless, the trade is hopeful of a marked revival of business early in the new year.

The following quotations are nominal and are the same as reported for November, 1920.

NEW YORK QUOTATIONS

DECEMBER 27, 1920

Prices subject to change without notice

STANDARD RECLAIMS

Floating	*$0.22	@$0.24
Friction	* .25	@ .30
Mechanical	* .11	@ .12
Shoe	* .14¾	@ .15½
Tires, auto	* .14½	@ .15
truck	* .12½	@ .13½
White	* .20	@ .21

*Nominal.

THE MARKET FOR COMMERCIAL PAPER

In regard to the market for crude rubber paper, Albert B. Beers, 1 Liberty street, New York City, advises as follows:

"During December demand for paper has been light, and almost entirely from out-of-town banks, which have been practically looking only for bargains, so that the best rubber names have ruled at about 9 per cent, and those not so well known 9½ per cent."

COMPARATIVE HIGH AND LOW NEW YORK SPOT RUBBER PRICES

	December					
	1920*		1919		1918	
PLANTATIONS						
First latex crêpe	$0.20	@$0.16¾	$0.55	@$0.51	$0.58	@$0.54
Smoked sheet ribbed	.19	@ .16	.55	@ .51	.56	@ .52
PARAS						
Upriver, fine	.21½	@ .18	.49	@ .47	.66	@ .62
Upriver, coarse	.15	@ .13¼	.36½	@ .35	.39½	@ .36½
Islands, fine	.19	@ .18	.48¼	@ .46¾	.57	@ .53
Islands, coarse	.14½	@ .11½	.22	@ .21	.24	@ .24¼
Cametá	.14	@ .11¾	.23½	@ .23	.26	@ .25

* Figured to December 26, 1920.

AMSTERDAM RUBBER MARKET

JOOSTEN & JANSSEN, Amsterdam, report [December 3, 1920]:

In the period under review one can speak at last of an actual rise, which, however, was not lasting. By good demand and rather big turnover, especially on all kinds of terminal deliveries, prices increased from 3 to 5 cents. Sheets enjoyed much attention at about 5 cents below crêpe.

In spot rubber hardly any business could be done owing to prices being too high. Holders did not make use of the temporary increase and prices fell back again, about 2 to 3 cents.

At the close, the market was steady and prices for crêpe and sheets are about 76 cents and 71 cents on the spot, 76 and 71 January—March, 82 and 76 April—June.

SINGAPORE RUBBER MARKET

GUTHRIE & CO., LIMITED, Singapore, report [November 4, 1920]:

The local rubber market declined rapidly over the week-end in sympathy with the depression in other markets where there has been an absence of trade demand and forced liquidation of heavy stocks by dealers. At the weekly auctions held yesterday the chief buyers were conspicuous by their absence, and something approaching a collapse in prices occurred. Demand was confined to a few Chinese buying to cover, and the bulk of the rubber offered had to be withdrawn. Standard ribbed smoked sheet sold up to 41½ cents per pound, a decline of 9 cents. Standard crêpe is not quoted, but four lots sold from 42 to 44 cents. Off quality crêpe and sheet was unsalable. Lower grades were freely sold, but at a considerable sacrifice in prices, the average decline being 7 to 10 cents.

Of 848 tons catalogd, only 186 tons were sold, the lowest sale on record. The following is the course of values:

	In Singapore per pound[1]			Sterling Equivalent per pound in London		
Sheet, fine ribbed smoked	38½c	@	41½c	1/ 1⅛	@	1/ 2
Sheet, good ribbed smoked	25	@	38	—/ 9¼	@	1/ 1
Crêpe, good pale	28	@	34	—/10⅝	@	1/ 0⅝
Crêpe, fine brown	26½	@	30½	—/10¼	@	—/11⅜
Crêpe, good brown	20	@	26	—/ 8⅜	@	—/10½
Crêpe, dark	17	@	23	—/ 7½	@	—/ 9¼
Crêpe, bark	15	@	21½	—/ 7	@	—/ 8⅞

[1] Quoted in Straits Settlements currency, $1 = $0.567 United States currency.

RUBBER EXPORTS FROM PENANG

	January 1 to November 2	
	1919	1920
To Great Britain ....piculs[1]	186,406	217,959
Europe	....	3,796
United States	110,637	142,176
Totals ....piculs	297,043	363,931

[1] One picul equals 133⅓ pounds.

CEYLON RUBBER IMPORTS AND EXPORTS

IMPORTS

	January 1 to November 8	
	1919	1920
Crude rubber:		
From Straits Settlements ....pounds	2,283,533	2,330,204
India	1,403,718	1,367,243
Burma and other countries	1,567	42,768
Totals ....pounds	3,688,818	3,740,215

EXPORTS

	1919	1920
Crude rubber:		
To United Kingdom ....pounds	24,216,628	35,748,868
Belgium	29,120	169,550
France	383,400	698,713
Germany	....	409,472
Netherlands	....	22,730
Italy	....	230,720
Norway	....	2,240
Spain	13	....
Australia	....	56
Victoria	98,755	286,836
United States	52,685,069	30,943,682
New South Wales	154,212	438,092
Canada and Newfoundland	668,294	425,600
India	2,649	2,176
Straits Settlements	454	44,800
Japan	267,427	204,730
Totals ....pounds	78,506,021	69,628,265

Compiled by the Ceylon Chamber of Commerce.

PLANTATION RUBBER EXPORTS FROM JAVA*

	September		Nine Months Ended September 30	
	1919	1920	1919	1920
To Netherlands ....kilos	582,000	319,000	1,564,000	3,451,000
Great Britain	905,000	1,192,000	5,687,000	6,297,000
Germany	....	....	....	70,000
France	39,000	....	215,000	11,000
Belgium	....	26,000	....	57,000
Other European destinations	....	....	....	....
United States	1,832,000	656,000	13,410,000	10,161,000
Singapore	593,000	224,000	4,074,000	3,194,000
Japan	1,000	....	181,000	184,000
Australia	....	....	245,000	190,000
Other countries	126,000	....	159,000	....
Totals ....kilos	4,078,000	2,417,000	25,535,000	23,615,000
Ports of origin:				
Tandjong Priok ....kilos	1,614,000	1,041,000	13,215,000	10,977,000
Samarang	85,000	43,000	431,000	346,000
Soerabaya	2,121,000	1,283,000	10,872,000	11,532,000

*August—figures 1919 and 1920 revised.

FEDERATED MALAY STATES RUBBER EXPORTS

An official report from Kuala Lumpur states that the exports of rubber from the Federated Malay States in the month of October amounted to 8,323 tons as compared with 7,604 tons in September and 8,381 tons in the corresponding month last year. The total export to the end of October was 88,585 tons as against 88,205 tons last year and 64,043 tons in 1918. Appended are the comparative statistics:

	1918	1919	1920
January ....tons	7,588	7,163	11,119
February	6,820	10,809	9,781
March	7,709	10,679	9,524
April	7,428	7,664	8,375
May	5,851	7,308	7,627
June	5,161	7,094	9,049
July	5,706	8,640	8,043
August	5,291	10,626	9,140
September	6,588	9,841	7,604
October	5,901	8,381	8,323
Totals ....tons	64,043	88,205	88,585

STRAITS SETTLEMENTS RUBBER EXPORTS

An official report from Singapore states that the exports of rubber from Straits Settlements ports in the month of October amounted to 9,882 tons, compared with 9,791 tons in September (transhipments 1,061 tons) and 8,338 tons in the corresponding month last year. The total export for ten months amounts to 110,602 tons as against 118,290 tons last year and 54,876 tons in 1918. Appended are the comparative statistics:

	1918	1919	1920
January ....tons	4,302	14,404	13,125
February	2,334	15,661	17,379
March	8,858	20,908	5,931
April	6,584	10,848	9,768
May	13,587	15,845	15,617
June	6,515	5,059	11,663
July	1,978	7,818	10,773
August	1,249	8,933	6,673
September	6,209	10,476	9,791
October	3,260	8,338	9,882
Totals ....tons	**54,876**	**118,290**	**110,602**

ANTWERP RUBBER ARRIVALS

DECEMBER 3. By the S. S. "Anversville," from the Congo.

Société Anonyme Bungé (Cie. du Congo belge)............... *kilos*	12,340
Société Anonyme Bungé (Cie. de l'N'Kémé & l'N'Kéni)..........	1,404
Société Anonyme Bungé (Plantation Lacourt)...................	1.640
Société Anonyme Bungé (Comptoir Colonial Belgika)	16.865
Société Anonyme Bungé (Grands Lacs)........................	8.476
Société Anonyme Bungé (Forminière).........................	9.430
Société Anonyme Bungé (Various)............................	13.370
Crédit Colonial & Commercial (Anc. L. & W. Van de Velde) (Cie. du Kassai)..	113,780
Various	18.736
Total .... *kilos*	196.041

Compiled by Grisar & Co., Antwerp.

CRUDE RUBBER ARRIVALS AT ATLANTIC AND PACIFIC PORTS AS STATED BY SHIPS' MANIFESTS

PARAS AND CAUCHO AT NEW YORK

	Fine	Medium	Coarse	Caucho	Pounds Totals
DECEMBER 1. By the S. S. "Michael," from Pará.					
General Rubber Co..........	....	....	....	....	40,180
Poel & Kelly................	80,754	....	12,371	33,306	126,431
H. A. Astlett & Co..........	58,570	....	14,060	24,600	97,230
Meyer & Brown, Inc.........	156,800	....	....	42,560	199,360
Various	....	....	....	....	268,088
DECEMBER 2. By the S. S. "Virgil," from Pará.					
Poel & Kelly................	43,007	2,212	9,200	5,404	59,823
DECEMBER 9. By the S. S. "Cavour," from Pará.					
Poel & Kelly................	33,544	1,347	5,893	....	40,784
DECEMBER 20. By the S. S. "Pennsylvania," from Montevideo.					
Neuss, Hesslein & Co........	78,988	....	....	....	78,988
Everett, Heaney & Co........	....	....	....	....	41,062
William Schall & Co.........	....	....	....	....	20,874

PLANTATIONS

(Figured 180 pounds to the bale or case)

	Shipment from:	Shipped to:	Pounds	Totals
NOVEMBER 22. By the S. S. "Akita Maru," at New York.				
Mitsui & Co., Limited..	Singapore	New York	57,780	
Fred Stern & Co.......	Singapore	New York	11,200	
Various	Telok Anson	New York	23,040	
Various	P't Sw't'nh'm	New York	30,060	
Various	Penang	New York	1,800	
The Goodyear Tire & Rubber Co.	Colombo	New York	126,000	
Chas. T. Wilson Co., Inc.	Colombo	New York	63,900	
Various	Colombo	New York	55,980	
Various	Singapore	New York	19,760	389,520
NOVEMBER 23. By the S. S. "Ningchow," at New York.				
Hood Rubber Co.......	Far East	Watertown	257,600	257,600
NOVEMBER 24. By the S. S. "West Amargosa," at New York.				
Fred Stern & Co.......	Singapore	New York	56,000	
Meyer & Brown, Inc....	Singapore	New York	11,200	
Various	Singapore	New York	515,460	582,660
NOVEMBER 24. By the S. S. "Valacia," at New York.				
Various	London	New York	180	180
NOVEMBER 29. By the S. S. "Teenkai," at New York.				
Fred Stern & Co........	Batavia	New York	125,440	
Various	Batavia	New York	26,200	
Various	Soerabaya	New York	117,720	269,360
NOVEMBER 29. By the S. S. "Ceylon Maru," at New York.				
L. Littlejohn & Co., Inc.	Colombo	New York	22,400	
Various	Colombo	New York	350,920	373,320
DECEMBER 4. By the S. S. "Rotterdam," at New York.				
Meyer & Brown, Inc....	Rotterdam	New York	22,400	22,400
DECEMBER 6. By the S. S. "Egremont Castle," at New York.				
William H. Stiles & Co.	Singapore	New York	145,600	
Meyer & Brown, Inc....	Singapore	New York	593,600	
E. S. Kuh & Valk Co..	Singapore	New York	9,900	
L. Littlejohn & Co., Inc.	Singapore	New York	479,813	
W. R. Grace & Co.....	Singapore	New York	88,380	
Aldens' Successors, Inc.	Singapore	New York	128,160	
Fred Stern & Co.......	Singapore	New York	271,040	
F. R. Henderson & Co..	Singapore	New York	187,020	
The Fisk Rubber Co....	Singapore	Chicopee Falls	67,200	
Poel & Kelly	Singapore	New York	144,360	
Eastern Rubber Co.....	Singapore	New York	375,840	
General Rubber Co.....	Singapore	New York	583,300	
X. W. Obalski & Co., Inc.	Singapore	New York	48,960	
Thos. A. Desmond & Co.	Singapore	New York	67,680	
Various	Singapore	New York	3,066,280	6,257,133
DECEMBER 6. By the S. S. "West Carnifax," at New York.				
East Asiatic Co., Inc....	Soerabaya	New York	17,280	
Meyer & Brown, Inc....	Singapore	New York	100,800	
W. R. Grace & Co......	Singapore	New York	174,240	
Innes & Co............	Singapore	New York	180	
A. C. Fox & Co........	Batavia	New York	55,980	
Fred Stern & Co.......	Batavia	New York	7,920	
Various	Batavia	New York	17,640	
Various	Singapore	New York	43,440	417,480
DECEMBER 6. By the S. S. "Grace Dollar," at New York.				
Hood Rubber Co.......	Far East	Watertown	92,828	92,828
DECEMBER 6. By the S. S. "Ajax," at New York.				
The Goodyear Tire & Rubber Co.	Penang	Akron	57,600	
Various	Penang	New York	293,580	
Poel & Kelly..........	Singapore	New York	20,160	
Baird Rubber & Trading Co.	Singapore	New York	24,300	
L. Littlejohn & Co., Inc.	Singapore	New York	201,600	
William H. Stiles & Co.	Singapore	New York	56,000	
Meyer & Brown, Inc...	Singapore	New York	89,600	
W. T. Sargent & Sons..	Singapore	New York	19,800	
Rogers-Pyatt Shellac Co.	Singapore	New York	79,020	
W. R. Grace & Co......	Singapore	New York	104,400	
Winter, Ross & Co.....	Singapore	New York	43,920	
Thos. A. Desmond & Co.	Singapore	New York	151,200	
General Rubber Co.....	Singapore	New York	945,180	
H. A. Astlett & Co......	Singapore	New York	112,000	
Rome Wire Co.........	Belawan-Deli	New York	11,160	
East Asiatic Co., Inc...	Belawan-Deli	New York	25,200	
J. Aron & Co..........	Belawan-Deli	New York	27,000	
Aldens' Successors, Inc.	Belawan-Deli	New York	21,600	
General Rubber Co.....	Belawan-Deli	New York	50,400	
Firestone Tire & Rubber Co.	Belawan-Deli	Akron	96,300	
The Fisk Rubber Co....	Singapore	Chicopee Falls	33,600	
Fred Stern & Co.......	Singapore	New York	56,000	
Various	Belawan-Deli	New York	369,180	
Various	Singapore	New York	361,300	3,250,100
DECEMBER 8. By the S. S. "Birmingham City," at New York.				
Fred Stern & Co.......	Medan	New York	22,400	
W. R. Grace & Co.....	Singapore	New York	138,600	
L. Littlejohn & Co., Inc.	Singapore	New York	29,700	
Thornett & Fehr, Inc...	Singapore	New York	201,600	
American Trading Co....	Singapore	New York	29,520	
Rogers-Pyatt Shellac Co.	Singapore	New York	111,060	
Meyer & Brown, Inc....	Singapore	New York	56,000	
Various	Singapore	New York	14,380	603,260
DECEMBER 17. By the S. S. "Langton Hall," at New York.				
L. Littlejohn & Co., Inc.	Singapore	New York	22,400	22,400
DECEMBER 18. By the S. S. "City of Dunkirk," at New York.				
Boston Insulated Wire & Cable Co............	Singapore	New York	4,140	
W. R. Grace &Co......	Singapore	New York	128,160	
Baird Rubber & Trading Co.	Singapore	New York	19,800	
Meyer & Brown, Inc....	Singapore	New York	56,000	
L. Littlejohn & Co., Inc.	Singapore	New York	336,000	
F. R. Henderson & Co..	Singapore	New York	122,580	
A. C. Fox & Co........	Singapore	New York	30,060	
Fred Stern & Co........	Singapore	New York	56,000	
Poel & Kelly...........	Singapore	New York	181,800	
Eastern Rubber Co.....	Singapore	New York	186,480	
Converse Rubber Shoe Co.	Singapore	New York	14,400	
Rogers-Pyatt Shellac Co.	Singapore	New York	64,260	
American Trading Co...	Singapore	New York	83,160	
Aldens' Successors, Inc..	Singapore	New York	93,960	
Mitsui & Co., Limited...	Singapore	New York	80,820	
General Rubber Co.....	Singapore	New York	1,829,880	
Thos. A. Desmond & Co.	Singapore	New York	40,320	
Thornett & Fehr, Inc....	Singapore	New York	116,820	
The Fisk Rubber Co....	Singapore	Chicopee F'ls	371,840	
Firestone Tire & Rubber Co.	Singapore	Akron	92,160	
Various	Singapore	New York	218,840	
Poel & Kelly..........	Malacca	New York	9,900	
Various	Malacca	New York	8,460	
Various	Teluk Anson	New York	24,300	
F. R. Henderson & Co..	Port Dickson	New York	23,940	
Various	Port Dickson	New York	9,540	
Various	Penang	New York	5,400	
Various	P. Swettenham	New York	3,240	4,212,260
DECEMBER 19. By the S. S. "Nieuw Amsterdam," at New York.				
Meyer & Brown, Inc....	Rotterdam	New York	22,400	
Various	Rotterdam	New York	26,100	48,500
DECEMBER 19. By the S. S. "Clan MacFadjen," at New York.				
Fred Stern & Co.......	Colombo	New York	4,220	
Meyer & Brown, Inc...	Cochin	New York	30,420	
Various	Cochin	New York	213,120	247,760

PLANTATIONS—Continued

	Shipment from:	Shipped to:	Pounds.	Totals.
December 20. By the S. S. "City of Hankow," at New York.				
Thornett & Fehr, Inc....	Colombo	New York	8,820	
Aldens' Successors, Inc.	Colombo	New York	5,040	
The Goodyear Tire & Rubber Co..........	Colombo	Akron	65,340	
Pacific Trading Corp. of America	Colombo	New York	28,800	
Poel & Kelly..........	Colombo	New York	54,180	
Fisk Rubber Co.........	Singapore	Chicopee Falls	33,600	
L. Littlejohn & Co., Inc.	Colombo	New York	56,260	
Various	Colombo	New York	822,500	1,074,540
December 20. By the S. S. "Aquarius," at New York.				
United States Rubber Co.	Singapore	New York	243,360	
Various	Colombo	New York	129,240	372,600

CENTRALS

November 22. By the S. S. "Colon," at New York.				
Ultramares Corp.	Cristobal	New York	1,200	1,200
November 25. By the S. S. "Caracas," at New York.				
Scholz & Co..........	Puerto Cabello	New York	5,250	5,250
December 1. By the S. S. "Esperanza," at New York.				
Various	Cristobal	New York	12,750	12,750
December 18. By the S. S. "Panama," at New York.				
C. W. Jacob & Allison..	Cristobal	New York	1,050	
G. Amsinck & Co., Inc.	Cristobal	New York	6,750	
Various	Cristobal	New York	1,950	9,750

AFRICANS

November 25. By the S. S. "Ryndam," at New York.				
Various	Rotterdam	New York	70,035	70,035
November 27. By the S. S. "Julia Luckenbach," at New York.				
Various	Rotterdam	New York	109,365	109,365
December 6. By the S. S. "Rotterdam," at New York.				
Various	Rotterdam	New York	56,350	56,350
December 8. By the S. S. "La Lorraine," at New York.				
The B. F. Goodrich Co..	Havre	New York	1,380	1,380
December 14. By the S. S. "Canada," at New York.				
Various	Marseilles	New York	115,000	115,000
December 16. By the S. S. "Soestdijk," at New York.				
Various	Rotterdam	New York	74,520	74,520

GUTTA SIAK

December 6. By the S. S. "Egremont Castle," at New York.				
Various	Singapore	New York	128,400	128,400

BALATA

November 22. By the S. S. "Colon," at New York.				
Isaac Brandon & Bros..	Cristobal	New York	1,500	1,500
November 27. By the S. S. "Meroke," at New York.				
Middleton & Co., Limited	Surinam	New York	1,930	
Wm. Schall & Co........	Dutch Guiana	New York	23,369	25,299
December 1. By the S. S. "Victoria," at New York.				
South & Central America Comm'l Co..........	Trinidad	New York	2,760	
Various	Trinidad	New York	12,840	15,600
December 1. By the S. S. "Vinton County," at New York.				
Mecke & Co..........	Cristobal	New York	2,760	
Pablo Calvet & Co......	Cristobal	New York	4,255	7,015
December 10. By the S. S. "Maturo," at New York.				
South & Central America Comm'l Co..	Port of Spain	New York	10,950	
G. Amsinck & Co., Inc..	Port of Spain	New York	15,000	25,950
December 20. By the S. S. "Quillota," at New York.				
Ultramares Corp.......	Guayaquil	New York	3,150	3,150

GUAYULE

November 26. By rail at Eagle Pass, Texas.				
Continental-Mexican Rubber Co.	Mexico	New York	55,000	55,000

CUSTOM HOUSE STATISTICS

PORT OF NEW YORK

IMPORTS

	October 1919		October 1920	
Unmanufactured—*free*	Pounds	Value	Pounds	Value
Crude rubber:				
From Belgium	18	$9	44,550	$10,264
France	903,765	277,812	....	....
Netherlands	424,224	202,338	51,546	24,993
England	8,757,468	4,314,311	143,246	43,648
Nicaragua	....	....	6,252	1,731
Honduras	1,885	575	....	....
Costa Rica........	856	348	....	....
Panama	15,024	5,356	....	....
Argentina	3,322	1,661	....	....
Mexico	8,216	2,417	10,712	1,835
Trinidad	4,351	2,200	....	....
Bolivia	79,959	25,808	375	145
Haiti	1,000	400	....	....
Brazil	2,941,514	1,302,557	2,369,369	576,346
Columbia	30,965	10,913	22,054	6,214
Jamaica	....	....	1,900	982
Ecuador	10,043	2,960	2,887	560
Peru	68,988	19,576	50,629	13,705
Uruguay	28,600	13,415	....	....
Venezuela	88,695	32,163	19,525	8,819
British India......	481,200	193,448	22,449	10,291
British Guiana	5,548	4,723	....	....
Straits Settlements.	13,685,973	5,507,611	11,307,078	4,501,293
British East Indies.	5,532,307	2,373,191	1,813,330	603,967
Dutch East Indies..	5,755,742	2,450,961	3,556,174	1,455,579
Philippine Islands..	32,013	11,000	....	....
Totals	38,861,676	$16,755,753	19,422,076	$7,260,372
Jelutong (Pontianak):				
From England	56,000	$10,080	....	....
Straits Settlements.	2,085,125	296,070	166,680	$17,270
Dutch East Indies..	388,928	75,427	131,342	19,427
Totals	2,530,053	$381,577	298,022	$36,697
Gutta percha:				
From England	995	$370	....	....
Straits Settlements.	412,290	73,039	94,837	$28,119
Dutch East Indies.	93,698	17,910	429,227	90,882
British W. Africa..	262,132	36,003	....	....
Totals	769,115	$127,322	524,064	$119,001
Balata:				
From England	9,077	$9,203	....	....
Ecuador	1,200	650	....	....
Colombia	31,842	10,595	2,667	$1,081
Panama	23,296	9,312	....	....
Brazil	....	....	770	616
Venezuela	21,190	7,053	19,353	12,284
Bolivia	....	....	4,296	2,638
French Guiana.....	....	....	46,285	34,940
British Guiana.....	32,509	21,665	14,190	7,178
Dutch Guiana......	29,414	26,110	24,456	14,179
Totals	148,528	$84,588	112,017	$72,916
Reclaimed and scrap rubber.	289,554	16,795	239,121	13,025
Totals unmanufactured.	42,598,926	$17,366,035	20,595,300	$7,502,011
Manufactures of rubber and gutta percha............	....	$43,345	....	$54,955
Guayule	124,223	18,595	....	....
Rubber substitutes...*dutiable*	....	....	15,620	3,385
Chicle ....*dutiable*	500,845	347,145	279,358	237,124
Totals	625,068	$409,085	294,978	$295,464

EXPORTS

	October 1919		October 1920	
	Pounds	Value	Pounds	Value
Manufactured:				
Automobile tires............	....	$2,027,789	....	$2,800,553
Inner tubes................	....	....	....	321,962
Solid tires................	....	....	....	118,140
All other tires............	....	138,164	....	55,257
Belting	....	295,421	....	172,812
Hose	....	....	....	258,773
Packing	....	....	....	125,174
Rubber boots..........*pairs*	15,761	27,414	8,623	25,268
Rubber shoes..........*pairs*	474,329	396,886	501,560	508,747
Soles and heels............	....	....	....	60,019
Druggists' sundries.........	....	78,889	....	105,607
Other rubber manufactures.	....	569,450	....	462,021
Totals, manufactured..	....	$3,534,013	....	$5,014,333
Insulated wire..............	....	$443,671	....	$493,671
Fountain pens.......*number*	25,789	33,850	51,292	57,785
Suspenders and garters.....	....	162,049	....	258,097
Chewing gum.............	....	190,565	....	154,696
Totals	....	$830,135	....	$964,249
Unmanufactured—*free:*				
Reclaimed and scrap rubber.	601,350	$78,864	425,601	$48,582

FOREIGN EXPORTS

Crude rubber	370,242	$148,226	1,008,721	$334,231
Balata	5,300	3,366	41,320	17,219
Rubber scrap..............	....	....	4,500	705
Rubber manufactures	....	19,364	....	3,107
Rubber substitutes	....	....	44,250	14,632

PORT OF BOSTON

IMPORTS

Unmanufactured—*free:*				
Crude rubber:				
From England	56,510	$31,221	....	....
Straits Settlements.	....	....	7,000	$2,503
British East Indies.	....	....	67,940	17,246
Totals	56,510	$31,221	74,940	$19,749
Rubber scrap and reclaimed.	....	....	14,883	$930
Rubber manufactures.*dutiable*	....	$3,567	....	2,217

EXPORTS

	October 1919 Pounds	Value	October 1920 Pounds	Value
Manufactured:				
Automobile tires	....	$1,115	....	$2,457
Inner tubes	....	....	....	552
Other tires	....	....	....	801
Belting	....	388	....	3,638
Hose	....	....	....	4,654
Packing	....	....	....	299
Rubber boots .... *pairs*	8,396	23,622	7,705	26,964
Rubber shoes .... *pairs*	94,245	71,114	106,910	110,219
Soles and heels	....	....	....	3,862
Druggists' sundries	....	1,932	....	12,245
Other rubber manufactures	....	13,981	....	13,144
Totals	....	$112,152	....	$178,835
Insulated wire	....	$14,086	....	$425
Suspenders and garters	....	13,127	....	17,337
Rubber scrap and reclaimed	8,907	855	....	....

PORT OF NEW ORLEANS

IMPORTS

	October 1919 Pounds	Value	October 1920 Pounds	Value
Manufactured—*free:*				
From Nicaragua	5,300	$1,375	2,000	$616
Totals	5,300	$1,375	2,000	$616

EXPORTS

	October 1919 Pounds	Value	October 1920 Pounds	Value
Manufactured:				
Automobile tires	....	$19,105	....	$138,237
Inner tubes	....	....	....	16,354
Solid tires	....	....	....	22,098
All other tires	....	135	....	7,636
Belting	....	1,228	....	9,068
Hose	....	....	....	24,309
Packing	....	....	....	1,255
Rubber boots .... *pairs*	....	....	50	212
Rubber shoes .... *pairs*	2,176	2,425	33,371	43,217
Soles and heels	....	....	....	3,241
Druggists' sundries	....	22	....	265
Other rubber manufactures	....	432	....	5,201
Totals	....	$23,347	....	$271,093
Insulated wire	....	$3,083	....	$16,599
Fountain pens .... *number*	60	89	13	31
Suspenders	....	128	....	11,569
Chewing gum	....	2,006	....	1,890

PORT OF SEATTLE

IMPORTS

	October 1919 Pounds	Value	October 1920 Pounds	Value
Unmanufactured—*free:*				
Crude rubber:				
From Straits Settlements	1,463,441	$599,642	....	....
Canada	2,063	1,001	360	$98
Hongkong	33,360	11,676	....	....
Japan	565,423	254,354	....	....
Totals	2,064,287	$866,673	360	$98
Rubber manufactures	....	$4	....	$30

EXPORTS

	October 1919 Pounds	Value	October 1920 Pounds	Value
Manufactured:				
Automobile tires	....	$9,114	....	$24,415
Inner tubes	....	....	....	4,034
Solid tires	....	....	....	3,928
All other tires	....	2,344	....	8
Belting	....	1,656	....	1,239
Hose	....	....	....	2,207
Packing	....	....	....	521
Rubber boots .... *pairs*	49	208	315	1,347
Rubber shoes .... *pairs*	2,875	4,255	810	1,497
Druggists' sundries	....	1,452	....	189
Other rubber manufactures	....	7,253	....	1,920
Totals	....	$26,282	....	$41,305
Insulated wire	....	$195	....	$562
Fountain pens .... *number*	....	205	1,327	1,858
Suspenders	....	545	....	1,112
Chewing gum	....	340	....	....
Reclaimed rubber	138,688	6,114	96,310	2,058

PORT OF SAN FRANCISCO

IMPORTS

	October 1919 Pounds	Value	October 1920 Pounds	Value
Unmanufactured—*free:*				
Crude rubber:				
From Straits Settlements	1,486,843	$597,562	840,940	$174,758
Dutch East Indies	64,054	19,740	....	....
Japan	....	....	22,400	6,224
Totals	1,550,897	$617,302	863,340	$180,982
Jelutong (Pontianak)	....	....	9,200	$736
Rubber manufactures	....	$846	....	473

EXPORTS

	October 1919 Pounds	Value	October 1920 Pounds	Value
Manufactured:				
Automobile tires	....	$48,694	....	$230,288
Inner tubes	....	....	....	31,359
Solid tires	....	....	....	14,010
All other tires	....	1,228	....	5,075
Belting	....	10,621	....	43,710
Hose	....	....	....	44,497
Packing	....	....	....	34,734
Rubber boots .... *pairs*	1,028	2,910	168	200
Rubber shoes .... *pairs*	3,220	2,949	4,258	4,960
Soles and heels	....	....	....	18,341
Druggists' sundries	....	1,814	....	6,608
Other rubber manufactures	....	7,588	....	25,443
Totals	....	$75,804	....	$459,225
Insulated wire	....	$1,212	....	$4,986
Fountain pens .... *number*	216	320	165	212
Suspenders	....	5,903	....	3,938
Chewing gum	....	782	....	1,964
Unmanufactured—*free:*				
Reclaimed and scrap rubber	2,000	75	....	....

EXPORTS OF INDIA RUBBER AND CAUCHO FROM MANAOS DURING SEPTEMBER, 1920

Exporters:	Europe Fine	Europe Medium	Europe Coarse	Europe Caucho	Europe Totals	New York Fine	New York Medium	New York Coarse	New York Caucho	New York Totals	Grand Totals
Stowell & Co. .... *kilos*	....	....	....	....	....	52,442	12,550	2,277	106,099	173,368	173,368
General Rubber Co. of Brazil	....	....	....	....	....	125,322	7,028	12,487	163	145,000	145,000
Tancredo, Porto & Co	....	....	....	....	....	101	11,133	4,848	30,795	46,877	46,877
J. Adonias & Co	....	....	....	....	....	....	1,000	....	....	1,000	1,000
Totals from Manáos .... *kilos*	....	....	....	....	....	177,865	31,711	19,612	137,057	366,245	366,245
In transit from Iquitos	8,074	4,491	2,436	9,156	24,157	26,132	22,617	16,835	13,286	78,870	103,027
Totals .... *kilos*	8,074	4,491	2,436	9,156	24,157	203,997	54,328	36,447	150,343	445,115	469,272

Compiled by Stowell & Co., Manáos, Brazil.

EXPORTS OF INDIA RUBBER AND CAUCHO FROM MANAOS DURING OCTOBER, 1920

Exporters	Europe Fine	Europe Medium	Europe Coarse	Europe Caucho	Europe Totals	New York Fine	New York Medium	New York Coarse	New York Caucho	New York Totals	Grand Totals
General Rubber Co. of Brazil. *kilos*	146,667	29,182	12,151	....	188,000	514,856	24,563	60,037	33,544	633,000	821,000
Stowell & Co	184,863	7,178	6,968	54,001	253,010	10,880	3,040	4,590	....	18,510	271,520
Tancredo, Porto & Co	11,831	15	98	5,065	17,009	37,087	13	10,513	13,220	60,833	77,842
B. Lévy & Co	....	....	....	....	....	28,841	1,752	4,172	7,584	42,349	42,349
Ohliger & Co	9,775	3,816	12,587	9,259	35,437	....	....	....	....	....	35,437
Higson & Fall	13,140	....	4,420	480	18,040	10,135	2,335	330	....	12,800	30,840
Semper & Co	4,160	326	5,959	254	10,699	....	....	....	....	....	10,699
Companhia Fluvial	4,948	....	284	1,472	6,704	....	....	....	....	....	6,704
Paulo Lévy & Co	1,356	118	37	....	1,511	....	....	....	....	....	1,511
Totals .... *kilos*	376,740	40,635	42,504	70,531	530,410	601,799	31,703	79,642	54,348	767,492	1,297,902

Compiled by Stowell & Co., Manáos, Brazil.

RUBBER STATISTICS FOR THE DOMINION OF CANADA

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	August			
	1919		1920	
	Pounds	Value	Pounds	Value
Unmanufactured—*free:*				
Rubber, gutta percha, etc.:				
From United Kingdom	256,494	$110,790	48,620	$22,092
United States	472,119	193,620	309,368	92,019
Brazil	....	....	40,000	13,000
British East Indies:				
Straits Settlements.	433,500	168,951	235,230	109,923
Other countries	500	177	66,498	36,676
Totals	1,162,613	$473,538	699,716	$273,710
Rubber, recovered	296,476	$49,307	509,455	$79,863
Rubber, powdered, and rubber or gutta percha scrap.....	345,885	19,790	40,340	4,844
Rubber substitutes	67,300	8,246	212,477	27,878
Totals unmanufactured..	1,872,274	$550,881	1,461,988	$386,295
Partly Manufactured—				
Hard rubber sheets and rods.	5,871	$1,991	7,911	$5,717
Hard rubber tubes...........	....	1,652	....	4,113
Rubber thread, not covered..	2,532	3,410	3,873	5,352
Totals, partly manufactured	8,403	$7,053	11,784	$15,182
Manufactured—				
Belting	....	$7,502	....	$13,002
Hose	....	7,667	....	13,946
Packing	....	6,498	....	7,964
Boots and shoes............	....	22,528	....	11,820
Clothing, including waterproofed	....	12,885	....	31,157
Gloves	....	787	....	1,045
Hot water bottles...........	....	858	....	731
Tires, solid	....	22,439	....	22,201
Tires, pneumatic	....	94,905	....	213,803
Tires, inner tubes...........	....	16,184	....	25,014
Other manufactures	....	187,350	....	283,051
Totals, manufactured....	....	$379,603	....	$623,734
Totals rubber imports...	....	$937,537	....	$1,025,211
Insulated wire and cables:				
Wire and cables covered with cotton, linen, silk, rubber, etc.	....	$12,283	....	$36,461
Copper wire and cables covered as above	....	9,300	....	68,246
Chicle	217,003	182,584	48,329	23,198

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS

	August			
	1919		1920	
	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
Unmanufactured—				
Crude and waste rubber.....	$24,366	$17,536	$25,275	....
Manufactured—				
Belting	$647	....	$9,615	....
Hose	11,602	....	23,518	....
Boots and shoes..	172,202	$187	72,937	....
Clothing. including waterproofed	3,889	12	2,398	....
Tires, pneumatic	724,474	....	898,146	....
Tires, other kinds..........	3,047	598	1,486	$515
Other manufactures	22,119	2,086	73,235	4,467
Totals, manufactured....	$937,980	$2,883	$1,081,335	$4,982
Totals, rubber exports...	$962,346	$20,419	$1,106,610	$4,982
Chicle	$114,151	....	....	....

RUBBER STATISTICS FOR THE DOMINION OF CANADA

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	September			
	1919		1920	
	Pounds	Value	Pounds	Value
Unmanufactured—*free:*				
Rubber, gutta percha, etc.:				
From United Kingdom.....	850,491	$374,266	932,357	$409,416
United States	468,858	194,954	774,341	236,986
British East Indies:				
Ceylon	30,651	17,098	14,442	5,484
Straits Settlements.	609,540	264,217	1,338,847	648,735
Totals	1,959,540	$850,535	3,059,987	$1,360,621
Rubber, recovered	180,642	$28,902	215,488	$35,590
Rubber, powdered, and rubber or gutta percha scrap......	220,572	16,498	526,972	51,402
Rubber substitutes	53,260	9,255	139,682	19,474
Totals, unmanufactured..	2,414,014	$905,190	3,942,129	$1,467,087
Partly Manufactured—				
Hard rubber sheets and rods..	5,977	$4,493	3,463	$2,525
Hard rubber tubes...........	....	3,211	....	2,492
Rubber thread, not covered..	3,469	5,080	1,696	2,382
Totals, partly manufactured	9,446	$12,784	5,159	$7,399
Manufactured—				
Belting	....	$10,449	....	$11,006
Hose	....	7,872	....	6,498
Packing	....	5,683	....	8,205
Boots and shoes............	....	40,106	....	50,238
Clothing, including waterproofed	....	14,629	....	16,129
Gloves	....	1,526	....	1,264
Hot water bottles...........	....	4,436	....	2,169
Tires, solid	....	14,869	....	16,036
Tires, pneumatic	....	105,857	....	140,825
Tires, inner tubes	....	7,759	....	16,174
Other manufactures	....	174,028	....	231,118
Totals, manufactured.....	....	$387,214	....	$499,662
Totals, rubber imports...	2,423,460	$1,305,188	3,947,288	$1,974,148
Insulated wire and cables:				
Wire and cables covered with cotton, linen, silk, rubber, etc.	....	$15,543	....	$12,581
Copper wire and cables, covered as above	....	13,363	....	28,901
Chicle	118,334	93,790	....	....

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS

	September			
	1919		1920	
	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
Unmanufactured—				
Crude and waste rubber.....	$52,653	$11,062	$13,896	....
Manufactured—				
Belting	$14,016	....	$3,675	....
Hose	17,983	....	18,176	....
Boots and shoes............	175,633	$593	99,064	$384
Clothing, including waterproofed	2,413	13	2,562	....
Tires	987	1,486	946	4,644
Tires, pneumatic	455,847	....	1,028,458	....
Other manufactures	17,549	1,113	46,034	5,649
Totals, manufactured	$684,428	$3,205	$1,198,915	$10,677
Totals, rubber exports....	$737,081	$14,267	$1,212,811	$10,677
Insulated wire and cable:				
Copper wires and cable.....	$221	....	$26,289	....
Chicle	1,941	....	1,728	....

UNITED STATES CRUDE RUBBER IMPORTS FOR 1920 (BY MONTHS)

1920	Plantations	Parás	Africans	Centrals	Guayule	Maniçoba and Matto Grosso	Balata	Miscellaneous Gum	Waste	Totals 1920	Totals 1919
January ....*tons*	17,799	2,620	821	111	....	....	....	....	....	21,351	7,235
February	29,681	2,456	558	265	34	....	....	....	....	32,994	17,456
March	28,533	2,463	514	23	114	3	113	983	1,252	33,998	28,223
April	21,036	1,893	628	29	79	10	22	812	448	24,957	28,146
May	24,443	2,025	662	95	113	....	45	1,059	224	28,666	16,348
June	12,911	1,352	427	27	164	....	7	552	164	15,604	16,319
July	14,695	1,115	34	40	....	....	8	1,283	312	17,487	17,965
August	12,730	590	13	75	156	....	67	1,135	300	15,066	11,067
September	10,974	459	99	8	74	22	44	516	218	12,414	14,036
October	8,759	1,613	27	17	223	....	33	498	425	11,595	28,888
November	13,049	2,230	351	44	....	....	68	27	608	16,377	15,674
Totals, 11 months, 1920....	194,610	18,816	4,134	734	957	35	407	6,865	3,951	230,509	....
Totals, 11 months, 1919....	170,385	24,880	2,895	1,288	1,478	431	....	....	....	....	201,357

Compiled by The Rubber Association of America, Inc.

EXPORTS OF INDIA RUBBER MANUFACTURES AND INSULATED WIRE AND CABLE FROM THE UNITED STATES BY COUNTRIES, DURING THE MONTH OF OCTOBER, 1920

EXPORTED TO—	Belting	Hose	Packing	Boots		Shoes		Soles and Heels	Automobile Tires				Insulated Wire and Cables	Druggists' Rubber Sundries	All Other Manufactures of Rubber	Totals
	Value	Value	Value	Pairs	Value	Pairs	Value	Value	Casings Value	Inner Tubes Value	Solid Tires Value	All Others Value	Value	Value	Value	Value
EUROPE:																
Austria									$20,566	$1,708						$22,274
Azores and Madeira Islands									60		$180					240
Belgium						600	$992		132,011	16,521			$3,895		$600	154,019
Bulgaria						2,712	3,918		400	142						4,460
Denmark	$4,480		$149	872	$3,270	34,708	29,311		20,216	796	4,200		1,425		1,620	65,467
Finland	3,351					31,800	37,272		5,620	1,800						48,043
France	7,784	180	5,340			14,036	9,934		31,468	708			25,434	$183	41,910	122,941
Germany		38							4,920	1,152				280		6,408
Gibraltar									1,016	128		$18				1,144
Greece	303							$136	40,707	11,058			2,511	344	12,855	67,914
Italy		12	250			6,432	5,000	336	147,621	10,808	346		11,560	480	6,742	183,155
Malta, Gozo and Cyprus Islands						360	378		1,500					44		1,922
Netherlands	474	9,143				18,120	14,541	67	178,700	59,098		937	27,094	3,592	5,052	298,698
Norway	4,063	8,988	104			102,914	92,641		45,463	8,054	27,404	2,343	17,709	1,536	7,109	215,414
Poland and Danzig						1,008	1,206		4,800							6,006
Portugal	120								30,050	73	95		3,453	1,775	1,162	36,728
Roumania		3,167							30,209	336						33,712
Russia in Europe				8	32				516	71				360	150	1,129
Spain	1,800	1,471	109			21,772	21,261	906	142,571	14,426	880	59	1,997	12,984	8,429	206,893
Sweden	4,082	2,673	656	204	612	720	700		20,499	633	300	3,896	7,785	445	2,618	44,899
Switzerland	966					16,207	17,549		10,721	2,122			515		3,853	35,726
Turkey in Europe		258				50,303	62,146		288	50					282	63,024
England	13,217	44,969	8,421	2,484	8,690	55,533	51,733	5,994	338,435	19,476		1,836	37,440	12,602	70,379	613,192
Scotland	3,557		496	1,428	3,825	12,948	11,578		3,511						3,311	26,278
Ireland						980	790	2,540	127						2,414	5,871
Yugoslavia, Albania, etc									1,500	1,509						3,009
TOTALS, EUROPE	$44,197	$70,899	$15,525	4,996	$16,429	371,153	$360,950	$9,979	$1,213,495	$150,669	$33,405	$9,089	$140,818	$34,625	$168,486	$2,268,566
NORTH AMERICA:																
Bermuda		$170		39	$128	738	$1,035	$105				$287	$1,258	$143	$203	$3,329
British Honduras		20	$28			2,014	3,299		$837	$247				6	27	4,464
Canada	$24,481	23,456	9,868	8,637	32,198	10,094	23,840	161	165,951	28,268	$6,327	202	29,519	25,831	169,845	539,947
Costa Rica		310	66					358	610	37	542	24	1,448	1,055	784	5,234
Guatemala	1,945	93	1,189			479	754	1,433	2,263	2,147	59	653	429	22	324	11,311
Honduras	1,745	1,205	791			235	305	274	513	55	254		1,046	253	1,549	7,990
Nicaragua	899		336	50	212	280	372	1,484	4,831	277	482		2,196	58	791	11,938
Panama	1,496	7,141	263	28	102	2,589	4,428	3,400	18,004	3,568	10,491	8,328	30,727	543	2,993	91,484
Salvador	242	26	95	168	200			4,659	4,991	1,185	352	342	8,300	792	310	21,494
Mexico	38,911	81,116	34,716	11	46	24,798	26,774	1,907	167,350	23,392	10,317	2,182	56,911	9,450	51,707	504,779
Miquelon, Langley, etc				600	2,172	192	165									2,337
Newfoundland and Labrador	381	250		4,767	16,841	729	388	728	575			879			1,692	21,734
Barbados						681	1,164	315	3,847	606			469	3	163	6,567
Jamaica	284	1,514	725			6,165	8,868	1,457	34,413	2,764	5,274	269	591	358	1,220	57,737
Trinidad and Tobago	194	365	1,039			6,661	6,674		10,256	4,323	720		1,260	250	986	26,067
Other British West Indies	476	191	3			1,422	1,462	5	25,848	2,628	296	513	709	96	352	32,579
Cuba	19,007	50,199	35,369	12	85	84,753	84,179	16,933	491,632	58,781	11,865	14,803	63,302	30,837	50,202	927,194
Virgin Islands of United States		1,471	109			639	1,065	560	2,300	672				59	15	6,251
Dutch West Indies	13	23	13			2,073	2,483	5	997	136				114	65	3,849
French West Indies	1,415	518	20						3,874	590	2,595		1,674		35	10,721
Haiti	13	98				487	742	3,411	8,650	1,761			388	58	374	15,495
Dominican Republic	1,078	847	543			2,824	3,664	319	24,740	1,773	2,456	887	12,874	1,265	2,722	53,168
TOTALS, NORTH AMERICA	$92,580	$169,013	$85,173	14,312	$51,984	147,853	$171,661	$37,514	$972,482	$133,210	$52,030	$29,369	$213,101	$71,193	$286,359	$2,365,669
OCEANIA:																
Australia	$1,212	$5,846	$3,478	384	$1,576	2,463	$2,178	$24	$159,885	$15,152	$8,780	$6,256	$3,492	$7,064	$19,015	$233,958
New Zealand	11,544	6,305	2,805	144	1,142	1,942	2,551	4,079	167,951	9,666	15,201	2,531	16,442	1,935	26,591	268,743
Other British Oceania						226	402		643	63						1,108
French Oceania	86	38				1,580	2,211		1,115	215		61		75		3,801
Other Oceania															42	42
Philippine Islands	12,702	9,697	15,591			22,747	32,132	21,320	195,255	31,511	11,281	12,554	14,799	3,131	19,556	379,529
TOTALS, OCEANIA	$25,544	$21,886	$21,874	528	$2,718	28,958	$39,474	$25,423	$524,849	$56,607	$35,262	$21,402	$34,733	$12,205	$65,204	$887,181
SOUTH AMERICA:																
Argentina	$6,940	$5,766	$2,685			14,440	$14,969	$900	$196,511	$20,865	$3,405	$4,698	$7,161	$6,174	$38,827	$308,901
Bolivia	1,282	108		19	$93	7	9		3,712	189			150	91	358	5,992
Brazil	20,797	15,994	2,356	7	35	18,140	18,954	6,101	153,278	17,156	674	9	54,131	6,726	20,924	317,135
Chile	22,412	17,319	1,661			3,543	3,908	17	43,232	7,981	1,201	1,496	40,786	2,217	14,399	156,629
Colombia	594	2,260	891			1,746	2,065	421	10,847	2,400	2,416	89	9,796	4,427	5,604	41,810
Ecuador		1,419	858			1,352	1,530	700	4,545	1,090		195	336	1,023	904	12,600
British Guiana		230				6,260	9,141		1,257	125	50		135	48	674	11,660
Dutch Guiana		124							144						6	274
French Guiana									75							75
Paraguay	163												336			499
Peru	1,917	9,206	5,555	324	2,699	120	167		20,755	3,570		273	25,181	1,223	3,547	74,093
Uruguay		1,518				3,312	2,671	2,213	31,398	7,400			175	1,231	5,289	51,895
Venezuela	2,096	968	451			96	108	581	24,998	3,976	249		7,899	3,209	3,292	47,827
TOTALS, SOUTH AMERICA	$56,201	$54,912	$14,457	350	$2,827	49,016	$53,522	$10,933	$490,752	$64,752	$7,995	$6,760	$146,086	$26,369	$93,824	$1,029,390

EXPORTED TO—	Belting Value	Hose Value	Packing Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Soles and Heels Value	Automobile Tires: Casings Value	Automobile Tires: Inner Tubes Value	Automobile Tires: Solid Tires Value	All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
ASIA:																
China	$4,238	$1,581	$296	36	$200	1,944	$2,167	$806	$38,625	$1,830	$150	$134	$34,080	$3,441	$4,524	$92,072
Chosen	187	......	......	......	......	......	......	......	......	......	......	32	......	......	......	219
British India	790	804	2,356	......	......	4,403	6,874	39	118,060	14,036	8,000	......	1,123	3,972	6,976	163,030
Straits Settlements	......	1,276	......	......	......	4,633	5,213	......	27,885	3,364	12,174	......	50	2,259	1,808	54,029
Other British East Indies	......	......	......	......	......	480	616	......	9,431	682	......	......	......	......	153	10,882
Dutch East Indies	......	28,037	1,739	......	......	387	515	......	83,707	2,010	10,835	3,636	1,839	578	1,825	134,721
French Indo China	10,460	......	......	......	......	......	......	......	......	......	......	......	......	......	73	10,533
Hongkong	......	......	362	......	......	744	1,358	......	1,851	1,184	1,752	......	......	26	2,310	8,843
Japan	3,116	8,925	14,309	4,740	8,812	23,830	25,307	121	4,648	168	......	88	1,943	292	6,420	74,149
Persia	......	......	......	......	......	16,674	12,000	......	2,459	550	......	......	......	......	......	15,009
Russia in Asia	......	......	......	......	......	......	......	......	......	......	......	......	......	......	27	27
Siam	263	......	......	......	......	224	230	......	......	......	......	157	......	......	......	650
Turkey in Asia	......	137	......	......	......	10,219	12,447	572	9,957	2,418	......	......	......	57	410	25,998
TOTALS, ASIA	$19,054	$40,760	$19,062	4,776	$9,012	63,538	$66,727	$1,538	$296,623	$26,242	$32,911	$4,047	$39,035	$10,625	$24,526	$590,162
AFRICA:																
British West Africa	......	$34	......	......	......	126	$242	......	$35,922	$4,833	$434	$45	......	......	$100	$41,610
British South Africa	$46,382	37,268	$26,312	......	......	5,968	6,276	$437	226,409	20,865	2,816	1,321	$696	$1,097	52,147	422,026
British East Africa	......	......	......	......	......	336	322	......	13,564	970	222	......	189	5	66	15,338
Canary Islands	......	......	......	......	......	......	......	......	......	......	......	......	......	65	92	157
French Africa	......	......	......	......	......	......	......	......	503	20	560	......	383	......	1,955	3,421
Kamerun, etc.	......	3,366	......	......	......	......	......	......	......	......	......	......	......	......	......	3,366
Morocco	......	......	......	......	......	......	......	......	2,088	......	......	......	......	......	......	2,088
Portuguese Africa	......	1,266	573	......	......	......	......	......	644	34	......	......	......	......	159	2,676
Egypt	......	220	......	......	......	......	......	956	12,488	1,288	1,697	......	......	......	192	16,841
TOTALS, AFRICA	$46,382	$42,154	$26,885	......	......	6,430	$6,840	$1,393	$291,618	$28,010	$5,729	$1,366	$1,268	$1,167	$54,711	$507,523
TOTAL	$283,958	$399,624	$182,976	24,962	$82,970	666,948	$699,174	$86,780	$3,789,819	$459,490	$167,332	$72,033	$575,041	$156,184	$693,110	$7,648,491

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORY OF UNITED STATES

	Belting, Hose and Packing Value	Boots and Shoes Pairs	Boots and Shoes Value	Tires: Automobile Value	Tires: All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
Hawaii	$34,145	......	......	$147,748	$5,764	......	......	$26,442	$214,099
Porto Rico	7,747	......	......	139,299	635	......	......	85,050	232,731
TOTALS	$41,892	......	......	$287,047	$6,399	......	......	$111,492	$446,830

Compiled by the Bureau of Foreign Commerce, Department of Commerce, Washington, D. C.

OFFICIAL INDIA RUBBER STATISTICS FOR THE UNITED STATES

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	September 1919 Pounds	1919 Value	1920 Pounds	1920 Value
UNMANUFACTURED—*free:*				
India rubber:				
From France	46,086	$31,576	....	....
Netherlands	....	....	307,383	$141,036
United Kingdom	2,923,810	1,237,056	947,073	338,454
Canada	42,930	19,555	....	....
Central America	46,198	14,888	4,124	901
Mexico	39,353	12,232	....	....
Brazil	8,147,297	2,495,311	1,509,440	410,832
Peru	79,177	32,108	233,993	60,835
Other South Am.	291,289	133,448	135,633	36,990
British E. Indies	14,091,078	5,588,391	17,558,092	7,048,561
Dutch E. Indies	4,359,356	1,739,439	5,977,766	2,423,550
Other countries	726,248	145,455	1,210,244	496,686
Totals	30,792,822	$11,449,459	27,883,748	$10,957,854
Balata	180,335	$123,654	894,115	$380,143
Guayule	....	....	235,000	47,000
Jelutong (Pontianak)	1,275,699	145,165	466,480	72,155
Gutta percha	56,666	14,160	308,389	51,207
Rubber scrap	976,924	72,872	854,736	42,046
Totals, unmanufactured	2,489,624	$355,851	2,758,720	$592,551
Chicle (dutiable)	503,032	343,497	257,938	170,774
MANUFACTURED—*dutiable:*				
India rubber and gutta percha	....	224,812	....	245,017
India rubber substitutes	112	98	....	....

EXPORTS OF DOMESTIC MERCHANDISE

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
MANUFACTURED—				
India rubber:				
Scrap and old	1,340,082	$126,083	506,420	$31,466
Reclaimed	286,039	48,840	563,742	96,754
Belting[1]	....	414,814	....	258,065
Hose[1]	....		....	319,445
Packing[1]	....		....	136,375
Boots[1] ... *pairs*	28,542	75,659	26,489	92,216
Shoes[1] ... *pairs*	702,744	631,150	851,191	819,853
Soles and heels[1]	....	....	....	77,494
Tires:				
For automobiles[1]	....	2,120,477	....	....
Casings[1]	....		....	3,883,923
Inner tubes[1]	....		....	446,352
Solid tires[1]	....		....	271,572
All other tires[1]	....	136,907	....	78,597
Druggists' rubber sundries[1]	....	108,929	....	137,400
Suspenders and garters	....	239,224	....	409,542
Other rubber manufactures[1]	....	650,809	....	613,921
Totals, manufactured	....	$4,552,892	....	$7,672,975
Fountain pens ... *number*	47,971	$43,816	19,018	$25,772
Insulated wire and cables[1]	....	91,881	....	95,986

EXPORTS OF FOREIGN MERCHANDISE

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
UNMANUFACTURED—				
India rubber	503,587	$219,675	1,339,013	$395,374
Balata	3,712	2,789	17,920	13,762
Jelutong (Pontianak)	....	....	2,240	582
Rubber scrap	....	....	1,630	425
Totals, unmanufactured	507,299	$222,464	1,360,803	$410,143
MANUFACTURED—				
Gutta percha	....	$5,546	....	$2,071
Totals, manufactured	....	$5,546	....	$2,071

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
MANUFACTURED—				
To Alaska:				
Belting, hose and packing	....	$5,561	....	$8,708
Boots and shoes.. *pairs*	5,882	14,483	5,153	17,001
Other rubber goods	....	6,491	....	10,221
Totals	....	$26,535	....	$35,930
To Hawaii:				
Belting, hose and packing	....	$3,540	....	$10,262
Automobile tires	....	86,649	....	88,807
Other tires	....	1,043	....	3,742
Other rubber	....	13,880	....	12,992
Totals	....	$105,112	....	$115,803
To Porto Rico:				
Belting, hose and packing	....	$4,703	....	$7,400
Automobile tires	....	82,454	....	75,107
Other tires	....	468	....	2,358
Other rubber goods	....	16,807	....	31,251
Totals	....	$104,432	....	$116,116

To Philippine Islands—treated as foreign commerce.

[1]Details of exports of domestic merchandise by countries during September, 1920, were given on pages 224-225 of our December issue.

RUBBER STATISTICS FOR ITALY

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	Six Months Ended June			
	1919		1920	
	Quintals[1]	Lire[2]	Quintals	Lire
Unmanufactured—				
Crude rubber and gutta percha—raw and reclaimed:				
From Great Britain	......		185	
French Asian Colonies	97		2,075	
India and Ceylon	18,101		3,659	
Straits Settlements	24,948	60,867,450	15,119	30,552,950
French African Colonies	2,487		578	
Belgian Congo	574		1,184	
Brazil	16,948		9,075	
Other countries	916		286	
Totals	64,071	60,867,450	32,161	30,552,950
Rubber scrap	8,584	1,287,600	136	20,400
Totals, unmanufactured	72,655	62,155,050	32,297	30,573,350
Manufactured—				
India rubber and gutta percha—				
Threads	152	440,800	197	571,300
Sheets, including hard rubber	98	197,400	90	177,900
Tubes	88	125,450	114	242,500
Belting	254	419,100	489	806,850
Rubber-coated fabrics ....*pieces*	343	731,000	489	952,600
Boots and shoes ....*pairs*	12,980	259,600	75,578	1,511,560
Elastic webbing	247	839,800	282	958,800
Clothing and articles for travel	2	8,000	114	45,600
Tires and tubes—				
From Belgium	......		632	
France	2,729		2,485	
Great Britain	461	8,940,400	4,067	23,377,200
United States	2		1,140	
Other countries	1		25	
Other manufactures	10,010	18,828,100	11,844	22,105,300
Totals, manufactured	......	30,789,650	....	50,749,610
Total imports	......	92,944,700	....	81,322,960

EXPORTS OF CRUDE AND MANUFACTURED RUBBER.

	Quintals[1]	Lire[2]	Quintals	Lire
Unmanufactured—				
India rubber and gutta percha—raw and reclaimed:				
To Austria	......		300	
Spain	1,922	1,646,000	622	1,892,500
United States	1,370		2,340	
Other countries	......		523	
Totals	3,292	1,646,000	3,785	1,892,500
Rubber scrap	100	20,000	5,638	1,127,600
Totals, unmanufactured	3,392	1,666,000	9,423	3,020,100
Manufactured—				
India rubber and gutta percha—				
Threads	180	558,000	194	601,400
Sheets, including hard rubber	49	108,200	196	356,800
Tubes	487	711,150	940	1,207,550
Belting	95	199,500	....	....
Rubber-coated fabrics ....*pieces*	98	294,000	203	602,600
Boots and shoes ....*pairs*	......	....	445	8,900
Other footwear	......	....	2	3,000
Elastic webbing	363	1,379,400	747	2,838,600
Clothing and articles for travel	4	20,000	291	1,455,000
Tires and tubes—				
To Austria	50		1,407	
Belgium	700		830	
Czecho-Slovakia	252		546	
Denmark	84		981	
France	225		1,256	
Great Britain	1,644		6,336	
Netherlands	28		366	
Rumania	......		670	
Spain	261	15,177,500	346	66,510,000
Switzerland	13		362	
Hungary	......		233	
India and Ceylon	545		3,637	
Netherland East Indies	......		1,444	
Straits Settlements	140		1,436	
Australia	242		611	
Argentina	635		1,854	
Brazil	462		1,405	
Other countries	790		2,888	
Other manufactures	940	1,771,800	6,755	12,474,000
Total, manufactured	......	20,219,550	....	86,057,850
Total exports	......	21,885,550	....	89,077,950

[1]One quintal equals 220.46 pounds.
[2]One lira equals $0.193 (normal).

RUBBER STATISTICS FOR ITALY

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	Five Months Ended May			
	1919		1920	
	Quintals[1]	Lire[2]	Quintals	Lire
Unmanufactured—				
Crude rubber and gutta percha—raw and reclaimed:				
From Great Britain	.....		169	
India and Ceylon	18,101		3,241	
Straits Settlements	23,131		6,577	
French African Colonies	1,425	56,370,150	578	18,546,850
Belgian Congo	574		875	
Brazil	15,190		5,783	
Other countries	916		2,300	
Totals	59,337	56,370,150	19,523	18,546,850
Rubber scrap	988	148,200	136	20,400
Totals, unmanufactured	60,325	56,518,350	19,659	18,567,250
Manufactured—				
India rubber and gutta percha—				
Threads	123	356,700	156	452,400
Sheets, including hard rubber	86	167,400	60	109,700
Tubes	75	104,150	82	193,100
Belting	178	293,700	330	544,500
Rubber-coated fabrics..*pieces*	260	561,600	370	715,600
Boots and shoes....*pairs*	12,043	240,860	58,106	1,162,120
Elastic webbing	89	302,600	186	632,400
Clothing and articles for travel	1	4,000	105	420,000
Tires and Tubes—				
From Belgium	......		632	
France	2,283		1,806	
Great Britain	298	7,229,600	2,358	15,640,800
United States	......		782	
Other countries	1		8	
Other goods	7,584	14,285,600	8,385	15,611,500
Totals, manufactured	......	23,546,210	....	35,482,120
Total imports	......	80,064,560	....	54,049,370

EXPORTS OF CRUDE AND MANUFACTURED RUBBER

	Quintals[1]	Lire[2]	Quintals	Lire
Unmanufactured—				
India rubber and gutta percha—raw and reclaimed:				
To Austria	......		300	
Spain	1,830	1,480,500	468	1,459,500
United States	1,131		1,867	
Other countries	......		284	
Totals	2,961	1,480,500	2,919	1,459,500
Rubber scrap	......	....	3,839	767,800
Totals, unmanufactured	2,961	1,480,500	6,758	2,227,300
Manufactured—				
India and rubber gutta percha—				
Threads	137	424,700	153	474,300
Sheets, including hard rubber	41	92,300	121	224,300
Tubes	341	492,350	689	864,600
Belting	94	197,400	....	....
Rubber-coated fabrics....*pieces*	56	168,000	109	320,600
Boots and shoes....*pairs*	......	....	445	8,900
Other footwear	......	....	1	1,500
Elastic webbing	320	1,216,000	562	2,135,600
Clothing and articles for travel	1	5,000	202	1,010,000
Tires and tubes:				
To Austria	50		1,195	
Belgium	698		475	
Czecho-Slovakia	......		468	
Denmark	76		620	
France	170		701	
Great Britain	1,493		4,540	
Netherlands	28		222	
Rumania	......		610	
Spain	7		139	
Switzerland	7	11,882,500	325	46,387,500
Hungary	......		216	
India and Ceylon	488		2,586	
Dutch East Indies	......		1,444	
Straits Settlements	140		925	
Australia	241		406	
Argentina	431		1,407	
Brazil	419		1,259	
Other countries	505		1,021	
Other rubber goods	741	1,399,600	4,447	8,282,000
Totals, manufactured	......	15,877,850	......	59,709,300
Total exports	......	17,358,350	......	61,936,600

[1] One quintal equals 220.46 pounds.
[2] One lira equals $0.193 (normal).

UNITED KINGDOM RUBBER STATISTICS

IMPORTS

	October 1919		October 1920	
	Pounds	Value	Pounds	Value
UNMANUFACTURED—				
Crude rubber:				
From—				
Straits Settlements	7,831,900	£809,345	8,011,000	£602,390
Federated Malay States	9,999,400	1,009,367	6,699,800	523,362
British India	253,100	25,178	747,100	56,787
Ceylon and dependencies	1,537,000	160,225	5,403,300	417,758
Other Dutch possessions in Indian Seas	1,444,300	144,863	996,600	79,818
Dutch East Indies (except other Dutch possessions in Indian Seas)	379,800	41,749	811,800	58,209
Other countries in the East Indies and Pacific not elsewhere specified	511,700	50,908	300,400	22,971
Brazil	437,500	44,823	1,462,600	104,272
Peru	111,400	11,040	....	....
South and Central America (except Brazil and Peru)	74,500	7,756	86,200	6,105
West Africa:				
French West Africa	....	....	9,500	602
Gold Coast	9,400	607	34,[illegible]00	2,904
Other parts of West Africa	25,500	1,935	40,400	2,560
East Africa (including Madagascar)	94,200	8,956	69,200	5,189
Other countries	198,300	18,198	58,900	4,236
Totals	22,908,000	£2,334,950	24,731,000	£1,887,163
Waste and reclaimed rubber	689,400	21,271	571,400	13,331
Totals, unmanufactured	23,597,400	£2,356,221	25,302,400	£1,900,494
Gutta percha and balata	1,615,400	£290,895	363,100	£113,439
*Rubber substitutes	....	....	13,300	777
MANUFACTURED—				
Boots and shoes...*dozen pairs*	20,805	£33,731	27,627	£77,443
Waterproofed clothing	....	3,506	....	2,257
Insulated wire	....	381	....	1,626
Submarine cables	....	38	....	....
Tires and tubes	....	208,296	....	488,580
Other rubber manufactures	....	58,001	....	81,466

EXPORTS

	October 1919		October 1920	
	Pounds	Value	Pounds	Value
UNMANUFACTURED—				
Waste and reclaimed rubber	1,120,900	£26,431	910,200	£24,474
Rubber substitutes	....	....	136,800	6,269
Totals	1,120,900	£26,431	1,047,000	£30,743
MANUFACTURED—				
Boots and shoes..*dozen pairs*	14,981	£32,736	17,593	£40,774
Waterproof clothing	....	189,365	....	278,589
Insulated wire	....	81,709	....	149,492
Submarine cables	....	46,292	....	144,411
Tires and tubes	....	300,238	....	504,053
Other rubber manufactures	....	228,289	....	425,435

EXPORTS—COLONIAL AND FOREIGN

	October 1919		October 1920	
	Pounds	Value	Pounds	Value
UNMANUFACTURED—				
Crude rubber:				
To Russia	....	....	1,000	£94
Sweden, Norway and Denmark	457,800	£52,062	93,700	8,303
Germany	961,400	84,083	1,218,000	84,536
Belgium	498,400	48,141	128,900	11,207
France	1,688,900	175,095	1,037,300	84,345
Spain	54,900	5,959	24,000	2,005
Italy	214,800	23,652	114,800	10,000
Austria-Hungary	16,300	1,940	144,300	11,591
Other European countries	788,000	76,508	259,500	23,924
United States	16,131,200	1,687,931	74,300	5,518
Canada	1,183,700	134,245	100,600	6,375
Other countries	51,400	6,488	50,600	4,247
Totals, rubber	22,046,800	£2,296,104	3,247,000	£252,145
Waste and reclaimed rubber	14,000	700	1,800	90
Gutta percha and balata	68,700	11,759	66,500	11,570
MANUFACTURED—				
Boots and shoes.*dozen pairs*	90	£449	269	£1,390
Waterproof clothing	....	5	....	....
Tires and tubes	....	8,656	....	5,827
Insulated wire	....	975	....	....
Other manufactures	....	3,695	....	2,863
Totals, manufactured	....	£13,780	....	£10,080

*Included in "Other Articles," Class III, T., prior to 1920.

THE MARKET FOR RUBBER SCRAP

NEW YORK

Trade in rubber scrap is at the lowest ebb. There is no market and virtually nothing doing. Reclaimers have no need tor stocking scrap, which is, in fact, so nearly without market value that its collection scarcely repays the labor involved. Those holding scrap entertain the hope that in time crude rubber prices may advance and the scrap rubber and reclaiming business revive together in consequence. The following quotations are nominal:

QUOTATIONS FOR CARLOAD LOTS DELIVERED

Prices subject to change without notice

December 27, 1920

BOOTS AND SHOES:			
Arctic tops	*lb*	*$0.075 @	
Boots and shoes	*lb*	*.05½ @	.05¾
Trimmed arctics	*lb.*	*.04¾ @	.05¾
Untrimmed arctics	*lb.*	*.03¾ @	.04¾
HARD RUBBER:			
Battery jars, black compound	*lb*	*.01 @	.01¼
No. 1, bright fracture	*lb.*	*.23 @	.24
INNER TUBES:			
No. 1	*lb.*	*.09½ @	.10½
Compounded	*lb.*	*.05½ @	.06½
Red	*lb.*	*.05 @	.06
MECHANICALS:			
Black scrap, mixed, No. 1	*lb*	*.03½ @	.04
No. 2	*lb.*	*.02½ @	.02¾
Car springs	*lb.*	*.03½ @	.04
Heels	*lb.*	*.03 @	.03½
Horse-shoe pads	*lb.*	*.03 @	.03½
Hose, air brake	*lb.*	*.03½ @	.03¾
fire, cotton lined	*lb*	*.01½ @	.01¾
garden	*lb.*	*.01½ @	.01¾
Insulated wire stripping, free from fiber	*lb.*	*.03½ @	.04
Matting	*lb.*	*.01¼ @	.01½
Red packing	*lb.*	*.05½ @	.06
Red scrap, No. 1	*lb.*	*.09 @	.10
No. 2	*lb.*	*.06¾ @	.07¼
White scrap, No. 2	*lb.*	*.08 @	.09
No. 1	*lb*	*.10 @	.11
TIRES:			
PNEUMATIC—			
Auto peelings	*lb.*	*.03¾ @	.04¼
Bicycle	*lb.*	*.02¼ @	.02¾
Standard white auto	*lb.*	*.02½ @	.03½
Mixed auto	*lb*	*.01¼ @	.02¼
Stripped, unguaranteed	*lb.*	*01 @	.02½
White, G. & G., M. & W., and U. S.	*lb.*	*.03 @	.03¾
SOLID—			
Carriage	*lb.*	*.03 @	.03¼
Irony	*lb.*	@	
Truck	*lb.*	*.02½ @	.02¾

*Nominal.

THE MARKET FOR COTTON AND OTHER FABRICS

NEW YORK

Absence of demand from consumers featured last month's market for American cotton, and prices declined in sympathy with all other raw materials used by the rubber trade. On December 1 middling uplands was quoted 16.65 cents for spot, compared with 39.50 cents last year. With minor fluctuations and a generally weak undertone the market continued to decline and on December 28, middling uplands spot was quoted 14.50 cents, compared with 39.25 cents a year ago.

Arizona Cotton. This market was very quiet during the past month and prices lower, No. 2 Pima being nominally quoted at 35 to 40 cents.

Egyptian Cotton. Egyptians were very dull and the market weak with a sagging tendency. Prices quoted were 18 to 23 cents for Uppers and 28 to 35 cents for Sakel, all nominal quotations.

Sea Island Cotton. There was very little interest shown in this market. Average extra choice was nominally quoted at 45 cents.

Ducks, Drills and Osnaburgs. While a better market condition was indicated by a more general inquiry, the actual business transacted in these goods was negligible. Prices have not declined.

Raincoat Fabrics. Quiet has ruled in this market even in view of the prevailing low prices. Sales during the month were

extremely small, and unimportant. There is no prospect of real business in raincoat fabrics before March 1.

Tire Fabrics. Fabric mills continue to withhold quotations in view of the absence of tire makers' demand, and the speculative trading in stocks held by second hands. Normal demand is not expected to materialize until tire manufacturing again resumes in order to meet the spring demand for tires. The tire fabric prices quoted in the following list are those of August 1, 1920:

NEW YORK QUOTATIONS

December 27, 1920

Prices subject to change without notice

ASBESTOS CLOTH:			
Brake lining, 2½ lbs. sq. yd., brass or copper insertion ....lb.		@	
2¼ lbs. sq. yd., brass or copper insertion ....lb.		@	
BURLAPS:			
32—7-ounce ....100 yards		@	
32—8-ounce		@	
40—7½-ounce	$5.00	@	
40—8-ounce	5.00	@	
40—10-ounce	5.25	@	
40—10½-ounce	5.50	@	
45—7½-ounce	5.75	@	
45—8-ounce	5.75	@	
48—10-ounce		@	
DRILLS:			
38-inch 2.00-yard ....yard	.22½	@	.23½
40-inch 2.47-yard	.18¼	@	.19
52-inch 1.90-yard	.23¼	@	.24¼
52-inch 1.95-yard	.23	@	.24½
60-inch 1.52-yard	.29⅝	@	.30⅛
DUCK:			
CARRIAGE CLOTH:			
38-inch 2.00 yard enameling duck..........yard	.23½	@	
48-inch 1.74-yard	.27	@	
72-inch 16.66-ounce	.63½	@	
72-inch 17.21-ounce	.66⅛	@	
MECHANICAL:			
Hose ....pound	.43	@	
Belting	.43	@	
HOLLANDS, 40-INCH:			
Acme ....yard		@	
Endurance		@	
Penn		@	
OSNABURGS:			
40-inch 2.35-yard ....yard		@	
40-inch 2.48-yard		@	
37½-inch 2.42-yard		@	
RAINCOAT FABRICS:			
COTTON:			
Bombazine 64 x 60..........yard	.12½	@	
60 x 48	.11½	@	
Cashmeres, cotton and wool, 36-inch, tan	.85	@	
Twills 64 x 72	.20	@	
64 x 102	.23	@	.24
Twill, mercerized, 36-inch, blue and black	.30	@	
tan and olive	.27½	@	
Tweed	.40	@	1.00
printed	.22½	@	
Plaids 60 x 48	.12½	@	
56 x 44	.12	@	
Repp	.30	@	.35
Prints 60 x 48	.13	@	
64 x 60	.14	@	
IMPORTED WOOLEN FABRICS SPECIALLY PREPARED FOR RUBBERIZING—PLAIN AND FANCIES:			
63-inch, 3¼ to 7½ ounces..........yard	.81	@	2.22
36-inch, 2¾ to 5 ounces	.63	@	1.62
IMPORTED PLAID LINING (UNION AND COTTON):			
63-inch, 2 to 4 ounces..........yard	.71	@	1.57
36-inch, 2 to 4 ounces	.44	@	.84
SHEETINGS, 40-INCH:			
48 x 48, 2.35-yard..........yard	.15	@	
48 x 48, 2.50-yard	.13½	@	
48 x 48, 2.85-yard	.10¾	@	
64 x 68, 3.15-yard	.13½	@	.14
56 x 60, 3.60-yard	.10	@	
48 x 44, 3.75-yard	.09½	@	
SILKS:			
Canton, 38-inch ....yard	$0.35	@	
Schappe, 36-inch	.60	@	
STOCKINETTES:			
SINGLE THREAD:			
3½ Peeler, carded..........pound		@	
4½ Peeler, carded	.55	@	
6½ Peeler, combed	.85	@	
DOUBLE THREAD:			
Zero Peeler, carded..........pound	.45	@	
3½ Peeler, carded	.52½	@	
6½ Peeler, combed		@	
TIRE FABRICS:			
BUILDING:			
17¼-ounce Sakellarides, combed ....pound	*2.35	@	
17¼-ounce Egyptian, combed	*2.15	@	
17¼-ounce Egyptian, carded	*2.05	@	
17¼-ounce Peelers, combed	*2.25	@	
17¼-ounce Peelers, carded	*1.47	@	
CORD:			
15-ounce Egyptian ....pound	*2.40	@	
BICYCLE:			
8-ounce American ....pound	*1.50	@	
10-ounce American	*1.48	@	
CHAFER:			
9¼-ounce Sea Island ....pound		@	
9¼-ounce Egyptian, carded	*2.29	@	
9¼-ounce Peeler, carded	*1.71	@	

* Nominal.

NATIONAL AUTOMOBILE SHOW IN NEW YORK

The twenty-first national automobile show will be held at Grand Central Palace, New York City, January 8-15, inclusive. It is expected that it will be the most successful as well as the most important yet held, and 30,000 dealers have been invited to attend. The annual dinner of the National Automobile Chamber of Commerce will be served at Hotel Commodore, Tuesday evening, January 11, while the motor truck committee of the Chamber will hold one of its most important meetings Wednesday following.

The National Automobile Show in Chicago will be held at the Coliseum and Armory the week of January 29 to February 5.

STORING AND PACKING GAS BLACK[1]

In commercial practice there are four different processes of manufacturing carbon black from natural gas, namely, the channel,[2] the small rotating disk, the roller or rotating cylinder, and the large plate processes. The main differences of these methods are in the size and shape of the surface upon which the carbon is collected and the rate at which the moving devices actuate. The channel process is probably the best method and is the most extensively used. The production of carbon black by cracking or thermal decomposition methods is not extensive.

STORAGE BINS AND PACKERS

The storage bins are made of galvanized iron and vary in size. They are hopper shaped and located over the packers.

The packers are very similar to those used in sugar refineries, and are connected to the storage bins by spouts. An auger works inside of a tight sheet steel tube, pressing the carbon into a paper sack. The auger is so designed as to stop the waste of the free-flowing stock running out past the blades of the auger when the packer is stopped for changing sacks. The stock when passing through the auger, keeps the hinged gates folded parallel to and against the top auger blades. When the auger stops, the coil springs force the gates downward against the carbon lodged between the blades, not closing the passageway completely, but holding back the carbon sufficiently to prevent leakage. The machine is gaged to pack a uniform amount in each sack, which is usually 12½ pounds, or a quarter of a barrel. In some cases, especially for export trade, the sacks contain 15 pounds. The packer stops automatically when the sack has been filled with 12½ pounds of carbon black.

The sacks are tied, and in most plants slightly compressed. The compressor consists of a steel plate box, in which a plunger, actuated by a crank shaft or eccentric, travels. The sides of the sack are flattened to facilitate storing and transporting. After compressing, another paper sack is placed over the package.

[1]Abstract from advance report of the Bureau of Mines, published by permission of the Director.

[2]The India Rubber World, June 1, 1920, page 581.

"SKOGUM" JAR RINGS OF RED RUBBER

A new high-grade red rubber jar ring is called the "Skogum." The makers claim it has passed the highest test ever given a rubber ring. It is attractively packed in cartons showing a scene on a rubber plantation.—Smalley, Kivlan & Onthank, 21 Blackstone street, Boston, Massachusetts.

"CARMOJON DE-LUXE" INNER TUBES

Pure plantation Pará is used in "Carmojon De-Luxe" tubes, which are made in three colors, brown, red and green. The makers claim a special point of quality for each letter of the name.—Carlisle Tire & Rubber Co., Carlisle, Pennsylvania.

A dispatch from the American consul at Alexandria dated November 10, 1920, states that the new cotton crop for Egypt has been estimated at 612,000,000 pounds.

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS

NEW YORK

The continued curtailed production of rubber goods of every sort, particularly of automobile tires, has reduced activity in the market for compounding ingredients very appreciably.

In some cases, notably lithopone, production has been decreased owing to lack of demand, which has also not responded to price reductions in this and other ingredients. Prices on lithopone for the first quarter of 1921 were announced early in December and are quoted at 7¾ to 8 cents, an advance of ¾-cent in anticipation of increased spring demand by the paint-consuming trade and rubber manufacturing industry.

Decreased manufacturing activity in all branches of industry has minimized the demand for raw materials of every sort, but rubber manufacturers in common with those in other lines are optimistic of a marked renewal of business by the spring months of 1921.

Aniline Oil. Prices declined from 25 cents to 22 cents toward the close of December, with the market weak and dull.

Barytes. This material is in good supply, little demand and steady prices.

Blanc Fixe. The same conditions prevail as with barytes.

Benzol. Prices fell off during the past month until they were quoted at 28 cents for 90 per cent in tank cars, or 31 cents in drums. And at 30 cents in tank cars for pure, or 36 to 38 cents in drums.

Blacks. The prices held steady at the usual figures regardless of the fact that in Wyoming strenuous efforts are being made against the use of natural gas for the manufacture of carbon black.

China Clay. Foreign arrivals are said to be coming freely and the market is well supplied.

Carbon Bisulphide. The market is dull, with prices quoted at 8 to 9 cents per pound.

Carbon Tetrachloride. Little demand in evidence. Quotations are 10½ to 13 cents per pound.

Litharge. Slight changes in price occurred during the month of December, notably ½ cent per pound reduction for litharge in casks, which did not affect that in kegs.

Lithopone. Stocks are not large and some producers have reduced their volume of output in the absence of active demand, notably from automobile tire manufacturers.

Sublimed Lead. Equally dull with the market for litharge. The price level is maintained at 8½ to 8¾ cents per pound.

Sulphur. The demand is moderate. Price on commercial grade flour has been reduced to $1.60 from $1.95 per hundred weight, and on the superfine flour from $2.75 to $2.10 per hundred weight.

Solvent Naphtha. This is not much in demand and is cheaper at 28 to 30 cents.

Talc. The demand is fair, with prices steady.

Whiting. Good receipts of chalk are arriving and the demand continues steady.

Zinc Oxide. Although the market is dull, producers are still operating mills at full capacity. Lead-free oxide advanced from 10 to 10¼ cents per pound.

NEW YORK QUOTATIONS

December 27, 1920

Prices subject to change without notice

ACCELERATORS, ORGANIC				
Accelerene (New York)	lb.	$4.75	@	
Accelemal	lb.	*.60	@	.65
Aldehyde ammonia crystals	lb.	1.75	@	1.80
Aniline oil	lb.	.30	@	
Excellerex	lb.	*.70	@	
Hexamethylene tetramine (powdered)	lb.	1.60	@	1.65
N. C. C.	lb.	.45	@	
No. 999	lb.	.18	@	

Paraphenylenediamine	lb.	*$2.60 @ $2.70
Thiocarbanilide	lb.	.45 @ .70
Velosan	lb.	*3.70 @
Vul-Ko-Cene	lb.	.35 @
Virol	lb.	.65 @

ACCELERATORS, INORGANIC

Lead, dry red (bbls.)	lb.	.10¼ @
sublimed blue (bbls.)	lb.	.08¼ @
sublimed white (bbls.)	lb.	.08¼ @ .09
white, basic carbonate (bbls.)	lb.	.09 @
Lime, flour	lb.	.02½ @ .03
Litharge, domestic	lb.	.09¾ @ .15
imported	lb.	*.17 @
sublimed	lb.	.10 @
Magnesium, carbonate, light	lb.	.10 @ .11½
calcined extra light	lb.	.55 @
calcined light	lb.	.30 @
calcined medium light	lb.	.25 @
calcined heavy	lb.	.06 @ .08
calcined commercial (magnesite)	lb.	.05 @
oxide, extra light	lb.	.60 @
light technical	lb.	.35 @
light, imported	lb.	.55 @
imported	lb.	.55 @

ACIDS

Acetic, 28 per cent	cwt.	2.75 @ 3.25
glacial, 99 per cent	cwt.	10.00 @13.58
Aqua fortis	cwt.	6.40 @
Cresylic (97% straw color) (bbl.)	gal.	.95 @ 1.02
(95% dark) (bbl.)	gal.	.90 @ .97
Muriatic, 20 degrees	lb.	.02½ @
Nitric, 36 degrees	cwt.	6.28 @
Sulphuric, 66 degrees	ton	20.00 @

ALKALIES

Caustic soda, 76 per cent (bbls.)	lb.	.03¾ @ .04
Soda ash (bbls.)	lb.	.05 @

COLORS

Black:

Bone, powdered	lb.	.06 @
granulated	lb.	.11 @ .15
Carbon black (sacks, factory)	lb.	.12 @ .20
pressed	lb.	.16 @
Dipped goods	lb.	1.50 @
Drop	lb.	.07½ @ .18
Ivory black	lb.	.18 @ .45
Lampblack	lb.	.16 @ .45
Oil soluble aniline	lb.	1.00 @
Rubber black	lb.	.08 @
Rubber makers' black	lb.	.40 @

Blue:

Cobalt	lb.	.30 @ .35
Dipped goods	lb.	1.50 @
Prussian	lb.	.82 @
Ultramarine	lb.	.18 @ .35
Rubber makers' blue	lb.	3.50 @

Brown:

Iron oxide	lb.	.04½ @ .06½
Sienna, Italian, raw and burnt	lb.	.06½ @ .14
Umber, Turkey, raw and burnt	lb.	.05½ @ .09½
Vandyke	lb.	.06 @ .08
Maroon oxide	lb.	14 @

Green:

Chrome, light	lb.	.45 @ .60
medium	lb.	.50 @ .65
dark	lb.	.55 @ .70
commercial	lb.	.12 @ .20
tile	lb.	.12 @ .15
Dipped goods	lb.	1.50 @
Oxide I. R.	lb.	.85 @
Oxide of chromium (casks)	lb.	.70 @ .90
Rubber makers' green	lb.	3.50 @

Red:

Antimony, crimson, sulphuret of (casks)	lb.	.45 @
crimson, "Mephisto" (casks)	lb.	.60 @
crimson, "R. M. P."	lb.	.55 @ .60
Antimony, golden sulphuret of (casks)	lb.	$0.27 @$0.30
golden, "Mephisto" (casks)	lb.	.40 @ .55
golden, "R. M. P."	lb.	.25 @
vermilion sulphuret	lb.	.65 @
red sulphuret	lb.	.25 @ .27
Arsenic, red sulphide	lb.	.14 @ .15
Dipped goods, red	lb.	1.75 @
purple	lb.	1.75 @
orange	lb.	1.75 @
Indian	lb.	.14 @ .15
Para toner	lb.	2.00 @
Red excelsior	lb.	*.19 @ .22
Toluidine toner	lb.	3.25 @ 4.25
Iron oxide, reduced grades	lb.	.05½ @ .15
pure bright	lb.	.16 @ .17
Spanish neutral	lb.	.05¾ @ .08
Venetian	lb.	.03 @ .07½
Oil soluble aniline, red	lb.	2.00 @
orange	lb.	1.65 @
Oximony	lb.	.18 @
Vermilion, American	lb.	.25 @ .30
permanent	lb.	.37 @
English quicksilver	lb.	1.00 @ 1.10
Rubber makers' red	lb.	3.50 @ 4.00
purple	lb.	2.50 @

White:

Albalith	lb.	.07¾ @ .08¼
Aluminum bronze, extra brilliant	lb.	.65 @
extra fine	lb.	.75 @
Lithopone, Beckton white	lb.	.08 @ .08¼
Lithopone	lb.	.07¾ @ .08¼
Ponolith (carloads, factory)	lb.	@
Rubber-makers' white	lb.	@
Zinc oxide, American Horse Head brand (factory):		C. L. L. C. L.
Special	lb.	.10 @ .10½
XX red	lb.	.09¾ @ .10
French process, Florence brand (factory):		
White seal	lb.	.13 @ .13¼
Green seal	lb.	.11¾ @ .12¼
Red seal	lb.	.10¾ @ .11¼
White seal, imported	lb.	.15 @
Azo factory:		
ZZZ (lead free)	lb.	.09½ @ .10
ZZ (under 5% leaded)	lb.	.08½ @ .09
Z (8-10% leaded)	lb.	.08⅛ @ .08⅝
Standard AA	lb.	.09 @

Yellow:

Cadmium, sulphide, yellow, light, orange	lb.	1.80 @
red	lb.	1.80 @
Chrome, light and medium	lb.	.30 @
Dipped goods	lb.	1.75 @
Ochre, domestic	lb.	.02½ @ .05½
imported	lb.	.04¼ @
Rubber makers'	lb.	.50 @ 3.50
Zinc chromate	lb.	.49½ @ .50
Oil soluble aniline	lb.	1.75 @

COMPOUNDING INGREDIENTS

Aluminum flake (carload)	ton	33.00 @45.00
hydrate	lb.	.25 @
silicate	ton	28.00 @40.00
Ammonium carbonate (powdered)	lb.	.14 @ .15
Asbestine (carloads)	ton	35.00 @40.00
Barium, carbonate, precipitated	ton	97.50 @
dust	ton	110.00 @
Barytes, pure white (f. o. b. works)	ton	28.00 @40.00
off color	ton	20.00 @30.00
uniform floated	ton	28.00 @
German "Cream"	ton	45.00 @
Basofor	lb.	.05½ @
Blanc fixe (dry, bbls.)	lb.	.05½ @ .06¼
Bone ash	lb.	.10 @
Carrara filler	lb.	.02½ @
Chalk, precipitated, extra light	lb.	.04½ @ .05
heavy	lb.	.03½ @ .04
China clay, Dixie	ton	22.00 @
Blue Ridge	ton	22.00 @
domestic	ton	10.00 @20.00
imported	ton	40.00 @
Cotton linters, clean mill run, f. o. b. factory	lb.	.02½ @ .03
Fossil flour (powdered)	ton	60.00 @
(bolted)	ton	65.00 @
Diatomite	lb.	.03 @

Glue, high grade	lb.	$0.35	@	$0.45
medium	lb.	.30	@	.35
low grade	lb.	.20	@	.25
Graphite, flake (400-pound bbl.)	lb.	.14	@	
amorphous	lb.	.04	@	
Ground glass FF. (bbls.)	lb.	.05	@	
Infusorial earth (powdered)	ton	60.00	@	
(bolted)	ton	65.00	@	
Liquid rubber	lb.	.18	@	
Mica, powdered	lb.	.15	@	
Pumice stone, powdered (bbl.)	lb.	.05	@	
Rotten stone, powdered	lb.	.02½	@	.04½
Rubber paste	lb.	*.19	@	.22
Silica, gold bond	ton	30.00	@	34.00
silver bond	ton	24.00	@	28.00
Soap bark	lb.	.24	@	
Soapstone, powdered gray (carload)	ton	12.00	@	
Starch, powdered corn	cwt.	3.18	@	3.76
Talc, powdered soapstone	ton	25.00	@	
Terra blanche	ton	24.00	@	32.00
Tripoli earth, air-floated, cream or rose (factory)	ton	50.00	@	
white (factory)	ton	52.50	@	
Tyre-lith	ton	110.00	@	
Whiting, Alba (carloads)	cwt.	.80	@	.90
Columbia	cwt.	.95	@	
commercial	ton	25.00	@	
Danish	ton	22.00	@	26.00
English cliffstone	ton	42.50	@	
gilders	ton	40.00	@	
Paris, white, American	ton	25.00	@	29.00
Quaker	ton	13.00	@	
Super	ton	30.00	@	32.50
Wood pulp, imported	lb.	.03¾	@	
XXX	ton	60.00	@	
X	ton	60.00	@	
Wood flour, American	ton	45.00	@	

MINERAL RUBBER

Elateron (c. l. factory)	ton	55.00	@	
(l. c. l. factory)	ton	58.00	@	
Gilsonite	ton	60.00	@	
Genasco (c. l. factory)	ton	62.50	@	
(l. c. l. factory)	ton	64.50	@	
Hard hydrocarbon	ton	42.00	@	
Soft hydrocarbon	ton	40.00	@	
K-X	ton		@	
K. M. R.	ton		@	
M. R. X.	ton		@	
Pioneer (c. l. factory)	ton	60.00	@	
(l. c. l. factory)	ton	68.00	@	
Raven M. R.	ton	60.00	@	65.00
Refined Elaterite	ton		@	
Richmond (car load)	ton	75.00	@	
No. 64 (car load)	ton	45.00	@	
318/320 M. P. hydrocarbon (c. l. factory)	ton	60.00	@	
(l. c. l. factory)	ton	62.50	@	
300/310 M. P. hydrocarbon (c. l. factory)	ton	45.00	@	
(l. c. l. factory)	ton	47.50	@	
States "A" (c. l. factory)	ton	51.00	@	
No. 1 (c. l. factory)	ton	42.00	@	
Robertson, M. R. pulverized (c. l. factory)	ton	95.00	@	
M. R. pulverized (l. c. l. factory)	ton	97.50	@	
M. R. (c. l. factory)	ton	72.50	@	
M. R. (l. c. l. factory)	ton	75.00	@	
Rubrax (factory)	ton	50.00	@	60.00
Synpro, granulated	ton	97.50	@	
Walpole rubber flux (factory)	lb.		@	

OILS

Avoilas compound	lb.	.17	@	.19
Castor, No. 1, U. S. P.	lb.	.13	@	
No. 3, U. S. P.	lb.	.12	@	
Corn	lb.	.10	@	
Cotton	lb.	.10	@	
Glycerine (98 per cent)	lb.	.26	@	
Linseed, raw (carloads)	gal.	.81	@	
Linseed compound	gal.		@	
Palmoline	lb.	.14	@	.16
Palm niger	lb.	.10	@	
Palm "Lagos"	lb.	.11½	@	
Palm special	lb.	.17	@	
Peanut	lb.	.13	@	
Petrolatum	lb.	$0.06	@	$0.10
Petrolatum, sticky	lb.	.08	@	.12
Petroleum grease	lb.	.07½	@	.09
Pine, steam distilled	gal.	1.40	@	1.70
Rapeseed, refined	gal.	1.20	@	
blown	lb.	.16	@	
Rosin	lb.	.04	@	
Synpro	gal.	.59	@	.90
Soya bean	lb.	.09	@	
Tar	bbl.	16.00	@	

RESINS AND PITCHES

Balsam, fir	gal.	2.00	@	
Cantella gum	lb.	.50	@	
Cumar resin, hard	lb.	.14	@	.18
soft	lb.	.09	@	.13
Tar, retort	bbl.	16.00	@	
kiln	bbl.	16.00	@	
Pitch, Burgundy	lb.	.08	@	
coal tar	lb.	.01½	@	
pine tar	lb.	.05	@	
ponto	lb.	.14	@	
Rosin, K	280 lbs.	9.50	@	
strained	280 lbs.	9.50	@	
Shellac, fine orange	lb.	1.50	@	

SOLVENTS

Acetone (98.99 per cent drums)	lb.	.20	@	
methyl (drums)	gal.	*1.50	@	
Benzol (water white, 90%)	gal.	.28	@	.34
Beta-naphthol	lb.	.47	@	.48
Carbon bisulphide (drums)	lb.	.08½	@	.09½
tetrachloride (drums)	lb.	.13	@	.14
Naphtha, motor gasoline (steel bbls.)	gal.	.31	@	
73 @ 76 degrees (steel bbls.)	gal.	.41	@	
70 @ 72 (steel bbls.)	gal.	.39	@	
68 @ 70 degrees (steel bbls.)	gal.	.38	@	
V. M. & P. (steel bbls.)	gal.	.30	@	
solvent	gal.	.30	@	
Toluol, pure	gal.	.30	@	.36
Turpentine, spirits	gal.	.74	@	
wood	gal.	.70	@	
Osmaco reducer	gal.	*.65	@	
Xylol, pure	gal.	.45	@	.50½
commercial	gal.	.30	@	.35½

SUBSTITUTES

Black	lb.	.10	@	.18
White	lb.	.11	@	.21
Brown	lb.	.14	@	.20
Brown factice	lb.	.08	@	.20
White factice	lb.	.09	@	.20
Paragol, soft and medium (carloads)	cwt.	10.00	@	
hard	cwt.	10.00	@	

VULCANIZING INGREDIENTS

Lead, black hyposulphite (Black Hypo)	lb.	.29	@	.35
Orange mineral, domestic	lb.	.13¼	@	
Sulphur chloride (jugs)	lb.	.20	@	
(drums)	lb.	.08	@	
Sulphur, flour, Brooklyn brand (carloads)	cwt.	2.65	@	2.90
Bergenport, soft (c. l. factory)	cwt.	2.85	@	
Bergenport, soft (l. c. l. factory)	cwt.	3.45	@	
superfine (carloads, factory)	cwt.		@	

(See also Colors—Antimony.)

WAXES

Wax, beeswax, white	lb.	.67	@	
ceresin, white	lb.	.16	@	
carnauba	lb.	.25	@	
Montan	lb.	*.10	@	
ozokerite, black	lb.	.65	@	
green	lb.	.65	@	
paraffine, 115° m. p.	lb.	.12½	@	
120° m. p.	lb.	.12¾	@	
125° m. p.	lb.	.13½	@	
130° m. p.	lb.	.14½	@	
Phenanthrene	lb.	.08	@	.10
Sweet wax	lb.	.15	@	

* Nominal.

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THE AMERICAN "RUBBER TRUST"

Brazilian deputies, three in number, before the House sitting in Rio Janeiro stated that the American "Rubber Trust" had deliberately forced the price of rubber down to its present level. Further, to quote one excited speaker, "The rubber planter, losing interest, is abandoning plantations which the Americans are acquiring at infinitesimal prices, becoming lords of our soil."

This is so interesting that we would fain ask for information. First, what is the American Rubber Trust? We know of no rubber company among the dozen big and three hundred smaller that can in any way be called a trust. Certainly each buys rubber separately and competitively. Second, what Americans are buying *seringaes?* (There are no Brazilian rubber plantations.) Frankly, Amazonian rubber lands are not investments that appeal to capitalists or to rubber men at present. The statement that they are being bought up, therefore, is hardly credible.

The trouble is that the Brazilian rubber producer is in a bad way. It is not his fault, nor is it the fault of the American rubber manufacturers. It is simply because rubber planters in the Far East can produce rubber cheaper than can the Brazilian *seringueiro.* Moreover, they have produced it in such quantity that the market became glutted and prices accordingly dropped. It is too bad, and all friends of Brazil are sorry. It is only fair, however, to point out that it is the law of supply and demand that is doing the grinding, and no trust, American or other.

THE IMPORTANCE OF CABLE SYSTEMS

While the United States easily leads the world in automobile tire making, and while there is no reason to doubt that it will long retain its primacy in that great division of the rubber industry, it is still a negligible factor in the production of another and important divisional product, namely, ocean cables. Of the 532 submarine cables privately owned, covering over 262,000 miles, and 2,628 government-owned lines, with a length of 56,000 miles, nearly 50 per cent are owned or controlled by British interests. This fact alone largely explains the great success of British foreign trade, for there is hardly a port in the world that a British ship enters but in which it can find a British cable office. The United Kingdom is a great financial power largely because, through its vast network of cables, British traders can easily keep ahead of rivals in the great commercial struggle with other nations.

It is obvious, therefore, that if the United States is to maintain a commanding position in international commerce it, too, must have an adequate and independent cable system of its own. Indeed, some such interoceanic links must be provided to render truly effective the nation's great plans for a merchant marine contemplating an outlay of even thousands of millions. Else American foreign trade must be conducted largely over systems owned by powerful commercial rivals, and American traders suffer a serious handicap. Even such non-American systems are already congested with trade and news communications, so that an American cable system would really serve a pressing international need, as it should also prove a profitable investment. Atlantic cables now carry about four times the traffic they did in 1913, while Pacific cable traffic has increased nearly nine times in the same period, making the situation there actually acute. True, there has been some talk of relief, but the laying of another Pacific cable is still "in the air," although the cost of such an immensely helpful medium of communication would probably be no more than that of the two $40,000,000 battle cruisers which the United States and Japan are said to be preparing to build.

The core of the cable used today consists of strands of copper wire covered with gutta percha. Attempts have been made to substitute rubber for gutta percha, but for

deep sea use nothing has been found to take the place of gutta percha as a dielectric. The major part of the world's supply comes from the Malay Archipelago, and there British interests are credited with being in complete control of the output. Almost all the submarine cables in the world are made in England, that country being practically the only one that has developed a cable manufacturing industry of importance.

Americans have long cherished the hope of making cables on their own account and growing gutta percha in the Philippines, but such expectation is not likely to be realized in the near future. Soil and climatic conditions may, indeed, be favorable in the American insular possessions in the Far East for the production of gutta percha, but the *Palaquium,* unlike the *Hevea,* is a tree that matures slowly, and many years would be required to develop a plantation that would yield a fair return on the large amount of labor and capital that would be involved in such an enterprise.

AMERICAN OVERSEAS PLANTATIONS

With a surplus of raw rubber on their hands, variously estimated at from 75,500 to 100,000 tons, not counting stocks held in warehouses, much of it bought at from 40 to 50 cents a pound; and holding 159,000 acres of rubber plantations in the East, costing between $15,000,000 and $16,000,000 and now worth double that amount, American rubber manufacturers are not, as some of their overseas friends fancy, at all indifferent to the depression which has been troubling the foreign rubber producers. Indeed, American rubber concerns, with a plantation investment of about 3 per cent of the total money expended for the raising of rubber, yet consuming 70 per cent of the world's output, fully realize that their interests are identical with those of the rubber growers; and they are ready to cooperate in any proper manner to stabilize the price of the raw product. Signs are not wanting, too, that in the near future, with the rapid increase in the foreign trade of the United States, other American investors besides rubber manufacturers will be making ventures in a large way in rubber planting in the East, as well as taking an active part in various big commercial enterprises overseas, just as the British have long done in all parts of the globe.

The large American plantation holdings are divided among four corporations. The United States Rubber Co. has put $10,000,000 into Sumatra, having 43,000 acres bearing, 11,000 planted but not bearing, and 63,000 reserved, totalling 117,000 acres. Thus it owns and operates the largest single rubber plantation in the world, and yet the product falls far short of the requirement for its forty-one factories in the United States, sixteen in Canada, and one in England. The Goodyear Tire & Rubber Co. has invested about $4,000,000 in 20,000 acres in Sumatra, of which 2,000 are bearing, 9,000 planted but not bearing, and 9,000 cleared but not planted. The Manhattan Rubber Manufacturing Co. owns 2,000 acres valued at about $500,000 in Java, 1,200 of which are bearing, and 800 planted; while the Continental Rubber Co. owns 20,000 acres in Sumatra on which about $1,000,000 has been spent, 2,000 acres being planted but not bearing, 2,000 acres cleared but not planted, and 16,000 reserved.

RUBBER PLANTATION CONSERVATION

To avert soil exhaustion and insure steady yield the farmer rotates crops but to the rubber planter such recourse is not feasible. Hence must he depend almost wholly upon inherent soil fertility, manuring, careful cultivation, and judicious tapping. Naturally the question arises, granted a deep, rich soil, may not forced growth and especially severe draughts on the latex ultimately lessen the fruitfulness of even the most fertile soil? Experts, however, declare that even three decades of planting have not yet shown any perceptible effect on the soil itself. But a marked decadence is shown in many of the first rubber trees planted, trees that should now be in their prime, and all through mistreatment. In the boom days a great number were hurriedly planted among fungi-infested jungle stumps that induced root troubles, and since then too eager latex gatherers have fairly bled them to death. Like poor humans, overworked, they got so weakened that when the "brown bast" came their low vitality left them an easy prey.

Happily, a more enlightened policy is now pursued by progressive planters. Excessive tapping has been found to be akin to killing the goose that laid the golden egg, and is taboo on all well-regulated estates. Felling, burning and clearing of jungles, as well as cultivating, are now done in a thoroughgoing way with the aid of modern machinery, chiefly from the United States. Planting and tapping are being done in a systematic, scientific way, conservation being stressed quite as much as utmost yield. All this with the "skip-a-day" plan of tapping in force as part of the crop-restriction scheme entered upon by the Rubber Growers' Association and other interests, by insuring more rest for the trees, should go far toward putting the great planted areas in a finer condition than they have ever been.

THE RUBBER ASSOCIATION'S NEW PRESIDENT

Again has The Rubber Association shown wisdom in the selection of chief executive. Harry T. Dunn, a live wire in rubber and motor manufacture, is one who will add strength to the organization and guide it to even greater influence and usefulness. His record with The Fisk Rubber Co. and the War Industries Board and his helpfulness on important association committees all are universally known and are pleasantly prophetic. We congratulate The Rubber Association, and the rubber trade at large.

Twenty-First Annual Dinner of The Rubber Association of America

With eight hundred and fifty members and guests in attendance, an excellent dinner, good music, three distinguished speakers, and a brilliant assemblage of ladies to grace the occasion, the twenty-first anniversary dinner of The Rubber Association of America, Inc., at the Waldorf-Astoria, on the evening of January 10, 1921, was a distinct success.

After the repast, which was accompanied by a program of popular selections by the orchestra and much good fellowship on the part of the diners, the postprandial exercises were led by the retiring president, Homer E. Sawyer, who spoke and later introduced guests of the evening with characteristic brevity and fitness.

FORMER PRESIDENT SAWYER'S ADDRESS

Mr. Sawyer delivered no prolonged valedictory, but alluded in a few well-chosen words to the accomplishments of the Association during the past two years and thanked members one and all for their unfailing and whole-hearted support. Said he:

Your enviable financial position is due to the broad-minded spirit of all the manufacturers of this association who have adhered to the informal agreement to pay three cents per 100 pounds on all rubber purchased, and this, together with your dues, has placed your directors in a position to pay all necessary expenses, to make certain proper contributions, to add materially to your invested reserves and leave a very comfortable cash balance on hand. Your numerous sub-committees have been indefatigable in their work for the welfare of the association and have with the utmost vision and unselfishness worked together for the good of all, and all of the work has been concentrated and centralized under our able general manager, Mr. Viles, and his able staff.

Your business represents a magnitude of something considerably over a billion dollars annually, and business of such magnitude, the products of which are necessary to nearly all of the other industrial life of the country, has a distinct duty to perform along progressive and cooperative lines, and we do not know how it can best be done except with the aid of a helpful aggressive association.

Under the wise leadership of the few, none of us has any doubt of our realizing our fondest hopes and aspirations for The Rubber Association of America.

CONGRESSMAN FESS' ADDRESS

Introduced as a wise and experienced legislator and a scholarly economist who has a wide sympathy with the legitimate requirements of commerce, and who ably represents that growing force in national affairs which justifies faith in the future cooperation of business and legislation, Honorable Simeon D. Fess, United States Representative from Ohio, outlined some of the early duties of Congress and the incoming administration. His sound and welcome doctrine and his manifest optimism were enthusiastically received.

READJUSTMENT OF COSTS AND TAXES INEVITABLE

How the inevitable liquidation of the war can be effected without disaster is not only the problem of the legislator but of every business man, he said, and problems inherited from the war should be solved in council with those who bear the burdens. Readjustment must take us from a world stage to a business basis; must get us down from a very high cost level, if possible, without danger. The war machine, he explained, had to be built quickly and every step pushed costs higher—employing the major portion of labor, shortening the basic day, higher overtime wages, increasing the number of workmen to the piece, transporting and housing labor, competition with industry for labor, cost plus contracts, bond issues and excess profits taxes. The Government, he pointed out, wanted profiteers taxed heavily, but ignored the fact that excess profits taxes were passed on to the consuming public to pay in higher prices.

HOW THE GOVERNMENT CAN HELP

As a beginning toward lower cost levels, he asserted that the cost of government can be reduced below the estimate of four billion dollars annually, a total six times the cost in 1912 and four times the cost in 1917. The war has increased the public debt from one to twenty-four billion dollars, on which the interest alone is $1,200,000,000, or nearly the total cost of government in 1912. Therefore it is the duty of Congress to cut all appropriations as far as is safe. A large army, he maintained, is unnecessary and naval estimates can also be reduced, effecting a saving of at least one billion dollars. The present unscientific system of taxation must be revised with repeal of the excess profits tax and reduction of the higher ranges of the surtax to avoid forcing the investment of incomes in non-taxables and thus destroying the purposes of the tax system. Congress, he said, will soon adopt a budget system to put the Government on a business basis. Government departments must be reorganized to save useless duplication. Customs will probably be revised to yield more than double the present three hundred million dollars annually. A final sales tax would probably yield $450,000,000 additional.

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Hon. Simeon D. Fess

THE BUSINESS OUTLOOK

Regarding the immediate future of American business he said in part:

Now, gentlemen, what of the future? What can we expect in business? Why should men lose faith? Why should we lack confidence? Think of the position of this nation. We have today harvested the largest crop from the agricultural fields that we have in any years, save three. There has been no famine, there has been no failure. Our fields have responded until our food products and the agricultural supply is abundant.

AN IMPROVED TRANSPORTATION SYSTEM

We have had the boldness—and it has taken courage—to enact a Transportation Act, not in the interest of the owners of the railroads, not in the interest of the security holders, not in the interest of labor, but in the interest of all these people who are included in the public for whom we must legislate; and consequently, you have seen a remarkable increase in the efficiency of our transportation system, that now promises to get back to a form of efficiency where, instead of increasing cost and decreasing efficiency, you ought to decrease cost and increase efficiency, which is the law of progress.

BETTER RELATIONS BETWEEN LABOR AND CAPITAL

Not only have we entered upon a safe transportation system, but, gentlemen, we have seen a new relationship between labor and capital. These two cannot be enemies. They are beginning to see the necessity of cooperation, of a better spirit toward labor by capital, and a better spirit of capital toward labor. We recognize that each depends upon the other and we see, now, instead of decreasing the product of labor and increasing the cost, we are beginning to increase the product and decrease the cost, which is again the law of progress.

We must not undertake to control the price of labor or anything else by reducing the production, because, gentlemen, the

The Rubber Association Banquet

Twenty-First Annual Dinner of The Rubber Association of America, Inc., at the Waldorf-Astoria, New York City, January 10, 1921

world depends upon increasing production and saving waste; and if we don't come to that, there will be rocks upon which the nation is to go. But we are coming to it—a finer spirit in work, and we are getting better results both in the investment of capital and in the employment of labor. I think it is the finest omen of the future that I know of.

I have been somewhat frightened at the tendency of attempting to Sovietize the industries of the country. We cannot afford to look with any particular favor upon such a movement as that, and I think we are passing over the danger point. Not only that we see better conditions in the employment of labor, but we certainly, gentlemen, are going to move out on the sea to stay there as a merchant marine country, for we have got the making of as fine a merchant marine now as any nation outside of the mother country.

THIS IS THE RUBBER AGE

These are some of the evidences of our ability to look into the future. And what may be said of the great industry represented by this group of men? Why, gentlemen, there isn't anything, in my judgment, surer than the perpetuation of the rubber industry which has, in a large degree, come to be so basic that you might call this the Rubber Age, as a few years ago we would speak of it as the Electric Age.

Our industries, our whole industrial life has been colored by new developments along the line of this industry. And if, now and then, we see some evidence of a slacking of business—and I wouldn't be surprised if in the slumps there would not be some severe suffering—yet, what about the 8,000,000 of motors that have determined what largely our thought in business will be? What about the 1,500,000 motors required for replacement every year when we were filled to our fullest capacity and could not reach over 2,000,000? What about the upkeep necessary to run those already manufactured?

Why, the rubber business must go on or civilization could not go as it now is. Nothing is more certain than that. So the outlook is not gloomy. The outlook is wondrously auspicious. We are going to enter upon a constructional era. We are retarded because of the clogging of the current of business.

THE INTERNATIONAL SITUATION

Referring to the international situation, Mr. Fess pointed out that Europe is not yet on her feet and cannot really begin to recover until the Allies fix the indemnity against Germany. Meanwhile neither Germany nor France is at work as will afterward be the case. Germany does not intend to place herself in a position where she might have thrust upon her a greater indemnity. The United States has not established trade relations with Germany because we are not yet at peace. This, he believes, will be quickly and honorably done after March 4, and he anticipates an early fixing of the German indemnity, for the salvation of the world depends on work in both Europe and America.

CONFIDENCE IN THE FUTURE

Summarizing the present duties of government and business, and emphasizing the importance of confidence in the future, he concluded as follows:

So I cannot see, ladies and gentlemen, anything but bright hope for America. And while this period of readjustment is going to produce suffering, I beseech you do not attempt to prevent the liquidation of the war; do not appeal to Congress to keep up the price, because the price was produced by war. I come from an agricultural center, and my farmers want me to vote to fix the price of wheat. Why, that would be foolish and unwise. You in the city would like to have the price come down and the country wants the price to stay up. But the country wants the price to stay up on the article that is sold and come down on the article that is purchased.

It is impossible, gentlemen, for Congress to so legislate that you put the price down on the thing you buy and up on the thing you sell. I am opposed to Congress interfering with prices any more. I think the duty of Congress is to get the Government out of business and let private enterprise have a chance.

Consequently, I come to you with this message: First, let the Government cut as far as it can; secondly, take immediate steps against further extravagance; thirdly, revise the taxation system and do away with that sort of system of tax that penalizes business and is built upon the position that any man who has succeeded must have been dishonest or he would not have succeeded.

And then, after the Government has done that, taken its hands off of business, let the people, of whom you represent a magnificent group, have faith and confidence and look to the future. And the moment that you begin to have confidence in the future and invest your money, labor will be employed, capital will be invested and in my judgment we are going to enter upon one of the greatest eras of business this nation has ever seen.

POSTMASTER-GENERAL BLONDIN'S ADDRESS

Honorable P. E. Blondin, Postmaster General of the Dominion of Canada, who has held various cabinet portfolios and other government offices, reviewed briefly the high light of Canadian development and achievement, especially with respect to industries, water power, railroads, highways, education and government.


Hon. P. E. Blondin

CANADIAN ACHIEVEMENTS

Referring to the difficulties and success of the Canadian Government, he said:

As for the Canadian federation, it was made as a compromise, or rather as a bona fide attempt to consolidate two races who had learned more to hate than love each other, and let me tell you, gentlemen, that this bona fide attempt has surpassed all possible hopes. The past successes give us confidence in the future. When we see the results of half a century, notwithstanding obstacles that seemed insurmountable; when we compare our inhabited territory with what it was forty years ago; when we think of the large railway lines covering the whole country from one ocean to the other and the many steamers carrying our products on all the seas; when we realize the prosperity of the nine Canadian provinces, need I tell you, ladies and gentlemen, that we feel in our hearts, the source of energy and perseverance, all the patriotism which produced all these results, and that we feel ourselves only at the starting point of a progressive march toward greater achievements, making us your worthy and your friendly neighbors?

THE FRIENDSHIP BETWEEN CANADA AND THE UNITED STATES

He alluded with particular fervor to the long period of mutual friendship and trust enjoyed by Canada and the United States, which it is hoped may be more firmly cemented as regards commercial relations by the newly organized Rubber Association of Canada, an outgrowth of the work of The Rubber Association of America. That the two nations, each in its sphere of influence, may always continue to set an example of friendship, and work in every way for peace on earth, he expressed as the desire of the Canadian Government and people.

THE RUBBER INDUSTRY A CARRIER OF CIVILIZATION

In recognition of the far-flung humanizing influences of the rubber industry he remarked:

Trade has always been the carrier of civilization; it is on the wings of trade that the Gospel of God and all human truth has reached the four corners of the world—and I am not afraid that I am over-praising you if I add that no industry deserves more credit than yours in that respect.

DOCTOR BOYNTON'S ADDRESS

The Reverend Nehemiah Boynton, of Brooklyn, New York, who aptly styles himself pastor at large, spoke with eloquence, wit and optimism in appreciation of the importance of the finer sensibilities in business and international relations, and pictured brilliantly the wonderful opportunities for helpfulness and progress in the ethical aspect of commercial and world affairs. After alluding amusingly to his association with the rubber industry, he warned against the provincialness in human nature that sometimes induces men immersed in their own affairs to think that the universe is bounded by their particular calling, business or dwelling place.

NEW DEMAND FOR BUSINESS ETHICS

There are two great things, he asserted, which business men ought to have their eyes on at present, the first being that there is a new demand for common, plain, old-fashioned ethics. Men who had slipped many cogs in the machine of ethics while engrossed by the unprecedented opportunity to pile up personal resources, foresaw in 1920 where business and the country were going to if, in the greed of accumulation, the homely principles of downright honesty and fair dealing were to relegated to the rear, and began to call for a new and square deal in commercial affairs. Continuing, he spoke in part as follows:

Rev. Nehemiah Boynton, D. D.

Business men began to say to people who had made contracts in good and honest purpose, and then because the market had fallen off tried to break their contracts and ship the goods for which they had contracted, back upon the people with whom they had made their contract; they began to say to those people, "Look here, don't you know that it is perfectly honorable for a man in the fortunes of war to lose his cash, but God help him if in trying to save his cash he loses his character?" And they started a new significance to this attempt to break contracts which had been made honestly and honorably and told each other the fact that if you wanted to take the entire life out of the business of our country, or any other country, you would make the principle of contracts a sort of shuffling thing, so that a man who holds a contract in all honesty and honor, does not know whether it is going to be lived up to by the other man or not.

Oh, the new demand for new ethics in the world, the professional as well as the business world, is one of the hopeful signs for the future of our country and the world in these depressing days, for, as has been said, and we remember the saying, gentlemen, in spite of everything, the Ten Commandments are not abridged, and stealing will continue.

THE IMPORTANCE OF WORLD NEIGHBORLINESS

Now, the other thing which is to be seen in the larger life of the world that we all ought to get our eye on is a new appreciation of the principle of neighborliness in the world. No man is such a consummate jackass in this day and generation as the man who undertakes to make you believe that you can build a high fence around the United States of America, and allow the rest of the world to go hang and let America proceed to glory.

All that happens in one corner of the world is now of immense significance to those who live in the other corners of the world, and it cannot be that in one corner of the world there are 3,500,000 starving boys and girls; that in another corner of the world there are a million starving men and women; that China has two million men and women in the grip of a most grasping famine, the most grasping that country has ever known—it cannot be that these things can transpire in other corners of the world and have no effect upon us in well fed, in rich, in prosperous America.

For the enlarging vision which today can make America with all her magnificent opportunities; with the great immunity which was hers through the war; in spite of her wonderful debt which she paid with her money, but which left us with our national life; it cannot be that America, with all these advantages, can look upon the sorrowing and suffering and hunger of the world and not respond. Oh, thank God, she does respond!

So, my two words are these: We ought to be able to see beyond our own individual interests and understand how mightily necessary it is today to accentuate in America the good old-fashioned principle of ethics which we learned at our mother's knee, that honesty is the best policy, and that only as honesty is at a premium in business life can business be either safe on the one hand or in any helpful way largely improved upon the other; and then the second thing, that the principle of neighborliness binds your life to the life of the man who is farthest away from you on this terrestrial sphere and that what affects him will inevitably affect you.

AS TO THE FUTURE

Somebody says there is a depression around. Well, maybe there is. You cannot have a country without having valleys as well as hills. But did you ever ride out into the country, and did you ever notice that what gave your landscape grace, symmetry and beauty was not that it was a dead level plain, but after you had risen through struggle to the summit of a hill, and perhaps had descended into a valley, another hill waited for you, and conquering that with your machine, when you stood upon its shining pinnacle, the view seemed better than any other view you had ever seen? That is the way with business. There may be depression today, but, oh, buckup, buckup, there is going to be a conquered mountain pretty soon in our American business world. And if we have ethics that are keen enough—and we have, and neighborliness that is generous enough—and we have—we shall not only share the view but divide the profit.

MEMBERS AND GUESTS PRESENT

AT THE PRESIDENT'S TABLE

Blondin, Hon. P. E.
Bourn, Hon. A. O.
Boynton, Rev. N., D.D.
Broughton, John S.
Brown, A. H.
Carlisle, C. H.
Clark, Merrell E.
Colt, Col. Samuel P.
Cox, William C.
Davol, Charles J.
Dunn, Harry T.
Fess, Hon. Simeon D.
Firestone, H. S.
Hanch, C. C.
Hodgman, George B
Kelly, William J.
Lewis, Seneca G.
Lowman, John S.
Maguire, John W.
McLaughlin C. W.
Rutherford, W. O.
Sawyer, Homer E.
Thompson, C. E.
Thornton, A. D.
Vincent, Col. J. G.

ALPHABETICAL LIST

A

Abberley, Lester S.
Absit, N. W.
Achelis, F. G.
Adams, H. J.
Agar, J. L.
Agnew, R. H.
Aiken, Mr.
Ake, M. E.
Alexander, A. N.
Allen, B. H.
Altschuler, A. A.
Anderson, E. A.
Anderson, J. D.
Anderson, V. T.
Andrews, E. S.
Appleton, F. H., Jr.
Armstrong, H. G.
Armstrong, H. H.
Arnold, W. H.
Asakage, A.
Ashcroft, R. W.
Ayer, Benjamin

B

Babbitt, R.
Babcock, F. H.
Babcox, E. S.
Badenhop, Robert
Baird, Collier W.
Baird, Robert B.
Baird, Robert L.
Baird, William T.
Baird, W. T., Jr.
Balch, W. H.
Ballou, R. H.
Ballou, W. S
Banbury, F. H
Barber, L.
Barnard, H. H
Barnes, Charles W
Barrell, Dr. C. S
Barry, B. J.
Bartlett, E. R.
Basten, Otto.
Batchelder, Frank
Bates, Charles A.
Bates, G. J.
Bauman, H. A.
Baxter, H. L.
Beal, Herman L.
Beard, E. C.
Beatty, C. F.
Bechtel, Fred V.
Beckberger, W. A.
Bedell, H. H.
Bedford, Bruce
Beecher, L. A.
Beecroft, David
Behrand, Victor
Benedict, J. R
Bennett, W. C
Benny, E.
Bensinger, R. F.
Bergeron, George
Berrien, W. P.
Bers, A.
Bers, E.
Berzen, Nat
BeSaw, E. W.
Bicknell, J. W.
Bigelow, B.
Birkenstein, Louis
Bishop, E. A
Bjerrelius, A.
Blackhurst, L. R.
Blake, C. A.
Blattman, R.
Blumenthal, H.
Bogardus, E. M
Boggs, C. R.
Boggs, William M.
Boom, C. S.
Bourn, Jr., A. O.
Bourn, S. W.
Bouton, P. V. L.
Bower, C. M.
Bowers, George W.
Boyer, E. S.
Braender, F. L.
Braender, Harry
Braender, W. P.
Braham, John J.
Brennan, W. J.
Brewer, W. G.
Breyer, F. G.
Brill, A.
Broadwell, E. H.
Brown, C. A.
Brown, David
Brown, L. D.
Bruyn, Frank S.
Bruyn, T. S.
Bruyn, W. E.
Bullock, Hugh
Burley, H. B.
Burnham, J. Frank
Burr, A. E.
Burrill, W. S.
Burton, John R.
Butler, C. J.
Butler, R. S.
Byrnes, J. W.

C

Cadwallader, Samuel
Caldwell, J. C.
Caldwell, R. J.
Caney, A. W.
Carberry, John D.
Carkhuff, S. G.
Carleton, W. S.
Carnahan, G. H.
Case, C. C.
Cast, J. F.
Chace, Fred C.
Chalfin, Joseph
Chalmers, G. C.
Chatillon, M.
Chidester, W. H.
Ching, C. S.
Chipman, R. L.
Clark, C. B.
Clark, C. S.
Clark, Myron H.
Clark, Seth L.
Clarkson, Coker F.
Clemens, James
Clement, Thomas
Clements, Dr. R. L.
Cobb, J. H.
Coffey, J. H.
Cohen, F. M.
Coleman, H. H.
Comer, Charles
Comey, G. P.
Conant, Richard G.
Conlin, A. J.
Connolly, E. E
Conway, Mr
Cook, C. E.
Cook, C. S.
Cook, Horace T.
Cook, R. Y.
Cook, Mr
Cooley, A. B.
Cornell, A Boyd
Cottle, George T
Coughlin, Edward J
Courteney, J. H.
Cowen, R. R.
Coyle, J. W.
Craig, F. H.
Cranor, D.
Cranz, J. M.
Craver, B. B.
Crowley, J. T.
Cummings, E. O.
Cummings, H. H.
Cummings, W. L.
Cunningham, O. A.
Currier, G. T.
Curry, M. D.
Curtis, E. B.
Cutter, W. O.

D

Daggett, H. A.
Dammann, Milton
Dane, F. S.
Daniel, F. W.
Daum, G. W.
Davies, I. R.
Dayton, F. E
Dean, T. B.
Dearth, E. E.
DeLanié, E. C.
DeLanie, H. S.
De Lisser, R. L.
Denman, Walter R.
Desmond, T. A.
Devine, C. F.
Devine, J. W.
DeVries, D. H
Dickerson, W. H.
Dickson, John A.
Diesher, C. J.
D'Louhy, Joseph
Doty, H. S.
Doucette, W. M.
Dreisler, W. H.
Dumont, L. W.
Duncan, W. W.
Dunlap, W. B.
Dunsford, S.
Dwyer, T. A.

E

Earle, R. W.
Earle, W. P., Jr.
Eaton, Hugh C.
Eden, W. A.
Edson, Franklin C.
Elbogen, Paul
Englert, G. F.
Enright, W. F.
Evans, P. P.

F

Faber, Charles H.
Faber, Eberhard
Faber, E. L.
Fairbank, L. G.
Fargo, A. W.
Farrel, Franklin
Feinberg, David
Fellows, J. W.
Fenton, Frank
Fera, Henry
Field, H. E.
Fillingham, M. P.
Finch, E. S.
Firestone, H. S., Jr.
Fisher, R. L.
Fisk, H. G.
Fitch, E. H.
FitzGerald, F. B.
Flint, Dr. H. A.
Foley, Frank
Forney, A. C.
Forsythe, Thomas
Fosse, L. A.
Fulkert, C. L.
Fuller, H. P.
Fuller, R. L.
Fulper, Edward B.
Frank, A. A.
Fraser, E. B.
Frazee, W. C.
French, H. W.
Frey, Henry.
Friedman, George
Friis, Mr.
Friswell, A. E.

G

Gardner, L. D.
Gardner, T. M.
Garretson, C. D.
Garthwaite, A. A.
Gaskill, J. W.
Gauss, F. L. E.
Gibbs, E. D.
Gibbs, G. W.
Gill, Harry R.
Gillette, R. B.
Githens, H. A.
Glaenzer, G. B.
Glanz, C. W.
Glass, R. E.
Glidden, A. A.
Goebel, R. H.
Gold, William B.
Goldman, Herman
Goodrich, D. M.
Goodwin, L.
Goudie, J. O.
Gould, G. C.
Grady, J. E.
Grafton, E. H.
Grandin, F. C.
Granzen, R.
Gray, D. E.
Greene, Bartlett
Greenough, A. B.
Greer, William E.
Grieb, W. G.
Griffith, R. T.
Grow, George
Grunthal, George C.
Gunlock, William M.
Gunn, J. N.
Gussenhoven, W.

H

Haartz, John C.
Habich, C. S.
Habich, G. E.
Haefelein, H. J.
Haigh, H. J.
Haldane, D. D.
Hall, George E.
Haller, G. B.
Mr. Halsey
Hamblen, C. W.
Hamilton, G. H.
Hamilton, R. S.
Handy, J. L.
Hanff, H.
Hannay, A. B.
Hardy, Roger S.
Harm, Henry
Harris, S. W.
Harrison, Clark W
Hassenzahl, K.
Hauvette-Michelin, J.
Hauff, H.
Hawkins, D. A
Hayes, Col. J. H.
Haynes, C. R.
Heminway, M. L.
Henderson, F. R.
Henderson, H. H.
Hendricks, H. H.
Henry, M. H.
Herron, J. W.
Hess, W. J
Hewins, E. D.
Heyworth, Lawrence O.
Hichborn, George F.
Higgins, William
Hill, F. G.
Hines, W. D.
Hirsch, I. Henry
Hitchcock, Carl
Hodgman, G. B., Jr.
Hodgman, S. T.
Hodgman, S. T., Jr.
Holcombe, Harold W.
Holmes, J. C.
Hood, F. C.
Hope, H. M.
Hopkins, M. G.
Hopkinson, Ernest
Hopper, C. C.
Horn, Fred.
Hotchkiss, H. Stuart
Houk, H. L.
Howell, C. I.
Hower, H. C.
Hubbard, H. B.
Huber, Edward F.
Hughes, C. A.
Huxley, E. H.

I

Isaacs, L. M

J

Jackson, E. F.
Jackson, O. H.
Jacoby, E
Jamieson, William
Jamison, C. S.
Jefferds, Harry R.
Jemison, Alfred
Jenkins, H. W.
Johnson, Charles F. H.
Johnson, F. H.
Johnson, J. T
Johnston, Frederick A.
Johnstone, J. T.
Jones, C. S.
Jones, E. G.
Jones, Fred H
Jones, W. O

K

Kane, F. O
Kaufman, A. R.
Kaufman, W. B.
Kavanagh, C. J.
Kavenagh, W. E
Kearns, John
Keim, John R.
Kelly, J. H.
Kelly, Timothy J.
Kent, H. L.
Kent, W. J.
Kerr, T. H. S.
Kershaw, R. R.
Keyes, William
Kimball, T. F.
Kinloch, D. H.
Kirchock, F.
Kirkpatrick, L.
Kitchel, A. F.
Kittle, F. Lester
Kloss, George
Kniffen, F
Korn, E. A.
Kubie, D. S.
Kugler, H. W.
Kuhre, T. W

L

Laird, E. W.
Lamont, Sloan, Jr.
Landers, D. H.
Landers, R. A.
Lane, J. H.
LaSchum, E. E.
LaShelle, C. P.
Laurie, Irving
Lawrence, L. F.
Leahy, F. M.
Leavitt, E. W.
Lee, Ivy L.
Leisure, B. R.
Leiser, W. A
Lemon, B. J.
Leonard, R. S.
LePan, Louis N.
Leavitt, E. W.
Lewis, W. T
Ley, L. H.
L'Hommedieu, P. B.
Lincoln, H. F.
Lindsey, H. A.
Lindsey, T. S.
Litchfield, P. W.
Little, C. E.
Littlejohn, Lomax, Jr.
Littlejohn, R. M.
Lockhorn, C. J.
Loewenthal, R. M.
Long, J. W.
Longthon, B. E.
Lord, George F.
Louis, Joseph
Lovatt, Frank W.
Love, R. A.
Low, P. H.
Lowell, E. E
Lowrey, Sam
Ludington, G. A.
Lyon, F. H.

M

MacChesney, L. E.
MacGregory, H. L.
Mackay, J. M.
MacKusick, H. A.
Macomb, J. W.
Mahoney, P. H.
Manchester, A. A., Jr.
Marean, B. E.
Marks, A. H.
Marsh, H.
Marland, W. H.
Marsh, H.
Marshall, T. C.
Marquette, M. A.
Martin, A. C.
Martin, H. T.
Martin, Louis S.
Marvin, J. S.
Mason, E. A.
Matchett, Thomas
Mathey, F. A.
Matthaei, J. W.
Maurer, Edward
Maurer, E. J.
Mayl, J. E.
Mayo, George H.
McCauley, W. J.
McCay, C. B
McCullough, G. C.
McDonald, A. D.
McDonald, C. P.
McDonough, A. G.
McGaw, R. B.
McGuire, C. V.
McKay, C. B.
McKenna, Francis R.
McKenna, R. T.
McLean, J. F.
McMahon, Wm. W.
McMurray, L. L.
McWilliam, H. P.
Mead, Fred S., Jr.
Meade, James
Medkiff, David
Metzger, Wm. F.
Meyer, D. L.
Meyer, E. T.
Meyerfeld, Paul
Meyers, A. C.
Meyers, Sidney S.
Meyers, Walter E.
Midgeley, T. W.
Miles, D. E.
Millenthal, M.
Miller, C. E.
Miller, Charles P.
Miller, H. C.
Miller, I. L.
Miller, J. A.
Miller, T. W
Millhoff, F. C.
Milne, Gordon
Miner, W. H.
Mitchell, G. J.
Mock, D. A.
Moffatt, D.
Moock, Harry G.
Moore, A. W.
Moore, J. T.
Moore, W. H.
Morgan, E. K.
Morse, C. A
Morse, W. M.
Mowe, J. V.
Muehlstein, H.
Muehlstein, J.
Murphy, P. A.
Murray, C. E., Jr.
Myers, C. A.

N

Naylor, R. B.
Neal, Frank G.
Neter, N. E.
Newlean, J. W.
Nickel, F. B
Niles, Charles
Noble, W. M.
Norris, Webster
Norwood, Guy E.

O

O'Donnell, G. F.
O'Donnell, M. J.
Oakley, C. H.
Oldfield, Barney
Oliver, J. William
Oliver, N. E.
O'Neil, George I.
O'Neil, William
O'Neill, T. V.
Owen, W. B.

P

Page, Hutchison
Palmer, H. G.
Pam, Eric
Pardee, A. L.
Parker, David
Parker, Paul P.
Parkin, W. H.
Partridge, Gilbert F.
Patterson, D. A.
Pearson, Morris
Peaty, S. H.
Pell, George E.
Pepper, W. M.
Perks, P. W.
Perlish, Henry T.
Perry, H. G.
Peters, E. V.
Peterson, Mr.
Petze, C. L.
Pfaff, Edward F.
Pfeiffer, W. F.
Pfeiffer, W. I.
Phillips, A. D.
Pierce, Mr.
Pingree, Mellen H.
Pinto, Peter P.
Place, Charles A.
Place, F. N.
Plumb, J. I.
Pohle, Harry V.
Polack, E.
Polly, I.
Potter, Guy
Powers, F. Wade
Pralow, H.
Pratt, B. H.
Price, A. H.
Price, John W.
Price, W. C.
Priest, E. H.
Proctor, L. B.
Pusinelli, Fred

Q

Quine, C. R
Quinn, P. M.
Quinn, P. N.

R

Robinson, Harry E.
Robinson, J. T.
Rand, L. H.
Rankin, W. H.
Raymond, H. K.
Rector, Dr. J. M.
Reed, J. Ely.
Reeve, Arthur
Reeves, Alfred
Replogle, H. H.
Reynolds, F. I.
Reynolds, W. A.
Rheinstrom, B. A.
Richards, G. A.
Richards, T. G.
Rieder, T. H.
Roberts, I. S.
Robertson, J. G.
Robins, Thomas
Robinson, Harry E.
Robinson, J. T.
Robinson, S. G.
Robinson, Scott
Roche, Frank
Rockhill, L. C.
Rodenbough, J. S.
Rogers, E. R.
Roper, C. H.
Rosenberg, Joseph
Ross, F. J.
Roth, C. H.
Rothschild, M.
Rousmaniere, J. E.
Rutter, Frank
Ryan, L.

S

Sanford, G.
Sanford, H. R.
Sanger, Mack
Sangster, G. M., Jr.
Sayen, W. Henry
Schaefer, S.
Schaffer, F. F.
Schank, J. C.
Scheel, Henry V. R.
Scheinler, G. LeRoy
Schlosser, George
Schulthess, Ernest
Schuster, M. Lincoln
Schwab, F. M.
Schwartz, S. L.
Schwartz, S. Robert
Scotson, Charles
Scott, H. L.
Seaman, F. A.
Sears, S. H.
Searles, J. E.
Seger, C. B.
Seiberling, C. W.
Seiter, E. A.
Sharts, F. W.
Shellenberger, H. R.
Sherman, George W.
Shilts, W. D.
Shugart, G. S.
Shurtleff, E. H.
Sider, Jack
Simmons, J. B.
Simpson, Elliot
Simpson, W. B.
Singmaster, J. A.
Skinker, B. E.
Skinker, Cleveland
Skirm, George W.
Slauson, H. W.
Sloan, Charles
Small, E. J.
Smith, F. G.
Smith, F. Haskell
Smith, F. W.
Smith, Gordon
Smith, Herbert E.
Smith, Herman E.
Smith, H. J.
Smith, H. O.
Smith, J. A.
Smith, Theodore E.
Smith, Willard P.
Smithyman, D. D.
Sniffin, George W
Somerville, A. A.
Sorrick, C. H.
Spadone, C. C.
Spien, J. T.
Spitz, L.
Springer, F. V.
Stedman, A. W.
Stedman, C. A.
Stephan, F. T.
Stephens, William
Stephenson, F. K.
Stern, Fred
Stewart, Frederic
Stiles, Lynn D.
Stiles, W. H.
Stimson, H. W.
Stokes, Charles E.
Stokes, Robert J.
Straub, O. E.
Stuart, C. J.
Susskind, Jesse
Susskind, Sidney
Swatts, R. L.
Swain, J. G.
Sweeney, Chas. W.
Sweeney, E. C., Jr.
Sweeney, George R.
Sweeney, J. F.
Swett, J. A.
Switzer, Maurice

T

Taft, George A.
Tait, J. M.
Talbot, J. Alden
Tallman, J. M.
Tarof, E. J.
Taylor, James N.
Teevan, Charles L.
Terhune, R. A.
Thomas, J. W.
Thomas, L. H.
Thomas, V. G.
Thomas, W. G.
Thomason, C. S.
Thompson, Kennedy M.
Thompson, W. A.
Thorpe, Merle
Tiederman, P.
Tilney, A. A.
Tobin, Horace B.
Tompkins, L. D.
Tonner, R. L.
Townsend, G.
Tozier, Edward B.
Troescher, A. A.
Trudeau, P. W.
Tucker, A. Y.
Turner, Harold M.
Turner, Morton A.
Twombly, E. K.

V

Van Alst, J. Milton
Van Cleef, F. C.
Van Etten, J. de C.
Van Kleeck, C. M.
Vance, L.
Venn, Charles J.
Vinton, A. E.
Von Bermuth, F. A.
Von Schlegell, V.

W

Wagner, C. E.
Wagner, Henry C.
Walsh, Thomas F.
Wanek, A.
Wanning, F. D.
Ward, S. B.
Warner, L. C.
Warren, A. W.
Warren, F. A.
Warren, H. D.
Waters, Clark
Watson, J. K.
Waugh, A. E.
Weaver, O. L.
Webber, E. G.
Webster, E. C.
Webster, Stuart
Weeks, P. S.
Weida, Harry
Weisel, William
Weisendanger, Ulric
Welch, C. J.
Wellein, H.
Weston, J. C.
Wheeler, George
Wherry, H. P.
White, Albert R.
White, C. M.
White, J. J.
White, W. T.
Whiting, W.
Whitlock, William
Whitman, R. L.
Whittaker, William
Whittelsey, C. B.
Wiegand, W. B.
Williams, Frank L.
Williamson, H. L.
Willis, R. S.
Wilson, Charles A.
Wilson, C. Dudley
Wilson, C. T.
Wilson, E. B.
Wilson, Edgar H.
Wilson, W. H.
Wilson, R. P.
Wilson, Wesley E.
Wiltse, F. S.
Winans, W. R.
Winsor, G. G.
Wood, Charles E.
Wood, LeRoy
Wood, Theodore
Woodard, S. P.
Woodbury, R. B.
Woodward, F. R.
Woodward, Van Lear
Worthington, H. D.
Wray, P. O.
Wright, O. I.

Y

Yamanaka, S.
Yard, D. D. F.
Young, H. N.
Yule, G. G.

Z

Zimmerman, H. J.

Annual Meeting of The Rubber Association of America

The sixth annual meeting, (under the present charter) of The Rubber Association of America, Inc., was held at the Waldorf-Astoria on the afternoon of January 10, 1921. President Homer E. Sawyer presided. The session was a short one, such formalities as the reading of the call for the meeting and the reading of the minutes of the previous meeting being dispensed with upon motion from the floor.

GENERAL MANAGER'S REPORT

The president made no report, as the 20-page report of general manager and secretary Viles covered comprehensively the activities of the past year and the hopes and aspirations of the Association for the future. In view of the distribution of this report in printed form, it was not read, and on motion from the floor Part I, devoted to a summary of the past year, was accepted and placed on file. Its contents is familiar to readers of The India Rubber World who have followed the monthly account of the activities of the Association.

TREASURER'S REPORT

The report of treasurer Cox, also printed, was likewise accepted and placed on file. The accompanying balance sheet shows the organization to be in a strong financial position with a general fund of $161,646; bond investments, $136,961, of which $42,000 were invested during 1920; cash, $24,366; unexpired division funds, $3,313.

BALANCE SHEET—DECEMBER 31, 1920

Assets		
Cash in bank and on hand		$24,366.24
Investments	$136,961.25	
Less depreciation	9,691.25	
		127,270.00
Furniture and fixtures	$10,968.73	
Less depreciation	7,043.84	
		3,924.89
Guaranty Trust Co. (London Branch)		7,047.99
Baling presses		24.00
Accounts receivable		970.86
Accrued interest on investments		1,363.19
Annual banquet (1921) expense		141.44
Total assets		$165,108.61
Liabilities		
Arbitration committee		$100.00
Associate dues paid in advance		5.00
Annual banquet (1921) receipts		8.00
New York State income tax, withheld		35.42
Unexpended division funds		3,313.91
General fund		$161,646.28
Total liabilities		$165,108.61

ELECTION OF NEW DIRECTORS

The Nominating Committee placed before the Association the names of ten firm members from whom to elect five directors. A perforated printed ballot was used so that any five names might readily be detached. The balloting resulted in the election of Harry T. Dunn, president of The Fisk Rubber Co. (reelected); F. A. Seiberling, president of The Goodyear Tire & Rubber Co. (reelected); Horace De Lisser, chairman of the board of directors, Ajax Rubber Co., Inc.; W. O'Neil, vice-president of the General Tire & Rubber Co.; F. R. Henderson, of F. R. Henderson & Co.

AMENDMENT TO THE CONSTITUTION AND BY-LAWS

The proposed amendment to Article XI, Section 2, of the constitution and by-laws, formally authorizing as part of the annual dues of manufacturing firm members an annual pro rata fee based upon the amount of crude rubber purchased by each of such members, was unanimously adopted. This perpetuates in principle the informal agreement made during the war and since effective on the part of all manufacturing members to contribute to the Association three cents per hundred pounds for such rubber as they purchase. As the annual dues are obviously insufficient to carry on much desirable association work, this action was necessary.

The amended section reads as follows:

Annual Dues. The annual dues for affiliated members shall be twenty-five dollars ($25) per annum and for associate members five dollars ($5) per annum, payable in advance on January 1 in each year. The annual dues for firm members shall include a basic fee of fifty dollars ($50) per annum, payable in advance on January 1 in each year and for all manufacturing firm members an additional pro rata annual fee based upon the amount of crude rubber purchased by each of such members. The rate upon which such pro rata fee shall be based for each year or any portion thereof and the time and method of payment of such fee shall be determined by the Association at its annual meeting or at any special meeting duly called for that purpose. Members elected after January 1 in each year shall pay a proportion of the annual dues for the balance of that year beginning with the first of the month following election. Members who fail to pay their entrance fees, annual dues or other indebtedness within thirty days after the same become due, shall be notified by the treasurer, and if payment is not made within the next succeeding thirty days, shall be reported to the Executive Committee as in arrears, and may, at the discretion of the Executive Committee, be dropped from the membership rolls.

On motion of J. Newton Gunn it was voted that for the year 1921 the rate upon which the pro rata fee shall be based shall be three cents per hundred pounds of crude rubber purchased and that the time and method of payment of this fee shall be in accordance with the practice heretofore employed.

PROPOSED EXTENSION OF ASSOCIATION ACTIVITIES

In taking up Part II of general manager Viles' able report, devoted to plans for gradually enlarging the activities of the Association, president Sawyer explained that the recommendations were in large measure the valuable suggestions of the subcommittees of the Association. While the recommendations had received the favorable consideration of the Board of Directors, it was felt that, as they entailed increased expense, the full membership should have a voice in the matter, and he invited remarks, comment and criticism from the floor.

On motion of W. O. Rutherford, seconded by J. Newton Gunn, Part II of the general manager's report was unanimously referred to the incoming board with power to act.

On motion of F. A. Seaman, seconded by R. Wolf, a unanimous vote of thanks was extended to all the officers and directors and to the general manager and his associates in the office for the very good work done by each of them during the past year. Following this, there being no further business, the meeting adjourned.

ELECTION OF OFFICERS

Immediately following the general meeting, the Board of Directors met in another room of the Waldorf-Astoria and the officers of the Association for the year 1921 were elected as follows: president, Harry T. Dunn; first vice-president, F. A. Seiberling; second vice-president, Horace De Lisser; each to serve for a term of one year.

The Executive Committee for the year is comprised of the following:

Harry T. Dunn, chairman;	F. R. Henderson,
J. S. Broughton,	F. A. Seiberling,
Horace De Lisser,	Homer E. Sawyer (ex-officio).

Officials and Directors of Rubber Association of America, 1921

Frank A. Seiberling
First Vice-President

Harry T. Dunn
President

(C) Underwood & Underwood, N. Y.
Horace De Lisser
Second Vice-President

J. S. Lowman

William C. Cox
Treasurer

J. Morgan

A. L. Viles
General Manager and Secretary

S. G. Lewis

J. N. Gunn

A. D. Thornton

J. A. Maguire

J. S. Broughton

W. O. Rutherford

Portraits of A. H. Brown, F. R. Henderson and W O'Neil, directors, not available

THE 1921 ASSOCIATION PROGRAM

In part II, of his report General Manager Viles asserts that with the Board of Directors he believes the time has come for equipping the Association with the facilities and organization necessary to serve its members more effectively along the more comprehensive lines employed by other trade organizations representing important industries and competently serving as the medium for cooperative effort in all matters of interest.

The Board of Directors has favorably considered numerous suggestions by firm members and the various divisions of the Association, and through the general manager recommends to the membership that the Board of Directors be authorized to proceed with the desired extension of the organization and its activities. This embraces: (1) an export or foreign trade department; (2) educational publicity for the industry in general; (3) a cost accounting department; (4) an industrial relations department; (5) research and statistical work; (6) standardization and specification work.

The proposals for broadening the scope of the Association are not an idealistic program for which no real demand has become evident, but represent the natural development of interest in the activities of the various divisions of the Association during the past year, and are presented as the needed equipment for carrying on work which has, to a greater or lesser extent, already been started. The recommendations do not contemplate any research work in connection with the technical, chemical or mechanical phases of rubber goods production, as that would duplicate the activities which manufacturers are better qualified and equipped to handle, but rather an increase of the Association organization to handle more efficiently the routine work which it is already being called upon to perform.

Careful consideration of the project was asked of the membership because the entire program would involve an additional expense which, when added to the annual expenditure of the Association as at present operating, would very closely approximate the annual income from all sources which may reasonably be anticipated for the next two or three years, provided the present basis of contributions to the Association is continued. However, the Board of Directors believes that it is so fundamentally sound in all its phases and will represent so satisfactory an investment that it should be proceeded with immediately. In this connection it is pertinent to state that the Association, even with the enlarged organization suggested, would represent an investment by the industry which is considerably less than that of other trade organizations representing other major industries.

DIVISIONS' AND COMMITTEE MEETINGS

Meetings of committees and divisions of the Association were held at the Yale Club, the Union League Club, and the Association rooms in New York City, and officers elected for the ensuing year.

Industrial Relations.—A meeting of the Executive Committee was held at the Yale Club, January 10. General labor conditions and other matters of a routine nature were discussed.

Hard Rubber Manufacturers' Division.—The annual meeting was held at the Yale Club, January 10, at which trade conditions in general were discussed. Harry Weida, The India Rubber Co., was elected chairman for the ensuing year.

Rubber Footwear Division.—The annual meeting was held at the Union League Club, January 10. George H. Mayo, United States Rubber Co. and Francis S. Dane, Hood Rubber Co., were reelected chairman and vice-chairman, respectively, for 1921. A very interesting discussion was had in connection with present conditions in the rubber footwear industry.

Cycle Tire Manufacturers' Committee.—This committee, a newly organized one, met at the Yale Club, January 11. The meeting was primarily of an organization nature although several other matters of interest to motorcycle and bicycle tire manufacturers were brought before the members.

Mechanical Rubber Goods Manufacturers' Division.—A very interesting meeting was held at the Yale Club January 11. C. E. Cook, The B. F. Goodrich Co., was elected chairman for the ensuing year, and C. D. Garretson, The Electric Hose & Rubber Co., elected vice-chairman.

Rubber Sundries Manufacturers' Division.—A meeting of the Executive Committee was held at the Yale Club January 11, which was followed by a meeting of the division. Charles J. Davol, Davol Rubber Co., who has been chairman for the past year, was succeeded by H. A. Bauman, The B. F. Goodrich Co., who, as vice-chairman, is succeeded by A. W. Warren, Hodgman Rubber Co.

Rubber Reclaimers' Division. A meeting of this division was held at the Yale Club January 11, with a good attendance. F. H. Appleton, Appleton Rubber Co., and Clark W. Harrison, Bloomingdale Rubber Co., were reelected chairman and vice-chairman, respectively, for 1921. A general discussion was indulged in by those present in regard to the general business conditions in the reclaiming industry.

Specification Committee, Mechanical Rubber Goods Manufacturers' Division.—A meeting of this committee was held January 11 in the association rooms. Matters of a detail nature of interest were considered, following which the Committee held a conference with the Executive Committee of the Mechanical Goods Division, the subject of which was the future work and activities of the Specification Committee.

Rubber Proofers' Division.—A meeting was held at the Yale Club January 12. General trade conditions in the rubberizing industry, as well as the subject of the cancellation of contracts in the auto-top manufacturing industry were the main topics of discussion. N. Lincoln Greene, United States Rubber Co., clothing division, was elected chairman, and A. W. Warren, Hodgman Rubber Co., was elected vice-chairman.

Foreign Trade Division.—A meeting which proved particularly interesting because of the contemplated organization of a foreign trade department of The Rubber Association was held at the Yale Club January 12. C. A. Wilson, Dural Rubber Corporation, was elected chairman, and R. H. Daniels, The Goodyear Tire & Rubber Co., was elected vice-chairman.

Tire Manufacturers' Division.—The annual meeting was held at the Yale Club January 13, which was immediately preceded by a meeting of the Executive Committee of that body in the association offices. The following officers were elected: Seneca G. Lewis, Pennsylvania Rubber Co., chairman; Joseph C. Weston, Ajax Rubber Co., Inc., vice-chairman. Executive Committee: Pennsylvania Rubber Co., Ajax Rubber Co., Inc., Kelly-Springfield Tire Co., Hood Rubber Co., The Fisk Rubber Co., The Miller Rubber Co., The Portage Rubber Co., Lee Tire & Rubber Co., Swinehart Tire & Rubber Co., Firestone Tire & Rubber Co., Empire Tire & Rubber Co., United States Tire Co., The B. F. Goodrich Co., The Goodyear Tire & Rubber Co., The Star Rubber Co., The Mohawk Rubber Co., and New Jersey Car Spring & Rubber Co., Inc.

Traffic Committee.—The annual meeting was held in the Yale Club January 10, at which a docket containing a large number of subjects was discussed. For the year 1921 H. J. Zimmerman, The B. F. Goodrich Co., and A. D. Phillips, The Fisk Rubber Co., were elected chairman and vice-chairman of the committee, respectively, who, with the following members, will constitute the Executive Traffic Committee of the Association; George F. Hichborn, United States Rubber Co.; John A. Moore, Ajax Rubber Co., Inc., E. C. Webster, Hood Rubber Co.; E. L. Morgan, The Miller Rubber Co., and L. H. Ley, Kelly-Springfield Tire Co.

The Traffic Committee appeared before the Consolidated Classification Committee on January 11, respecting ratings and packing specifications covering several rubber articles, principal among which was the question of more elastic specifications for paper wrapping on tires.

STANDING COMMITTEES

The personnel of the Standing Committees of the Association for the year 1921 was decided upon as follows:

COMMITTEE ON NOMINATIONS

B. G. Work, The B. F. Goodrich Co., 1780 Broadway, New York.
H. S. Firestone, Firestone Tire & Rubber Co., Akron, Ohio.
G. B. Hodgman, Hodgman Rubber Co., Tuckahoe, New York.
F. C. Hood, Hood Rubber Co., Watertown, Massachusetts.
H. E. Sawyer, United States Rubber Co., 1790 Broadway, New York.

LEGISLATIVE COMMITTEE

Charles Neave, chairman, counsel of The Rubber Association of America, Inc., 5 Nassau street, New York.
F. C. Van Cleef, The B. F. Goodrich Co., Akron, Ohio.
Ernest Hopkinson, United States Rubber Co., 1790 Broadway, New York.

AUDITING COMMITTEE

E. M. Bogardus, The Fisk Rubber Co., 52 Vanderbilt avenue, New York.
W. O. Cutter, United States Rubber Co., 1790 Broadway, New York.

BANQUET COMMITTEE

A. W. Warren, chairman, Hodgman Rubber Co., Tuckahoe, New York.
G. A. Ludington, The Fisk Rubber Co., 52 Vanderbilt avenue, New York.
H. C. Miller, The B. F. Goodrich Co., Akron, Ohio.

OUTING COMMITTEE

J. V. Mowe, chairman, Kelly-Springfield Tire Co., 1710 Broadway, New York.
W. J. Kelly, Poel & Kelly, 347 Madison avenue, New York.
H. G. Palmer, The Goodyear Tire & Rubber Co., Akron, Ohio.

ARBITRATION COMMITTEE

Term January, 1921—January, 1924

A. A. Garthwaite, Lee Tire & Rubber Co., Conshohocken, Pennsylvania.
G. A. Ludington, The Fisk Rubber Co., 52 Vanderbilt avenue, New York.

With respect to the Traffic Committee and the Industrial Relations Executive Committee, the board was of the opinion that as the personnel is composed of men familiar with the work, a greater measure of efficiency can be obtained by their reappointment, and it was formally decided to handle the matter accordingly. The personnel of these committees is as follows:

TRAFFIC COMMITTEE

J. A. Moore, chairman, Ajax Rubber Co., Inc., 220 West 57th street, New York.
H. J. Zimmerman, vice-chairman, The B. Goodrich Co., Akron, Ohio.
George F. Hichborn, United States Rubber Co., 1790 Broadway, New York.
R. G. Kreitler, The Goodyear Tire & Rubber Co., Akron, Ohio.
A. D. Phillips, The Fisk Rubber Co., Chicopee Falls, Massachusetts.
E. C. Webster, Hood Rubber Co., Watertown, Massachusetts.
E. C. Knox, Firestone Tire & Rubber Co., Akron, Ohio.
E. L. Tragesser, The B. F Goodrich Co., Akron, Ohio.
E. J. Tarof, The Brunswick-Balke-Collender Co., 29 West 32nd street, New York.
C. K. Smaltz, The Mansfield Tire & Rubber Co., Mansfield, Ohio.
W. L. Hulbert, Boston Woven Hose & Rubber Co., Cambridge, Massachusetts.
L. H. Ley, Kelly-Springfield Tire Co., Akron, Ohio.
E. L. Morgan, The Miller Rubber Co., Akron, Ohio.
George A. Pierce, Electric Hose & Rubber Co., Wilmington, Delaware.
F. B. Fitzgerald, New York Belting & Packing Co., 91 Chambers street, New York.
W. D. Norris, The Republic Rubber Co., Youngstown, Ohio.
T. R. Stoughton, Pennsylvania Rubber Co., Jeannette, Pennsylvania.
J. C. Wells, The Philadelphia Rubber Works Co., Akron, Ohio.
I. C. Raub, The Portage Rubber Co., Barberton, Ohio.
A. A. Lindsay, Lee Tire & Rubber Co., Conshohocken, Pennsylvania.
L. S. Rogers, New Jersey Car Spring & Rubber Co., Jersey City, New Jersey.
O. E. Straub, H. Muehlstein & Co., 2401 Third avenue, New York.
J. E. New, The McGraw Tire & Rubber Co., East Palestine, Ohio.
A. L. Viles, general manager and secretary, 52 Vanderbilt avenue, New York.

INDUSTRIAL RELATIONS EXECUTIVE COMMITTEE

C. S. Ching, chairman, United States Rubber Co., 1790 Broadway, New York.
H. L. Baxter, vice-chairman, Hood Rubber Co., Watertown, Massachusetts.
H. O. Smith, Ajax Rubber Co., Inc., 220 West 57th street, New York.
D. E. Beynon, Dunlop Tire & Rubber Goods Co., Limited, Toronto, Ontario, Canada.
C. H. Oakley, Essex Rubber Co., Inc., Trenton, New Jersey.
W. R. Murphy, Firestone Tire & Rubber Co., Akron, Ohio.
H. T. Martin, The Fisk Rubber Co., Chicopee Falls, Massachusetts.
C. J. Jahant, The General Tire & Rubber Co., Akron, Ohio.
D. R. Stevens, The Goodyear Tire & Rubber Co., Akron, Ohio.
M. A. Flynn, The B. F. Goodrich Co., Akron, Ohio.
A. L. Viles, general manager and secretary, 52 Vanderbilt avenue, New York.

MECHANICAL GOODS SPECIFICATION COMMITTEE

The Board concluded to approve the appointment tentatively made by the Executive Committee of the Mechanical Rubber Goods Manufacturers' Division of the personnel of the Mechanical Goods Specification Committee, to be constituted of the same companies as during the past year, namely:

N. S. Noble, chairman, The B. F. Goodrich Co., Akron, Ohio.
J. W. Fellows, vice-chairman, Boston Woven Hose & Rubber Co., Boston, Massachusetts.
K. B. Kilborn, The Goodyear Tire & Rubber Co., Akron, Ohio.
J. M. Cranz, Hewitt Rubber Co., Buffalo, New York.
C. Bockius, The Manhattan Rubber Manufacturing Co., Passaic, New Jersey.
W. H. Cobb, New York Belting & Packing Co., 91 Chambers street, New York.
S. R. Clark, The Republic Rubber Corp., Youngstown, Ohio.
J. S. Broughton, United & Globe Rubber Co., Trenton, New Jersey.
A. L. Viles, general manager and secretary, 52 Vanderbilt avenue, New York.

It was also decided to request the general manager to convey to the Executive Committee of the Mechanical Goods Division the view of the Board that that committee should hereafter assume the authority for the appointment of the Mechanical Goods Specification Committee.

GENERAL TAX COMMITTEE

F. C. Van Cleef, chairman, The B. F. Goodrich Co., Akron, Ohio.
E. S. Kochersperger, Hood Rubber Co., Watertown, Massachusetts.
Kennedy M. Thompson, United States Rubber Co., 1790 Broadway, New York.

SPECIAL JOINT EXCISE TAX COMMITTEE

It had been suggested that the General Tax Committee might very properly take care of all tax matters connected with association work, including the excise tax situation, particularly for the reason that it is desirable to have a small committee well versed in this specific phase of the tax subject and available for frequent conferences with the management of the Association. The Board approved the suggestion and requested the general manager to notify the General Tax Committee that the scope of its activities was enlarged to include excise tax matters which had been given attention by the former Excise Tax Committee.

COMMITTEE ON CRUDE RUBBER

Superseding "Special Committee on Uniform Crude Rubber Contract and Nomenclature" and Committee on Rubber and Kindred Products

The advisability of appointing the personnel of these committees was considered particularly in the light of the possibility of an affiliation of The Rubber Association of America, Inc., with the Rubber Trade Association, whose membership consists of rubber brokers, dealers and importers. Representatives of the crude rubber interests on the Board participated with particular interest in this discussion, which resulted in the conclusion that the matters formerly handled by the two committees referred to might very well be given attention by a small committee of five members, three representing crude rubber interests and two representing manufacturing interests. The suggestion was made that the name of the committee be simply "Committee on Crude Rubber," which was considered to be comprehensive, and it was so voted by the Board. The appointment of the personnel of the committee was left to the president of The Rubber Association of America, with power to act.

AMERICAN TRACTORS ON RUBBER PLANTATIONS

Materializing in a sense the hope of mankind that the sword will be beaten into a plowshare, the American tractor, which served as one of the powerful engines of war, has developed into one of the foremost instruments of peace. The sturdy caterpillar tractor which the Allies found so useful in military operations is now being employed on a rapidly increasing scale in the production of the necessities of civilization. Particularly is this true with regard to the cultivation of rubber on the vast estates in Malaya, Sumatra, Borneo, and other places in the Far East, where much of the land is so encumbered with dead stumps and roots and tough underbrush that plowing with oxen is practically impossible and clearing can be done efficiently only with the most powerful tractors. Even the most conservative estate managers, who have long looked askance at labor-saving equipment, are being won over by demonstrations of modern agricultural machinery and have placed

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Tractor Plowing Rubber Land

many orders with the recently-established American tractor agencies in Penang, Singapore and other adjacent cities.

In a tractor trial a short time ago in Sumatra one of these machines easily plowed up twenty acres of jungle-free land in about five hours, a job which, it is said, would have required 100 coolies. The saving in labor cost and insuring rice and other provisions for the workers was self-evident. Weeding by tractors is gradually supplanting the old method of rooting out rank growth by means of plows and oxen, inasmuch as the cost of oxen and labor is steadily increasing. Yet the tractor is not intended to compete with either coolies or oxen, but to aid in

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Tractor Pulling Stumps on Rubber Plantation

their work. A large 75-h.p. American tractor has been rendering surprisingly good service in pulling tree stumps and clearing jungles in Sumatra, as well as in doing general plowing under most unfavorable conditions. Experiments are planned in breaking up the soil between rubber trees with tractors in trained hands in a way that may not damage the roots close to the surface.

During the past year nearly 1,000 American tractors have been sold in the Philippines, where the need of more abundant and effective power for various kinds of agricultural work is constantly growing more urgent. The tractor made its advent into the islands just when the shortage of draft animals began to cause grave anxiety, for, despite all the efforts to lessen disease among the *carabao* (water buffalo), these valuable cattle have been dying off rapidly. Nor have large importations of these animals from Indo-China and elsewhere offset the drain.

The labor situation is also troubling employing agriculturalists. The natives bitterly resent the bringing in of coolies from Java, the mainland, and other places, fearing lower wages or loss of work; and many employers are hoping for a solution of the problem in the tractor, which will probably suffice, with the native workers, for all agricultural needs. Another trouble which the planters have long found a difficult one to overcome was keeping down the growth of cogon grass, the grass used largely for thatching, and which grows higher than a man's head, and chokes up crops worse than weeds.

Students of rubber conditions in Brazil believe that tractors could be used in the Amazon country with decided success. Rubber trees are abundant, and will long remain so, but labor is scarce and getting dearer. While the tractor may not be needed at present for rubber cultivation, it would undoubtedly facilitate plantation work if the latter be started; and it should be useful for food cultivation, making jungle paths for latex gatherers, for hauling the raw gum to depots, and transporting supplies.

Rubber growers and cotton raisers will watch with interest the result of trials of agricultural tractors and self-contained plows of all kinds, many of them prominent American types, now being made in Egypt. The first demonstration will be plowing medium land for cotton in the southern delta, and the second of the plowing of heavy land in the northern delta. The country is said to offer unusual opportunities for the sale of American agricultural machinery.

A Glossary of Words and Terms Used in the Rubber Industry—II[1]

By Henry C. Pearson

In response to inquiries, the tentative plan of this glossary is to submit it in sections, as for example, general terms relating to crude rubber which appeared in the January issue. This installment to be all available terms relating to American crude rubber. Next, African and Asiatic crude rubber. Following these, manufacturing terms in general use in all lines of rubber manufacture, and, lastly, terms relating to specific rubber manufacturing lines. In the event that the work is of proven value, the various sections to be consolidated alphabetically in book form, making a fairly complete working dictionary of rubber terms.

NORTH, CENTRAL AND SOUTH AMERICAN WILD RUBBER

Acid-cured Rubber. The product from the coagulation of latex by acids. The terms applies generally to plantation Hevea where acetic acid is the coagulant, but here to the use of that acid in coagulating the latex of Ceará rubber.

Air-Dried Rubber. See Coarse Pará, Ceará and Centrals.

Alum Coagulated Rubber. Latex coagulated by the addition of alum. See Mangabeira, Ceará and Matto Grosso.

Angostura Rubber. Hevea rubber which comes down the Orinoco river in Venezuela from Ciudad Bolivar, and is of the same grades as Amazonian Pará. See Fine Pará.

Acre Caucho. See Caucho.

Acre Pará. Hevea rubber from the Federal territory of the Acre in Brazil. See Upriver Pará.

Amazon Rubber. A general term for any Pará rubber gathered on the banks of the Amazon or its affluents.

Amazonas Rubber. See Manáos Rubber.

Amole Rubber. Castilloa rubber produced by the use of an infusion made from the amole vine with the latex. See Centrals.

Beni-Bolivian. See Bolivian.

Bolivian Pará. Hevea rubber which comes down the Beni and other rivers in Bolivia to the Madeira and thence to the Amazon. It has a cleaner fiber and is tougher than most upriver. See Upriver Pará.

Bolivian Caucho. See Caucho.

Bolivian Weak Fine. See Weak Fine.

Cametá Pará. Hevea rubber from the port of that name on the Tocantins River. It is air coagulated and comes in cup-shaped pieces, massed into large blocks or balls, called in the English market, Cametá negroheads. See Coarse Pará.

Caucho. Rubber derived from the *Castilloa ulei*, not the product of the *Castilloa elastica* (Centrals), obtained originally from Peru, but later from most of the rubber-producing areas of Bolivia and Brazil. It is classified generally as upper river and lower river. It comes to the market as ball, strip and slab. The slab is the result of coagulation through the addition of astringent plant juices or of soap. The strip is rubber that has self-coagulated or air-dried in the tapping cuts. Ball is the agglutinated product of air-dried scrap and strips. The product varies considerably in cleanness, the shrinkage being from 18 to 45 per cent. The ports of shipment are Iquitos, Manáos and Pará.

Caviana Fine. Smoke-coagulated Hevea, the highest grade of islands, having a smooth, close grain, the name being taken from the island at the mouth of the Amazon which produces it. Small flattened pelles are known as Caviana knapsack. See Fine Pará.

Coarse Pará. (Sernamby, Negroheads). Air-dried, self-coagulated rubber from the Hevea, collected from utensils used in gathering, in cuts in the trees and scraps. These are pressed together in roughly shaped balls, 3 to 10 inches in diameter. In packing, these balls stick together and form rough masses like the receptacle in which they are shipped. The balls when cut open are of a dirty yellowish white shot through with black lines. They often contain dirt, and foreign matter. The shrinkage is 18 to 45 per cent.

Castilloa (Castilla) Rubber. A term used chiefly for the product of the *Castilloa elastica*. See Centrals.

Ceará Negrohead. See Ceará.

Centrals (Central American). Rubber from the *Castilloa elastica* and allied species and from certain Sapiums from Central and South American states north of the Amazon and including Mexico. The rubber has neither the elasticity nor toughness of fine or coarse Pará. It is marketed as sheet or slab, strip, ball and sausage. Sheet or slab is coagulated often in holes in the ground, the coagulant being the juice of the amole vine, soap or any common astringent. Strip is latex that dries in the tapping cuts. Scrap, balls and sausages are small masses of strip and other air-coagulated rubber stuck together for convenience in shipping. The principal ports of shipment are Port Limón and Greytown, Costa Rica; Bluefields and Corinto, Nicaragua; Belize, Honduras; Salvador, St. José, Guatemala.

Costa Rica Rubber See Centrals.

Colombian Rubber. Castilloa rubber that comes to the market in dark colored, air coagulated strips, graded as No. 1 and No. 2. A small amount of thin rough tarry sheet comprises the lowest grade called Cartegena sheets. See Centrals.

Cartegena Rubber. See Columbian Rubber.

Columbian Virgin Rubber. See Virgin Rubber.

Corinto Rubber. Castilloa rubber shipped from the Pacific port of Nicaragua of that name. See Centrals.

Chrysil Rubber. The product of a North American shrub, the *Chrysothamus nauseosus*. Still in process of investigation.

Ceará Rubber (Maniçoba-Manihot). A rubber produced in the southern Brazilian states of Ceará, Piauhy, Pernambuco, Bahia and Minas Geraes. It is the product of the *Manihot Glaziovii*, *M. Dichotoma* and the *M. Piauhiensis*. There are three forms of coagulation: air-drying, in which the latex coagulates in tears on the surface of the trees; alum coagulation, and acid coagulation. The rubber ordinarily comes to the market in the form of Ceará scrap, which is the air-dried product, roughly agglutinated to the shape of the shipping containers; Ceará negroheads, which is air-dried scrap pressed into balls, and Ceará sheet coagulated either by the addition of alum or acetic acid. The above grades as a rule contain much foreign matter and the shrinkage is large. The alum or acid-coagulated Ceará is sometimes rolled by machinery into thin sheets, forming what is known as Ceará crêpe. The air-dried scrap is also washed and marketed as washed Ceará scrap. The above-mentioned grades are all products of the *M. Glaziovii*. A higher grade is the product of the *M. Dichotoma* (Remanso rubber). This comes as Jequie sheet and Jequie crêpe. acid-coagulated; Jequie scrap and Jequie washed scrap, air-coagulated. What is known as Piauhy rubber is the product of the *Piauhiensis* or *Heptaphylla*, which is classed as Ceará. The principal points of shipment are Bahia, Pernambuco, Ceará and Paranáhyba. The rubber shows a shrinkage of 25 to 55 per cent.

Cure. An ordinary term for smoking or coagulating.

Crêpe. Thin crenulated sheets of rubber prepared by passing freshly coagulated latex or air-dried scrap through compression rolls. See Ceará and Mangabeira.

Entrefina. The Brazilian and English term for medium fine Pará. See Medium Fine Pará.

Esmeralda Rubber. Castilloa rubber from Ecuador. The usual grades are strip and sausage. See Centrals.

[1]Continued from The India Rubber World, January 1, 1921, pages 235-6.

Fine Pará (*Hevea Brasiliensis*). The highest grade and for years the unit of value in crude rubber. It is smoke-cured in biscuits (pelles) ranging in size from 4 to 40 pounds. The biscuits vary in color from dark brown to black. Cut open, they show dark brown toward the outside, changing to amber and finally to white at the center. Each biscuit is made up of a multiplicity of thin films as complete layers, each film separately smoked and coagulated. The factory shrinkage is from 10 to 18 per cent. The grades of fine Pará, besides their general terms, are further divided and given names of rivers on the banks of which they are gathered. Thus Upriver Pará not only is known as Bolivian, Peruvian, Acre, Matto Grosso, Amazonas, but a further subdivision comes in such river names as Madeira, Purus, Juruá and Javary and Beni, lesser affluents of the Amazon.

Guayaquil Strip. Castilloa rubber from Colombia and Ecuador. Classed as good and ordinary. Usually in slab form. Often very wet. See Centrals.

Guatemala Rubber. Castilloa rubber usually of poor grade. Is air-cured in thin sheets, pressed together green into slabs, often black and tarry. See Centrals.

Greytown Rubber. See Centrals.

Guayule Rubber. Rubber produced from a desert shrub indigenous to Northern Mexico, the *Parthenium argentatum*. The rubber occurs in the shrub not as latex, but as rubber, and is extracted from the woody bark either by mechanical or chemical means. The product is soft, rather resinous, but usually quite clean. The shrinkage is 15 to 40 per cent. It is marketed under the private brands of the extracting companies.

Hancornia Rubber. See Mangabeira.

Hevea Rubber. See Pará.

Hard Cure. The best quality of upriver fine, the biscuits being drier than those of the lower river. See Fine Pará.

Honduras Rubber. See Centrals.

Islands Coarse. Hevea scrap from the lower Amazon. See Coarse Pará.

Islands Medium. Large second grade biscuits of Hevea from the delta of the Amazon. See Medium Fine Pará.

Islands Fine (Soft Cure). Hevea rubber collected on the lower Amazon, especially on the islands of the delta. See Fine Pará.

Itaituba Pará. Hevea rubber from the head of steam navigation on the Tapajos River, Brazil. The fine and medium are apt to be poor and the coarse dirty. See Fine, Medium and Coarse.

Iquitos Rubber. Hevea shipped from the Peruvian port of that name. See Fine Pará.

Javary Caucho. Upper river Castilloa rubber from the river of that name. See Caucho.

Javary Pará. Hevea upriver Pará. See Fine Pará.

Juruá Caucho. Upper river caucho rubber from the river of that name. See Caucho.

Juruá Para. Upriver Hevea rubber from the river of that name. See Fine Pará.

Jequie Rubber. Manihot rubber from the southern states of Brazil. See Ceará.

Knapsack Pará. Especially good grade of upriver Hevea from the Madeira River, so called from the shape of the pelles. See Fine Pará.

Knapsack Caviana. Small flattened Hevea pelles. See Caviana.

Lower River. Caucho from the Amazon below Santerem and the affluents, Tapajos, Xingu, and the Tocantins. See Caucho.

Madeira Pará. Upriver Hevea, named for the great tributary of the Amazon. Is of excellent quality and has a fine close grain. See Fine Pará.

Manãos Pará. Upriver Hevea rubber exported from the capital of Amazonas. See Fine Pará.

Matto Grosso Pará. Hevea rubber from the state of that name. See Fine Pará.

Matto Grosso Caucho. Caucho from the Brazilian province of that name. See Caucho.

Matto Grosso Virgin. Alum-cured Hevea rubber, prepared in blocks 6 inches thick and 12 inches in length and width. The surface is brown in color, the inside greenish yellow. The shrinkage is 12 to 25 per cent.

Mangabeira Rubber. The product of the *Hancornia speciosa* indigenous to Southern Brazil. It is alum-cured, flabby and wet and comes in sheets of a tawny color resembling liver. The shrinkage is from 40 to 60 per cent. The sheets are sometimes machine washed and marketed as Mangabeira crêpe. The rubber is exported from Bahia and Pernambuco.

Medium Fine Pará (Entrefina). Second grade Hevea rubber in biscuits similar to fine Pará. The inside of the biscuit, however, is composed wholly or in part of small lumps or scraps of air-dried, or partly coagulated rubber or badly smoked rubber over which films have been deposited by smoking. On cutting it shows an uneven mixture of brown, black or dirty white lines. The shrinkage is 12 to 25 per cent. See Fine Pará.

Middle River Pará. Hevea rubber from the rivers Tapajos, Tocantins and Xingu. The grades are upper Tápajos, lower Tapajos, Upper Xingu and Lower Xingu Fine, and Tocantins. See Pará, Fine, Medium and Coarse Pará.

Mollendo Pará. Hevea rubber shipped from the Peruvian port of that name, but collected in southern Bolivia, prepared principally in biscuits. See Fine Pará.

Mexican Rubber. Castilloa rubber shipped from the Mexican ports of Vera Cruz and Puerto Mexico. See Centrals.

Mexican Guayule Rubber. See Guayule.

Maniçoba Rubber. See Ceará.

Manihot Rubber. See Ceará.

Negroheads. See Coarse Pará and Ceará.

New Crop. Rubber but recently gathered or about to be received from the gatherers.

Nicaragua Rubber. Castilloa rubber from the republic of that name and to a degree from neighboring republics. It is drier than most Centrals. The best grade is Greytown scrap. The principal ports of export are Bluefields and Greytown. See Centrals.

Old Crop. The product of a former season's gathering.

Orinoco Pará. See Angostura Pará.

Old Fine. See Old Crop.

Pará Rubber (Wild). A general term for rubber from wild trees of the genus *Hevea,* indigenous to South America. Called Pará because it was first shipped commercially from the Brazilian port of that name. Most of this rubber comes from the states of Pará, Amazonas, Matto Grosso and Acre in Brazil and from the forest areas in Bolivia and Peru east of the Andes. It is also found in a lesser degree in Colombia, Venezuela and the Guianas. The most important is the *Hevea brasiliensis,* although of the twenty or more species, several also furnish Pará rubber either alone or in admixture. Pará rubber is first divided into three grades of origin: islands, middle river and upriver. These in turn are subdivided into three grades of quality: fine, medium and coarse. See Fine, Medium, Coarse.

Pará Weak Fine. See Weak Fine.

Peruvian Pará. Upriver Hevea rubber from Peru. See Fine Pará. Also a term erroneously applied in the English trade to the rubber described under the heading, Caucho.

Peruvian Caucho. Upper river caucho. See Caucho.

Peruvian Tails. See Caucho.

Peruvian Weak Fine. See Weak Fine.

Panama Rubber. Castilloa rubber shipped from either of the Panama Canal ports. See Centrals.

Purus Pará. Hevea rubber from the river Purus. One of the choicest upriver grades. See Fine Pará.

Purus Weak Fine. See Weak Fine.

Piauhy Rubber. See Ceará.

Pernambuco Rubber. See Mangabeira.

Rubber Crop. Rubber gathered in the dry season; that is, from June to October. From November to May floods render most rubber areas impassable.

Remanso Rubber. A local name for Jequie rubber. See Ceará.

Rio Negro Weak Fine. See Weak Fine.

Sapium Rubber. The product of the *Sapium jemani* formerly plentiful in the Guianas, graded as Centrals. See Centrals.

Siphonia Rubber. An obsolete term for Pará rubber.

Sernamby. See Coarse Pará.

Smoked Pará. Rubber coagulated in thin superimposed films by exposure to smoke, usually of palm nuts. See Fine Pará.

Soft Cure. A term applied to smoked Hevea from the Lower Amazon containing more moisture than hard cured rubber.

Santos Rubber. Hancornia rubber from the Brazilian port of that name. See Mangabeira.

Scrappy Negroheads. A second grade of coarse Pará. See Coarse Pará.

Tears. Small nodules of air-coagulated rubber. See Ceará.

Tuno Rubber. A trade name for the product of the *Castilloa tunu*. Marketed in yellowish white, brittle balls, three to five inches in diameter. It contains over 80 per cent resin and nearly 10 per cent of gutta-like hydrocarbons. Rare.

Tuxpam Rubber. Castilloa rubber from the Mexican port of that name. See Centrals.

Upriver Pará. Hevea rubber from the Upper Amazon, the ports of shipping being Iquitos, Manáos and Pará. It comes in biscuits averaging 30 pounds in weight. It is divided into upriver fine Pará, or hard cure; upriver medium and upriver coarse Pará. It comes specifically from the Brazilian states of Amazonas, Matto Grosso and Acre; also from Bolivia and Peru. The grades are in general Amazonas fine and coarse; further subdivided as to river locality, as Madeira, Javary, Purus, Jurua, etc. Bolivian fine and coarse and Peruvian fine and coarse. See Fine Pará.

Upper River. A term used in connection with caucho from Upper Amazon. See Caucho.

Virgin Sheets Pará. See Matto Grosso.

Virgin Gum. An early term for Central or South American rubber other than Pará. Obsolete.

Virgin Rubber. The product of a tree indigenous to Colombia, the *Sapium tolimense*. It comes as sheet and is graded with Centrals. See Centrals.

Weak Fine. Hevea rubber collected from Heveas other than the *H. Brasiliensis* as the *H. Guianensis*, is classed as weak, although coagulated in the same manner. It is softer, more resinous and lacks nerve. It is graded as Pará weak fine, Purus weak fine, Bolivian weak fine, Peruvian weak fine (Mollendo Peruvian debil), Rio Negro weak fine.

White Pará Rubber. See Matto Grosso.

Xingu Rubber. Hevea rubber from the Lower Amazon affluent of that name. See Fine Pará.

The American custom of using abbreviations wherever possible may result in real monetary loss to the user, instead of saving time. A case in point is the use of abbreviations in consular invoices of goods shipped to Brazil, as a result of which receivers of American goods at Brazilian ports are frequently subjected to fines. The Brazilian invoice form requires consignors of merchandise to write out in full the name of the country of origin of the goods and the country where the goods are purchased in each of the columns provided for that purpose. When it is considered that custom house officials discharging the goods receive 50 per cent of the fine levied, the need for meticulous care to conform to every regulation becomes at once apparent.

SPECIFICATIONS FOR STARTING AND LIGHTING STORAGE BATTERIES FOR MILITARY AUTOMOBILE AND TRUCK SERVICE

The Bureau of Standards has issued the final revision of the following specifications for military and truck service, prepared by the Bureau with the cooperation of manufacturers and the Electrical Equipment Subdivision on Storage Batteries.

TYPE OF BATTERY

The battery shall be of the lead-acid type, using flat pasted plates and shall be constructed to withstand hard mechanical service conditions.

CAPACITY AND ARRANGEMENT

Medium and Heavy Trucks

Number of Cells	Minimum Capacity, Amp.-Hr.		Maximum Overall Dimensions			Assembly
	5-hr. Rate	20-min. Rate	Length,[1] In.	Width, In.	Height, In.	
3	60	31	10¾	7½	9⅞	Side to side
3	72	37	11⅞	7½	9⅞	Side to side
3	80	35	14⅛	7½	9⅞	Side to side
6	48	25	17½	7½	9⅞	Side to side
6	50	24	19¾	7½	9⅞	Side to side

[1]No allowance made for hold-down clamps.

Passenger Cars and Light Trucks

Number of Cells	Minimum Capacity, Amp.-Hr.		Maximum Overall Dimensions			Assembly
	5-hr. Rate	20-min Rate	Length,[1] In.	Width, In.	Height, In.	
3	60	31	9¾	7½	9⅞	Side to side
3	72	37	11⅛	7½	9⅞	Side to side
3	84	43	12⅝	7½	9⅞	Side to side
3	96	50	13¾	7½	9⅞	Side to side
3	95	43	15⅜	7½	9⅞	Side to side
3	84	43	20⅛	4¾	9⅞	End to end
3	95	43	20⅝	5⅝	9⅞	End to end
3[2]	90	45	18⅞	5½	11¾	End to end
6	36	19	13¼	7½	9⅞	Side to side
6	48	25	15⅜	7½	9⅞	Side to side
6[2]	60	31	17¾	7½	9⅞	Side to side
6[2]	48	25	20⅝	5¾	9⅞	End to end

[2]Not to be continued as a standard size beyond present requirements.

CONSTRUCTION

Connecting straps shall be of lead or lead-antimony alloy. Plates of like polarity in each cell shall be integrally burned to the respective straps. Straps are to be of pillar-post type of sufficient size and strength to be an adequate conductor and support for the group of plates.

Intercell connectors are to be of the "burned-on" type. The voltage drop in the intercell connectors is not to exceed 10 millivolts per inch of distance between post centers, when discharging at the 20-minute rate. Copper straps, when used, are to be lead coated and provided with terminals of lead or lead-antimony alloy, which are burned to the posts. Intercell connectors must not obstruct the filling apertures.

Plates shall be of good design and the best quality of materials and workmanship. This is to be judged either by laboratory tests or by a record of satisfactory field service at the option of the purchaser.

Separators shall be (a) of properly treated wood corrugated on the side next to the positive plate; or (b) of properly treated wood as specified in (a) plus a perforated or slotted separator of thin flexible hard rubber, placed between the positive plate and the ribbed side of the wood; or (c) of an approved rubber type. The separators are to be held in place by suitable hold-downs.

Terminal posts shall be plainly marked with the polarity as follows:

The positive terminal shall be marked *POS* or *P*
The negative terminal shall be marked *NEG* or *N*

The terminal posts are to be in accordance with the S. A. E. Standard for taper posts as follows:

	Inches
Small diameter, negative post	⅝
Small diameter, positive post	11/16
Taper per foot	1⅓
Minimum length of taper	11/16

Sealing nuts or other suitable means are to be used to prevent leakage around the terminal posts of the individual cells. If metallic sealing nuts are used, it is required that they be of lead-antimony alloy throughout.

Jars are to be of hard rubber and to conform in dimensions, design and quality to the Standardization of Hard Rubber Storage Battery Jars for Starting and Lighting Batteries[3] prepared for the Hard Rubber Division of the War Service Committee of the Rubber Industry adopted August 27 and August 28, 1918.

Covers are to be of a good quality of hard rubber. They are to be flat-top and bottom, or molded with flat top, free from acid pockets, with single sealing flange. The cover of each cell is to be provided with a filling aperture closed by a vent-plug of hard rubber. The vent-plug may be of the bayonet or screw type. Each vent-plug is to be provided with an outlet for the gas and a baffle-plate or equivalent means to prevent slopping of the electrolyte, or the escape of spray. Covers for cells of the batteries specified as for medium and heavy truck service may be of the double-flange type. They are to conform otherwise to the requirements of this section.

Sealing compound shall be of an acid-proof material that will adhere firmly to both rubber and wood surfaces, and of such consistency that it will not flow at 55 degrees C. (131 degrees F.) and will not crack, or separate from the rubber at a temperature of 20 degrees C. (— 4 degrees F.) under static test. The sealing compound must not be easily ignited.

Trays shall be of close-grained seasoned hardwood, such as oak, maple, birch, etc., free from knots, checks or other imperfections, up to the standard known as No. 1. Ends are preferably to be of one piece each, but may be of not more than two pieces, provided the joint is reinforced. The trays are to be lock-cornered and pinned top and bottom. Trays are to be painted inside and outside with at least two coats of acid-proof paint. The trays for batteries specified for medium and heavy truck service shall be provided with spacers and tie-bolts, or other construction to provide additional strength.

Handles are to be of good quality steel or other malleable metal securely attached to ends of tray. Handles are to project above the intercell connectors to protect the connectors from the top of the battery box, but the overall height is not to exceed that previously specified. Handles are to be coated with lead and then heavily coated with acid-proof paint.

Electrolyte is to be a solution of sulphuric acid in pure water of density not exceeding 1.310 at 25 degrees C. (77 degrees F.) when the battery is fully charged. When specified by the War Department for use in hot climates the density of acid at 25 degrees C. (77 degrees F.) shall not exceed 1.225 under the same conditions.

TESTS OF THE BATTERIES

Measurements of the ampere-hour capacity of the batteries are to be made at the following rates of discharge, or more, and the results are to be expressed as the capacity of 25 degrees C. (77 degrees F.). Tests are to be made with the normal density of acid not to exceed 1.310 at 25 degrees C. (77 degrees F.). The rates and the end-voltages required are as follows:

Rate of Discharge	End-Voltage Per Cell
5-hr.	1.70
20-min.	1.50

The battery shall be completely charged and allowed to stand idle four weeks. The decrease in capacity at the end of this period when discharged at the 5-hour rate shall not exceed 30 per cent of the capacity as determined in the preceding paragraph.

For 1 hour the battery is to be subjected to a vibration consisting of a simple harmonic motion having a frequency of 1,000 vibrations per minute through a vertical displacement of 5 mm. (0.2-inch). The battery is to be discharged at approximately the 5-hour rate. It must maintain a steady voltage and current. The cell terminals must not become loose in the covers nor the electrolyte flood the top of the battery. At the conclusion of this test the cells will be examined for broken connectors, straps and plates and for excessive sediment.

Samples of electrolyte are to be drawn with a clean pipette from the cells when fully charged. The maximum allowable impurities in the electrolyte taken from the cells are as follows:

Color	none
Suspended matter	trace
Platinum	none
Antimony and arsenic	trace
Manganese, per cent	0.005
Iron, per cent	0.012
Copper, per cent	0.005
Oxides of nitrogen	trace
Chlorides calculated as chlorine, per cent	0.012
Organic matter	trace

STATE OF BATTERIES AT TIME OF DELIVERY AS REQUIRED

Batteries intended for immediate use or for wet storage where suitable facilities are available are to contain electrolyte and be fully formed and charged.

Batteries in the bone dry condition are to have rubber separators only or an approved equivalent. The plates are to be fully formed.

When delivered in a moist condition the wood separators are to be thoroughly wet with water. The plates and separators are to be free from acid in appreciable quantities. The vents of the individual cells are to be sealed in an approved manner. The plates are to be fully formed.

When delivered dismantled for dry storage the plates are to be fully formed and dry. Wood separators are to be kept moist with slightly acidulated water in a suitable non-metallic container with cover. The individual parts are to be complete and to conform to the various sections of these specifications.

[3]See The India Rubber World, October 1, 1920, page 50.

FIRST ANNUAL HIGHWAY TRANSPORTATION SHOW, 1921

The Motor Truck Association of America, Inc., held its first annual highway transportation show from January 3 to 8, in New York City, at the armories of the Twelfth Regiment and of the First Field Artillery.

Apart from the display of trucks for every purpose, civil and military, and of indispensable accessories, special interest was given to the show throughout the week by the plan of setting apart each day of the show for the emphasis of certain important aspects of motor transportation. These designations were: Opening Day; Army Day; Motor Accident Prevention Day; Transportation Day; Farmers' Day, and Motor Truck Association Day. On each special day were featured by appropriate addresses, practical demonstrations and educational motion pictures.

Special exhibits were presented through the courtesy of the United States Army, American Legion, Bureau of Economics, Red Cross and Police Department of New York.

Two exhibits among the accessories shown had rubber interest. These were the Tru-Matic Tire & Tube Co.'s molded endless red rubber tube and the Martin Cushion Wheel.

The Wellman-Seaver-Morgan Co. exhibited a four-cylinder truck motor, 4¾ by 6 inches, 40—60-h.p. at 1000—1500 r.p.m. and displayed an inverted motor and one with cylinders removed for better exhibition of their construction.

A RUBBER-TIRED BOOK WAGON

A variation of the well-known tea wagon is the book wagon, adapted for use in libraries or for the home. It is a beautiful and well-made piece of furniture, of solid mahogany with book-trough at top and two extra shelves underneath for books, magazines, etc. The book-wagon stands 29½ inches high and runs easily on rubber-tired wheels, silently and without marring the finest floors or crushing the softest rugs.—Mark Cross, 404 Fifth avenue, New York City.

Artificial Lighting in the Rubber Industry—II[1]

The Fundamental Principles of Illumination (Physical)

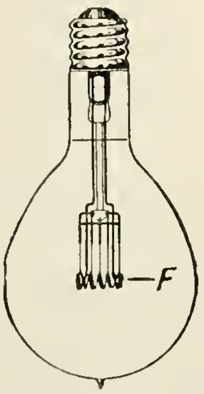
By E. Leavenworth Elliott

WHOSE BUSINESS IS IT TO PRESCRIBE THE LIGHTING?

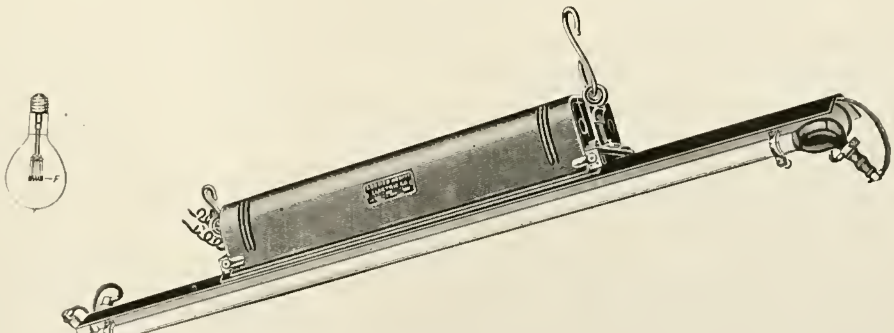
Before proceeding to discuss the scientific laws and theories pertaining to the use of light for purposes of illumination, it will be well to consider the subject briefly from the personal standpoint. To put the question in its plainest terms: Whose particular business is it to study the lighting problem, and prescribe the kind of illumination to be used?

The present lack of unanimity on this point is as remarkable as it is general. "What is everybody's business is nobody's business," is the nearest answer under existing conditions. The lighting in most factories is a mere makeshift; it is either an incongruous growth from an antiquated installation, or an arrangement laid out on empirical rules without regard to the special conditions under which it is to be used. Which of these two types is in use will generally depend upon the age of the buildings.

New buildings are usually turned over to the owners with the lighting equipment installed. Such equipment may be called the blue-print systems of illumination. They consist ordinarily of a certain conventional type of lighting unit distributed in geometrical order over the ceiling, no consideration being given to location of machinery, benches, or operative's position. "Blue-print lighting" is the result of the problem being handled by the architect or construction engineer. And again I disclaim any intention of reflecting upon the ability of either of these practitioners in their own proper spheres; the only criticism in this case being that they have assumed jurisdiction over a matter with which they have no logical connection. Having assumed jurisdiction, responsibility for results follows, and the results are very generally bad.



High Candle-Power Filament Lamp. Luminous Source, Heavy Lines F, A Circle One-Inch Diameter



Cooper-Hewitt Mercury Lamp, Luminous Source, Vapor in Glass Tube, One-Inch Diameter, Fifty Inches Long. Insert, Filament-Lamp Using Same Current and Reduced to Same Scale

Again, the light being produced from electricity, the whole matter is often turned over to the electrical engineer, whose business it is to install and maintain the electrical equipment. This may produce results having varying degrees of good and evil. If it is simply a matter of initial equipment it will result in a "blue-print lighting" system. If it involves maintenance, it may result in a system chosen wholly with regard to cost and trouble of upkeep, which is fundamentally wrong from the standpoint of rational economics, as I have already shown. On the other hand, the electrical engineer, especially if he is the regular works engineer and not acting in a consulting capacity, may become interested in the lighting problem in its broader aspects, which far exceed the mechanical and electrical boundaries of his professional duties. In such case he will probably pick up considerable practical knowledge from the more observing operatives, and so be able to give really helpful advice on the subject. But such help as he may be able to give is wholly gratuitous; the knowledge and duties of the electrical engineer do not give him any *ex officio* control over the methods of lighting. He has discharged his full duty when he supplies and maintains such lighting units as are demanded, in the locations designated.

Much less often, the purchasing agent assumes the authority of selecting the kind of lighting apparatus to be used—a modern instance of following Hamlet's instruction to "assume a virtue if you have it not." The absurdity of the case only shows the limits to which neglect of this vital facility may extend. The purchasing agent, in his own proper element, asks only the one universal question, "How much?" To buy lighting equipment on a sole basis of first cost is exactly on a par with hiring responsible executives on a basis of salary only—which is enough said on this point.

Sometimes the chief executive is the dictator of the lighting equipment. This may occur in "one man" institutions by reason of financial control; or it may result from the type of personality that insists on being "the whole procession and the dog under the wagon." In any case the lighting will suffer, either from lack of sufficient personal study of the problem, or from time-worn prejudices, or both. The exceptions will be those small, self-contained concerns whose entire activities are within the intimate supervision of a single individual.

LIGHTING NOT AN ENGINEERING PROPOSITION

"I see what you are driving at. You want all the lighting turned over to illuminating engineers."

My dear sir, never did you guess wider of the mark. After nearly a quarter of a century of work and observation in this field, I am now convinced that industrial lighting is not, properly speaking, an engineering proposition. The net results of all efforts to this end have been to encumber the subject with a mass of mathematical formulas and mechanical details, by the manipulation of which, it is assumed, the proper prescription for the lighting in any given case may be derived.

Neither experience, nor a comprehensive study of the underlying

[1]Continued from The India Rubber World, January 1, 1921, pages 239-241.

principles, justifies this assumption. The ultimate results of an engineer's work exist in material structures—in railways, bridges, machines, power plants, mine shafts, etc.; the ultimate result of a lighting installation exists in the minds of those using the light; its success is measured by the efficiency with which the visual organs, of which the brain is an essential part, perform their functions. In plain words and few, the final question asked of any method of lighting is: How well can you *see* by it? The basis of any rational science of lighting is therefore to be found in psychology, rather than in physics and mathematics, which are the fundamentals of all branches of engineering. So we shall have to seek still further for the proper source of authority on the practical use of light.

The end and aim of industrial lighting is perfectly definite and sharply defined; it is, to enable the workman to see to do his work. Without light he can do nothing. With the best of light he can do all that his muscular strength and skill are capable of performing. Between these limits there are all degrees of efficiency. The output of the workman thus depends directly upon his ability to see; or, as the scientist would put it, the output of any given operative is a function of his visual impressions. The answer to our question should now be clear: the person by whatever title designated, who is responsible for the output of any assembly of workmen, should prescribe the kind of light and method of its use for each and every operation.

LIGHTING BELONGS TO PRODUCTION MANAGEMENT

Lighting is a part of production management. This definite assignment of the subject to its proper place in industrial organization would of itself be a decided step toward reducing it to a practical science, and rescuing it from its present position in no-man's land, where it is kept busy dodging the knocks aimed at it from all quarters.

Having thus placed the responsibility for the lighting in the department where it rightfully belongs, the duty rests with the general management to assign a particular individual to take personal charge of the matter. Makeshift lighting, which characterizes 90 per cent of the industrial installations, and which reduces output anywhere up to 40 per cent, is a direct result of the failure to place the responsibility and authority in some one person, directly concerned with production. All of the technical data necessary to handle the problem in a practical, scientific manner can be easily mastered by anyone having a common school education.

I shall attempt to give this data in plain English, stripped of all unnecessary scientific verbiage, and omitting all that does not have a direct practical bearing on the subject. The reader who takes the trouble to become familiar with what is given can investigate his own special problems in a scientific manner, and pass intelligent judgment on all schemes proposed by sales engineers who are inclined to embellish their arguments with high-sounding technical terms, and particularly if they find their prospect is unable to contradict them.

ANALYSIS AND CLASSIFICATION OF THE SUBJECT

The first step in the scientific treatment of any subject is analysis, taking it apart to discover the elements, or fundamental principles of which it is composed. Now, as to industrial lighting: there is light; there are the mechanical contrivances for producing light, classed under the general title of lamps, which are often equipped with globes and reflectors for modifying the light; there are the objects on which the light falls and which it illuminates; there is the eye which receives light from the objects; and the brain, which gives the sensation of seeing.

The next step is classification. In this case the elements involved fall into two classes: the production of light and its conversion into illumination, and the action of the visual organ in producing the mental sensation of seeing.

Two different sciences will, therefore, be called upon to furnish the facts and theories, the judicious application of which will enable us to secure the most satisfactory results. These two sciences are physics, dealing with light, and psychology, dealing with vision. Lighting, as a science, is thus a branch of psychophysics.

But let not the practical, intelligent production manager, superintendent, foreman, or workman take fright at these high-sounding names. All that he needs to know of these sciences to enable him to handle his lighting problems understandingly is quite within his comprehension, as I hope to show.

NATURE OF LIGHT

Light is a form of energy which acts through space by means of wave motions. It is of the same nature as the energy used in wireless telegraphy, the only difference being in the size of the waves. The general properties of waves may be observed from those on water. Thus, if you drop a pebble into a pond of still water, you will see a series of waves spread out in the form of concentric circles, each circle enlarging uniformly until it reaches the shores of the pond. Any given point in a wave moves out from the center along a radius of the circle. If you bring your hands together sharply you set up a wave motion in the air, which you recognize as a sound; but in this case the waves spread out in the form of constantly expanding spheres, and so proceed in all directions in space, any given point in a wave traveling along a radius of the sphere. If you heat a piece of iron sufficiently hot it sends out in a similar manner a series of waves which spread in all radial directions, and which, if they enter the eye, produce the sensation which we call light. These waves are motions in a substance—or more accurately a medium, for it is quite different from what we know as substance, which is supposed to fill all space, and scientifically is called *ether*. It is in this ether that the wireless electrical waves move. Ether-waves are commonly called *radiations*.

Referring again to the water waves: the motion of the wave over the surface must be clearly distinguished from the motion of the water, which simply rises and falls with a definite rhythm. Recall now the waves on a large body of water; measuring from crest to crest they exhibit very great differences, from the huge dead-swell to the tiny ripple. This distance from crest to crest is called the *wave length*. Also, the waves show equally great differences in their height, or distance from the bottom of a trough to the top of a crest. This is called *amplitude* of the wave; the greater the amplitude the greater the amount of energy in the wave; on water high waves result from strong winds. You will recall further that waves of all sizes run over the water at the same time.

THE TWO MEANINGS OF LIGHT

We can now proceed with consideration of those waves, or radiations, which are called light because they produce the sensation of light on entering the eye. Note carefully now that the word light has two very different meanings, the one being an *effect upon the mind*, and the other the *form of energy* (radiations) which causes this mental sensation. These are, respectively, the psychological and the physical meanings of the term. Waves may differ in length and in amplitude. In light-waves variations in amplitude produce differences in intensity, or flux density, in the radiations, and differences of brightness in visual sensation. Differences in wave-length produce the variations of sensation which we call colors. The colors have a natural order, thus: beginning with the longest waves, the color is deep red; as the waves become shorter the color changes to brighter red, then to yellow, green and blue, the blue becoming fainter until it begins to show a mixture of dull red forming a violet, and finally becomes a faint crimson which soon fades entirely out. This succession of colors is called the *visible spectrum* and corresponds to the scale in music. The light of the sun and of all artificial lights with one exception contain all of the colors at once, but in somewhat different proportions. Pure sunlight is called white light. Any variation from the proportion of colors found in this standard

produces a colored light. *All artificial lights are more or less colored.*

THE TWO DIFFERENT KINDS OF LIGHT

By the use of glass prisms, or other devices, it is possible to separate the colors contained in any given kind of light, i.e., to produce the spectrum of that light. The rainbow is a natural spectrum of sunlight, and is called the "solar spectrum." The noticeable thing about this band of colors is that each color blends by the most perfect gradations into adjacent colors; the spectrum is *continuous,* there are no gaps, nor abrupt changes. This is true of all light produced from glowing solids or liquids. If, however, a vapor be heated to the point of incandescence or luminosity, and a spectrum formed of its light, it will be found that this spectrum is not continuous, but consists of certain lines of color separated by gaps or bands of darkness. This is called a *line spectrum;* and each kind of vapor has its own particular arrangement of color lines. One of the forms of electric lamps produces its light from glowing vapor (of mercury) and its light therefore differs from all other kinds of light in common use in that it has a line spectrum.

MEASUREMENT OF LIGHT

Light in the sense of energy can be measured. The most familiar measurement is the one expressed in *candle-power.* To speak of a 10-candle-power light is like speaking of a 40-horsepower motor. In each case the power developed from one source is compared to the power generated by another source taken as a unit; both are relics of the crude beginnings of scientific measurement. Candles and horses are themselves extremely variable in their powers, while the sole virtue of a unit is its constancy. However, very definite values have been evolved for these units so that their names are now only metaphorical. It is important to keep in mind that candle power does not signify quantity of light; it refers only to the intensity of the radiation in one direction, the horizontal.

The instrument for measuring candle-power is called a photometer. It consists of an arrangement by which two surfaces, one illuminated by a standard light (theoretically a candle, but actually an electric lamp), and the other by the light to be measured, can be seen side by side, and the brightness of one or the other varied until the two surfaces appear equally bright. The means generally used to vary the brightness is by changing the relative distances of the two lights from the observed surfaces, which are called the screen.

One of the fundamental laws of light is what is called "the law of inverse squares," and states that "the intensity of light varies inversely as the square of the distance from the source." Thus, if the intensity of light in a given direction at 1 foot from a lamp is 1 c.-p. (candle-power), at 2 feet from the lamp it will be ¼-c.p., at 3 feet, 1/9-c.p., etc. So, if the light to be measured has to be removed 4 times as far from the photometer screen as the standard lamp to bring the surfaces to the same brightness, then the light is 16 times as intense as the standard.

MEASUREMENT OF ILLUMINATION

A surface is illuminated when light falls upon it, and the *intensity of illumination varies inversely as the square of the distance of the surface from the light source.* To express the degree of intensity of illumination, therefore, a unit of distance must be used in connection with a unit of light. The units commonly used are the foot and candle, thus forming the *foot-condle* which is the intensity of illumination of a surface placed one foot from a light of one candle-power.

An instrument for measuring illumination is properly called an illuminometer. Such instruments operate on the same principle as photometers. A very small and compact instrument of this kind has been put on the market under the name of "Foot-candlemeter," which is not as accurate as the larger instruments, but is quite satisfactory for measurements of actual illumination as distinguished from laboratory conditions.

Measurements of intensity, whether of light or illumination, are not measurements of quantities, but of degrees of difference, and are similar to the measurements of intensities of heat as degrees of temperature. In order to form a unit quantity in either case it is necessary to introduce an additional unit. Thus, the unit quantity of heat, the calorie, is the amount of heat necessary to raise the temperature of a cubic centimeter of water one degree C., the definite quantity of water being the additional unit. In forming the unit quantity of light, a unit of surface (1 square foot) is taken, and when illuminated with an intensity of one foot-candle, it receives a definite quantity of light, which is called the *lumen.* Intensity in foot-candles multiplied by the number of square feet gives the total quantity of light in lumens falling on a given surface.

NATURE OF REFLECTION

There is one more measurement of light which is useful in the study of illumination, but before considering it we would better examine briefly the subject of reflection. When light falls on a surface, more or less of it is turned back, or reflected. What is not reflected is absorbed, i.e., changed from light into heat. Reflection is never complete; that is, a surface never reflects as much light as it receives. (There is one exception, but it applies only to certain optical apparatus.) This fact should be carefully noted. The fakes that have been based upon the assumption that light can be increased by reflection are many and varied, and date back for more than a century. If light could be increased by reflection, perpetual motion would be possible. The proportion of light which a surface reflects, expressed in per cent, is called the coefficient of reflection of that surface.

Besides differing in quantity, reflection also differs in quality, according to the character of the surface from which it is reflected. Thus, if the surface is perfectly smooth, like still water, or plate glass, or burnished silver, the reflection gives us images of objects, or, as we commonly say, we can "see things by its reflection." This is called *regular,* or *specular reflection.* If the surface is rough, the reflected light is scattered in all directions, which prevents its forming images, and gives only an effect of brightness to the surface. This is called *irregular,* or *diffuse reflection.* Most surfaces reflect the different colors of light with different degrees of completeness, or what is the same thing, absorb the different colors in different amounts, that is, they have "selective absorption." A surface which reflects only red light is called a red surface, and so for the other colors. Polished, or shiny surfaces are those which give a predominant amount of specular reflection; dull, or mat surfaces are those which give a predominant amount of diffuse reflection. All surfaces give some of each kind. Mat surfaces which reflect all the colors equally are white.

SURFACE BRIGHTNESS

We are now prepared to consider the other measurement of light, which is called surface brightness, and is the intensity of light reflected or emitted from a surface. The unit used for measuring this is called the *lambert,* and is the brightness of a surface, one square foot of which emits or reflects a light of 2 c.-p. intensity. The mille-lambert is .001 of this unit.

The (physical) efficiency of a lighting system is the ratio of the amount of light received on "the working plane," an imaginary surface parallel to and 30 inches above the floor, to the total amount of light generated. This is generally expressed as a ratio of watts per lumen. This "efficiency" is much talked of by illuminating "engineers," but is of trifling practical value, for reasons that will appear later.

So much for the physical measurements of light. While the lighting manager should be familiar with all the terms used, and the general principles upon which they depend, he will have comparatively little use for them in practice. Let us now give our attention to the mechanical side of the question, that is, to the lamps which generate the light, and the reflectors and other devices by which the light is distributed and diffused.

THE DIFFERENT KINDS OF ELECTRIC LAMPS

All electric lamps may be divided into two classes: those which produce light from an incandescent glowing solid, and those which produce light from an incandescent vapor. To the first class belong all forms of arc lamps, and electric "bulbs," or filament lamps. Of the latter the two different forms of tungsten filament lamps are the only types that need be considered today. To the second class belong the two types of mercury vapor lamps, the one in a long glass tube, commonly known, from the name of its inventor, as the Cooper-Hewitt lamp, and the other, a short tube of pure quartz, known generally as the quartz lamp.

These two classes of lamps are radically different mechanically, but the important difference—the most important fact in the whole subject of industrial lighting—is that the light from the filament lamps has a continuous spectrum (contains all the colors of the rainbow) while the light from the Cooper-Hewitt (mercury vapor) lamp has a line spectrum (contains only a few colors). The importance of this difference will be made clear after we have studied the structure and action of the visual organs. But let this be kept constantly in mind: the thing we see by is light, and there are two kinds of light now available. Differences in lamps are only incidental, and of very little consequence.

When we come to the subject of globes and reflectors, we are confronted by the mountain which, after prodigious labor, brought forth a mouse. Their number is legion, and the opportunities which they afford for mathematical juggling are endless. The literature of the subject is filled to overflowing with "papers" and discussions on this exhaustless topic. What it all amounts to in industrial lighting can be better shown later on, when we come to the consideration of actual problems; it will then appear that the matter is largely what Professor James called an "elaboration of the obvious."

SUMMARY

The applied science of illumination does not belong among the branches of engineering.

Industrial lighting should be in charge of the production manager, who should either personally superintend it, or place it in the hands of a responsible subordinate.

The scientific principles of illumination are divided into two classes; physical, those which deal with the production, distribution and measurement of light; psychophysical, those which deal with the construction and operation of the visual organs.

Light has two physical qualities, intensity, or brightness, and color.

Sunlight is made up of all the colors of the rainbow, which form the solar spectrum. All glowing solids give a light having a similar spectrum which is a continuous band of colors. Glowing gases give a line spectrum, i.e., a spectrum consisting of lines of color separated by lines or bands of darkness.

The spectrum of a light can be produced by passing it through glass prisms, which separate the colors.

Intensity is measurable. The unit is the candle-power, which is the intensity of light given out by a standard candle (now actually a standardized electric lamp) in a horizontal direction.

Intensity of light varies inversely as the square of the distance from the source.

Illumination is the result of light falling on a surface. It has the quality of intensity, which varies inversely as the square of the distance of the surface from the light source, and is measured in foot-candles.

The foot-candle is the intensity of illumination on a surface one foot from a standard candle.

Light falling upon a surface is partly reflected and partly absorbed. The percentage of reflected light is the coefficient of reflection of the surface.

Reflection is of two kinds, specular, or regular, and diffuse, or irregular. Specular reflection produces images of objects and gives shine or gloss to surfaces. Diffuse reflection gives surfaces a mat or dead finish.

Surface brightness is the intensity of light emitted by a surface. It is measured by the lambert, which is the brightness of a surface of one square foot which emits light of 2 c.-p. The mille-lambert is .001 of this unit.

The physical efficiency of a lighting system is the amount of light received on an imaginary plane 30 inches from the floor, divided by the number of watts used in generating the light, and is thus expressed in lumens per watt.

Electric lamps are of two classes: arc and filament lamps, which give a continuous spectrum, and vapor lamps, which give a line spectrum.

Accessories in the form of globes and reflectors are used with lamps to modify the distribution of light.

In the next article we will discuss the elements of vision; that is, the construction and operation of the eye.

UNITED STATES IMPORT DUTIES ON RUBBER GOODS

The following list has been taken from a schedule prepared by the Bureau of Foreign and Domestic Commerce solely for statistical purposes. This schedule will not be deemed authority for deciding, in doubtful cases, the rate of duty properly chargeable upon any imported article named therein.

Class No.	Tariff Paragraph		Unit of Quality	Rate of Duty
		CRUDE RUBBER, ETC.		
20,011	513	Wild rubber	*pound*	Free
20,021	513	Plantation rubber	*pound*	Free
20,031	513	Guayule	*pound*	Free
20,041	513	Jelutong (Pontianak)	*pound*	Free
20,051	513	Balata	*pound*	Free
20,061	502	Gutta percha	*pound*	Free
21,311	36	Crude chicle	*pound*	$0.15
21,321	36	Chicle, refined, dried, stained	*pound*	$0.20
		SCRAP AND RECLAIMED RUBBER		
20,111	513	Reclaimed rubber	*pound*	Free
20,121	513	Scrap or refuse	*pound*	Free
		RUBBER SUBSTITUTES		
20,211	385	Crude	*pound*	10%
20,212	385	Advanced by manufacutre	*pound*	15%
		RUBBER MANUFACTURES		
20,401	368	Druggists' sundries	*pound*	15%
20,671	368	Rubber tires and tubes	*number*	10%
20,911	262	Belting of cotton or other vegetable fiber and rubber	*pound*	15%
20,991	368	Other manufactures of rubber	*pound*	10%
20,995	368	Of gutta percha	*pound*	10%
20,999	369	Of vulcanized or hard rubber	*pound*	25%
		MANUFACTURES CONTAINING RUBBER		
31,425	262	Garters, suspenders, braces of cotton	*number*	25%
31,426	262	Tire fabrics of cotton	*square yard*	25%
33,995	262	Garters, tire fabrics, suspenders, braces, made of vegetable fibers and rubber	*yard*	25%
36,991	292	Webbings, suspenders, braces, of wool and rubber	*pound*	35%
37,315	316	The same, of silk and rubber	*pound*	45%
		RUBBER AND OTHER WATERPROOFED CLOTH		
39,161	254	Cotton or other vegetable fiber and rubber	*square yard*	25%
39,162	318	Silk, chief value	*square yard*	45%
39,163	288	Wool, chief value	*square yard*	35%
39,164	308	Mohair, chief value	*square yard*	40%
		WATERPROOF CLOTHING		
39,181	256	Cotton or other vegetable fiber and rubber	*pound*	30%
39,182	317	Silk, chief value	*pound*	50%
39,183	291	Wool, chief value	*pound*	35%
39,184	308	Mohair, chief value	*pound*	40%
39,185	278	Flax, hemp or ramie and rubber	*pound*	25%
60,894	114	Insulated wire	*pound*	15%
60,898	124	Card clothing, not attached to carding machines or parts of, manufactured with plated wire with rubber-face cloth	*square foot*	35%
61,394	138	Rivets, studs, for non-skid automobile tires	*pound*	20%
93,192	157	Fountain pens	*gross*	25%
94,213	368	Golf, tennis, foot basket and baseballs, chiefly of rubber	*pound*	10%
94,314	369	The same, chiefly of vulcanized rubber	*pound*	25%

A Ten-Year Financial Survey of the Rubber Industry

By Richard Hoadley Tingley

Compared with other "big business" in the essential commodities, wool, cotton, iron, the grains, etc., the rubber industry is but an infant in point of age, yet its lusty growth during the past few years has been so phenomenal and has placed it, young as it is, in such a premier commercial position, that a brief review of its wonderful strides into prominence will not be out of place. Escaping, up to now, most of the maladies to which children are usually subject, it is suffering at the moment with its first disorder. As in most children's diseases, however, the patient is considered to be in no danger and is expected soon to be up and about as usual—better than before.

There are hundreds of rubber manufacturing companies, large and small, that make every conceivable thing from that raw product, from buttons and "human shock absorbers" to the big tire casings and inner tubes. It takes many factories to use up the two hundred odd thousand tons of crude rubber that annually comes into this country. To enumerate all the important rubber manufacturers and to give an account of their doings is too much to be contained in a magazine review. Out of the hundreds, however, I have selected ten, whose financial operations I shall review, and out of the ten, there are six of the largest to which special attention will be paid in order to bring out, in graphic form, some of the big figures that are involved in the industry. These six are the United States Rubber Co., the Goodyear Tire & Rubber Co., The B. F. Goodrich Co., Kelly-Springfield Tire Co., The Fisk Rubber Co., and the Ajax Rubber Co., Inc.

Regarding the history of what these six have been doing, I shall say nothing but what is contained in the financial graph herewith. Regarding the other four, the Firestone Tire & Rubber Co., Hood Rubber Co., The Miller Rubber Co., and The McGraw Tire & Rubber Co., I shall tabulate some of the leading financial figures bearing on each.

In what follows I wish to draw particular attention to the fact that no attempt has been made, except in the graphs where price ranges have been brought nearly to date (December, 1920), to display any of the 1920 figures of capital, earnings, balances, etc.

FIRESTONE TIRE & RUBBER CO.

This company was incorporated in Ohio in 1910, taking over a company of the same name which dates back to a West Virginia incorporation of 1900. In addition to rubber products, it manufactures steel rims for tires, with plants at Akron and Hamilton, Ontario, Canada. Table A speaks for itself. The company has no funded debt.

TABLE A

Firestone

	Net Income	Dividends Paid	Operating Surplus	Stock Outstanding 1st 6% Preferred	2d 7% Preferred	6% Common
1920	....	....	....	$10,000,000	$10,000,000	$3,500,000
1919	$9,307,000	$2,597,009	$6,709,000	10,000,000	10,000,000	3,500,000
1918	6,520,000	2,610,000	3,910,000	8,500,000	....	3,500,000
1917	5,051,000	1,735,000	3,316,000	8,500,000	....	3,500,000

TABLE B

Firestone

Price Range

	6% Preferred High	Low	Common High	Low
1920	99½	...	200	...
1919	101	97	205	140
1918	101	93½	150	89¾
1917	108⅞	97	150½	97
1916	107¾	107	155	132

HOOD RUBBER CO.

Incorporated under the laws of Massachusetts in 1896, this company manufactures rubber boots, shoes and tires at its plant at Watertown, Massachusetts. It is said to be the largest independent rubber footwear company in the country, having a daily capacity of 75,000 pairs. The company publishes no income and expense sheet, and has no funded debt. Table C will show its financial position.

TABLE C

Hood

	Gross Sales	Common Stock	7% Preferred Stock	Assets	Surplus
1919	$22,969,000	$3,000,000	$5,000,000	$16,067,000	$2,864,000
1918	22,341,000	3,000,000	4,000,000	15,046,000	2,660,000
1917	18,573,000	3,000,000	4,000,000	13,748,000	2,312,000
1916	11,662,000	2,500,000	2,750,000	8,607,000	1,077,000
1915	9,084,000	2,000,000	2,500,000	7,355,000	1,275,000

The 7 per cent dividends have been regularly paid on the preferred stock since 1908. The common stock has been on a 12 per cent basis.

On October 27, 1920, the directors voted to change the existing common stock into an issue of 100,000 shares of no par value. The exchange has been made on the basis of two new shares for every one ($100) share held of the old stock.

THE MILLER RUBBER CO.

Incorporated in Ohio in 1906, this company owns The Miller Rubber Company of New York and of California. It has a capital stock outstanding of $10,000,000 in 1st preferred and $5,060,500 in common. Par value of shares, $100. In February, 1920, the authorized capital was increased from $20,000,000 to $60,000,000, of which $40,000,000 is to be 8 per cent cumulative preferred, par $100, and $20,000,000 common stock, par $10. There is no funded debt.

TABLE D

Miller

	Net Earnings	Dividends Paid	Operating Surplus
1919	$2,904,000	$710,651	$932,896
1918	1,650,000	528,243	214,660
1917	1,355,000	417,921	413,351

TABLE E

Miller

	First Preferred High	Low	Second Preferred High	Low	Common High	Low
1919	111	99¾	107	102	227	145
1918	100¼	90	...	...	160	99¼
1917	107	95	...	...	262½	112
1916	112¾	101¾	...	...	268½	241½
1915	113½	113	...	...	279½	193

THE McGRAW TIRE & RUBBER CO.

This company was incorporated in April, 1913, in Ohio. Its plant at East Palestine, Ohio, has a capacity of 5,000 tires and 5,000 inner tubes a day.

TABLE F

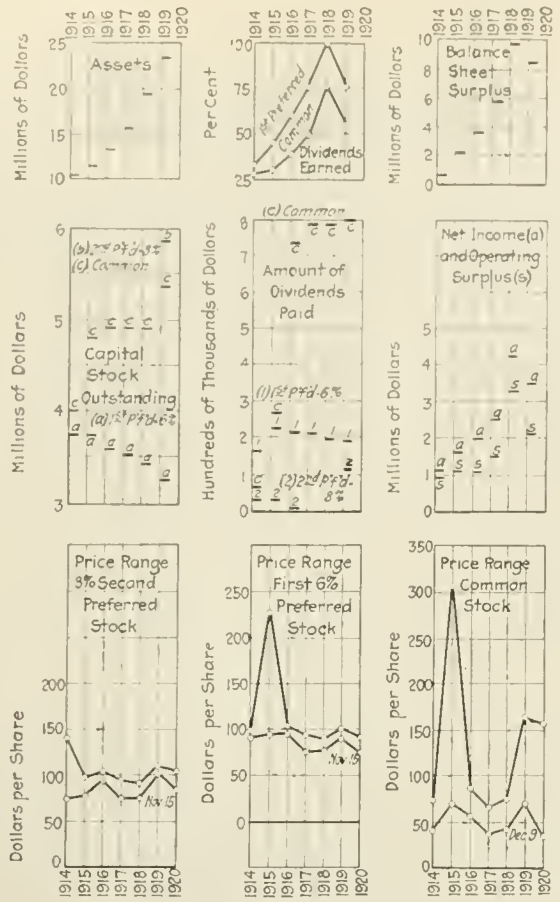
McGraw

	Net Profits	Capital Stock 7% Preferred	Common	Assets	Balance Sheet Surplus
1919	$380,393	$2,500,000	$496,540	$6,362,000	$1,621,000
1918	165,131	870,000	1,300,000	4,970,000	495,000
1917	726,832	1,000,000	1,333,333	5,246,000	601,000
1916	255,442	1,000,000	1,333,333	4,852,000	261,000
1915	312,306	500,000	750,000	....	....

There is no funded debt on the property; 7 per cent dividends have been regularly paid on the preferred stock. On the common stock, whose par value was formerly $100, 12 per cent dividends have been paid through 1919. In 1920, the common stock issue was changed to 100,000 shares, no par value, and an initial dividend was paid on this stock March 1, 1920, amounting to 75 cents a share.

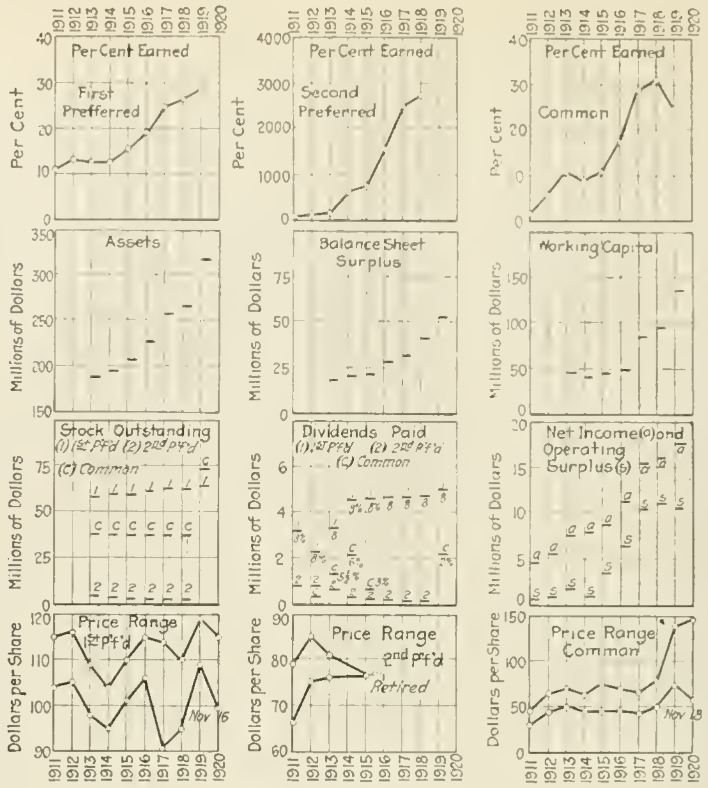
SUMMARY

The foregoing discloses some big figures that did not exist before. It discloses, for the year 1919, total assets amounting to $822,820,000 and a net working capital of $333,894,000. It tells



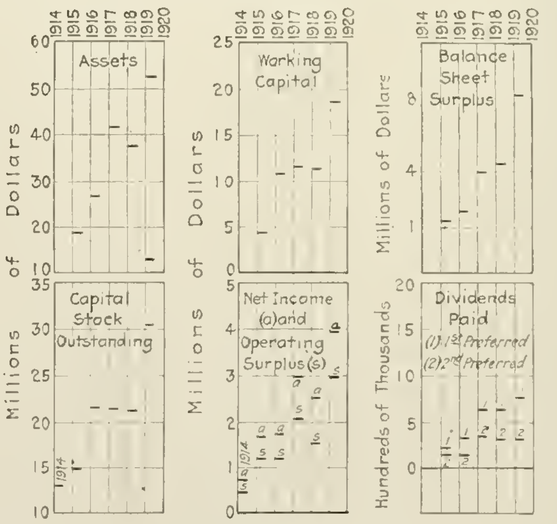
Kelly-Springfield Tire Company

Incorporated 1899 — A Six Year Financial Graph — No Funded Debt



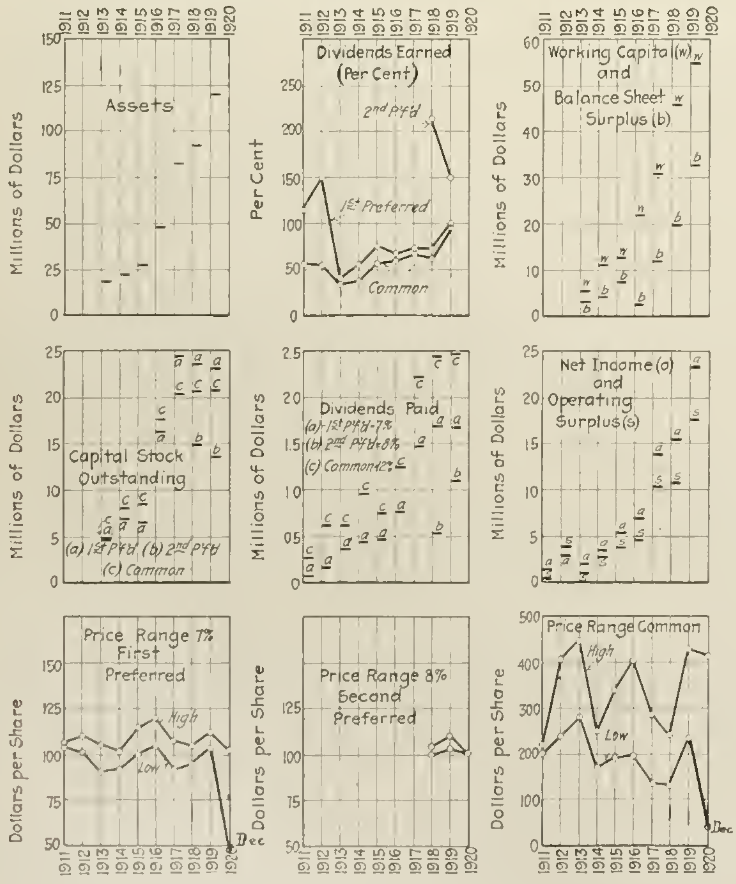
United States Rubber Company

Incorporated 1892 — A Ten Year Financial Graph



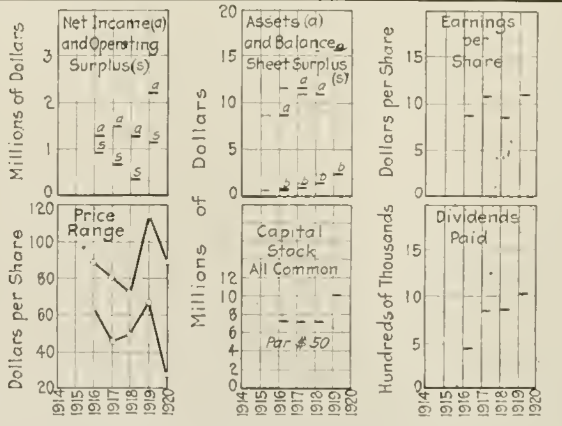
The Fisk Rubber Company

Incorporated 1912 — A Five Year Financial Graph — No Funded Debt



Goodyear Tire and Rubber Company

Incorporated 1898 — A Ten Year Financial Graph



Ajax Rubber Company, Inc.

Incorporated 1915 — A Five Year Financial Graph — No Funded Debt

FINANCIAL STANDING OF TEN OF THE LARGEST RUBBER COMPANIES, AS OF 1919

TABLE G

	Assets	Capital Stock Out	Dividends Paid	Net Working Capital	Net Income	Year's Operating Surplus
United States Rubber Co.	$319,534,000	$135,032,000	$7,140,000	$134,903,000	$17,730,000	$10,570,000
The Goodyear Tire & Rubber Co.	120,276,000	57,429,000	5,303,000	54,795,000	23,277,000	17,973,000
The B. F. Goodrich Co.	175,716,000	97,812,000	4,647,000	55,951,000	17,304,000	12,658,000
Kelly-Springfield Tire Co.	23,796,000	14,459,000	1,117,000	11,555,000	3,236,000	2,120,000
The Fisk Rubber Company	53,389,000	30,264,000	1,055,000	18,569,000	3,994,000	2,939,000
Ajax Rubber Company, Inc.	15,650,000	10,000,000	1,032,000	8,352,000	2,201,000	1,168,000
Firestone Tire & Rubber Co.	73,753,000	23,500,000	2,598,000	33,791,000	9,307,000	6,709,000
Hood Rubber Company	16,067,000	8,000,000	710,000	6,252,000	....	....
The Miller Rubber Co.	18,287,000	15,061,000	711,000	6,251,000	2,250,000	933,000
The McGraw Tire & Rubber Co.	6,362,000	2,996,000	175,000	3,475,000	380,000	....
Totals	$822,830,000	$394,553,000	$24,488,000	$333,894,000	$79,679,000	$55,070,000

TABLE H

Statistics of the Rubber Issues, November, 1920

Company	Common Stock	Par Value	Ann. Div.	Price Nov. 13	Investment Yield	High 1919	Low 1919	High 1920	Low 1920	Assets per Sh	Earnings First 6 Mos.
Ajax Rubber Co., Inc.	$10,000,000	$50	$6.00	$32	18.8	113	66	83¾	38⅝	51.00	$7.64
The Fisk Rubber Co.	12,254,000	25	3.00	15⅛	20.0	55	39⅜	48	19⅜	16.00	‡
The B. F. Goodrich Rubber Co.	600,000 sh.	No par	6.00	44¾	13.3	93½	56½	86¾	48	96.33	12.66
The Goodyear Tire & Rubber Co.	20,755,000	100	10.00	44½	14.6	430	227	415	103	261.00	‡
Kelly-Springfield Tire Co.	5,361,978	25	*4.00	39¼	10.3	164	68	152½	50¼	58.00	†7.43
Lee Tire & Rubber Co.	150,000 sh.	No par	2.00	19	10.1	40	21	38⅝	18¾	30.17	3.49
United States Rubber Co.	81,000,000	100	8.00	64⅞	12.3	139¼	173	143¾	74⅝	182.00	13.79

‡Not reported.

†Before taxes, but after deduction of preferred dividends.

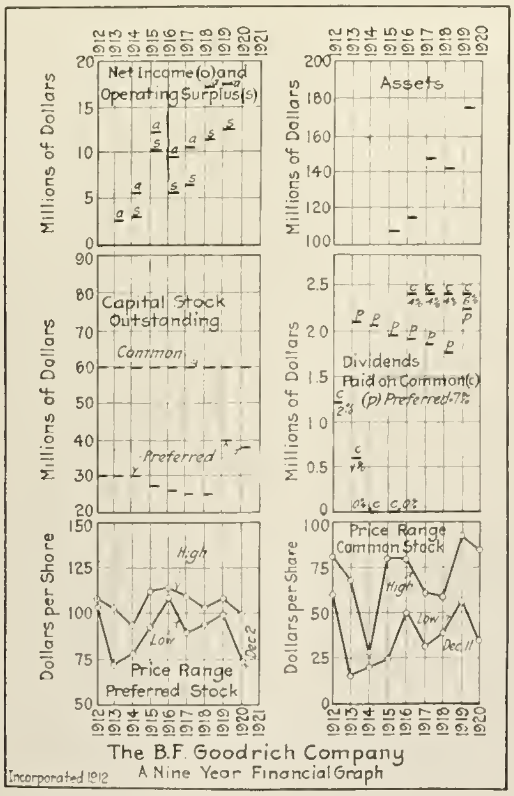
*Plus stock dividends of 3 per cent quarterly.

Compiled by M. S. Wolfe & Co., New York City.

the story of a dividend disbursement of $24,488,000 in that year on a capital outstanding of $394,553,000, or an average of more than 6 per cent. on all classes of stock. It tells the story of a net income and an operating surplus amounting to $79,679,000 and $55,070,000, respectively.

The operations of these ten companies for the year 1919 are summarized in table G.:

Illustrating the value of the common stock of the rubber companies whose shares are most active in the market, I introduce the above table H, which relates to conditions as they existed in November, 1920.



SELLING SAFETY IN THE FACTORY

Methods of furthering the Safety First movement by "selling safety" to every member of a manufacturing concern were aptly described by H. T. Martin, manager of the Health and Safety Department of The Fisk Rubber Co., Chicopee Falls, Massachusetts, in a paper read before the Rubber Division of the Ninth Annual Safety Congress held last September in Milwaukee, Wisconsin. One of the best mediums, he found, for safety propaganda was the factory house organ when made really interesting. Readers at home, often more impressed than the operative, generally pressed the caution-first articles on his attention. Moving pictures of safe and unsafe ways of working have been used with success by larger concerns. Safety first meetings of workers, with some "good time" features added, are also helpful in arousing interest and lessening accidents.

Cumbersome general rule books often confuse a new operative, when he would readily grasp a few simple, concise department rules such as a foreman might outline, subject to approval of the Safety Department. A No-Accident Day is also featured in some big shops, the date being well advertised and scoreboards being provided for all departments. On such days no accident counts unless it results in loss of time. Some inducement is given for the best score in safety contests. Sometimes the workers themselves stake small amounts in a pool to be given the winning department for a picnic or theatre party, the shop sometimes adding to the stake to show interest. It is found advisable often to induce workmen to take an active part in the accident prevention program by putting the more intelligent on inspection committees.

The victim of a shop accident is often a most effective safety first medium. The factory doctor, safety man, compensation insurance man and nurses can help to make an injured man returning to work a very effective safety salesman. A court of inquiry on all serious accidents, conducted by the factory manager, usually puts foremen on their mettle and they see to it, if possible, that no worker is badly harmed while in their charge. To deeply impress workers, Mr. Martin says, instructions should be given briefly and often.

The Netherlands East Indies proper comprise the islands of Java and Madura (Madoera); other Netherlands possessions in the Malay Archipelago, including parts of Borneo, etc., are grouped generally as outlying possessions.

What the Rubber Chemists Are Doing

THE ACTION OF LIGHT ON RUBBER[1]

In this paper the author, B. D. Porritt, cites many observations and investigations of the prejudicial effects of light on rubber, technically known as "perishing," beginning with the observations of Thomas Hancock, nearly 100 years ago, who found that by blackening the surface of the rubber, deterioration could be prevented. Similarly the deleterious effect on the rubber proofing of certain dressings present in the dyed fabrics, presumably metallic mordants, was remarked by him, as also was the fact that the non-caoutchouc constituents of the rubber exercised a marked protective effect.

DETERIORATION OF BALLOON FABRICS

Many eminent chemists have studied at many different angles the subject of perishing of rubber, one of the practical aspects being the deterioration of balloon fabrics.

Two types of protection have been found to give satisfactory results. One involves the employment of small proportions of litharge and other ingredients in the proofing mixture and probably depends mainly on the formation in the rubber of lead sulphide in a colloidal form. The other, which has been termed the "molecular protection process," involves the selective absorption of the ultra-violet light by a suitable colored organic compound actually dissolved in the rubber.

By the use of either of these two methods, especially if combined with some of the earlier protective processes, it is probable that at present the determining factor for the life of a balloon envelope in the tropics is the durability of the textile rather than of the rubber.

MASTICATION AND SUSCEPTIBILITY OF RUBBER TO LIGHT

With a view to determining whether the changes produced by the process of mastication have any effect on the susceptibility of raw rubber to light, a range of samples was obtained throughout the operation, and from these solutions were prepared and exposed, the viscosities being determined at intervals. The results would suggest that the physical changes produced in rubber by mastication are not necessarily the same as the initial effects arising from the exposure to light and air, and that the stability to light may increase rather than diminish with the severity of the treatment, though this is at variance with the results of Weber, who found that overmilled rubber was prone to oxidation.

SOLARIZATION AND USE OF ULTRA-VIOLET RAYS FOR VULCANIZING SOLUTIONS

It is desirable to draw attention to the fact that the action of light and air on rubber is not always associated with ill effects. In the early days of the industry, exposure to sunlight, a process termed "solarization," was frequently employed to produce a type of surface vulcanization.

A comparatively recent development of this old process involves the use of light sources rich in ultra-violet[2] for the production of "solutions" of vulcanized rubber. Under the influence of a quartz mercury vapor lamp, a solution of rubber and sulphur undoubtedly sets to a stable "gel," accompanied by the combination of a small proportion of the sulphur.

Under ordinary daylight conditions it is found, however, that the addition of sulphur to a rubber solution, if anything, accelerates the rate of viscosity diminution, and it was consequently thought of interest to see whether the removal of oxygen would enable the sulphur to respond to the more feeble incident radiation. An experiment in this direction did not, however, produce the anticipated result, those solutions to which crystalline sulphur had been added showed no apparent change after several months' exposure, while the blank sample containing rubber only, after a few days suddenly set to a "gel" without any obvious preliminary increase in viscosity. This gel on exposure was found to be rapidly transformed to a liquid.

PROJECTED NEW VISCOMETER

It is hoped shortly to design a viscometer which will enable these peculiar changes to be studied more thoroughly, using specially purified materials in view of the marked effects produced by traces of acid, and to verify Van Rossem's statement that, even in the absence of air, the action of light results in a reduction of the viscosity of rubber solutions.

While it would appear likely that the presence of air is not favorable to the light vulcanization effect, it must be noted that in the nascent condition oxygen is itself capable of producing a similar result, since organic peroxides which have recently been put forward as vulcanizing agents[3] have been proved in a measure to function as such.

AN IMPORTANT EFFECT

It may be of interest to draw attention to the important, but generally unrecognized effect which is produced in the vulcanization of rubber by the agency of sulphur and heat when this process is carried out in the presence of air. Goodyear's discovery of this remarkable transformation was due to the accidental heating of a piece of rubber containing sulphur and white lead. Hancock, when independently endeavoring to obtain the same result, secured no success by heating samples containing rubber and sulphur alone and ultimately discovered that to effect the change desired it was necessary to immerse the rubber in molten sulphur.

Technical experience has confirmed these early observations and proved that with sulphur only the absence of air is necessary to insure vulcanization, while to secure satisfactory results by the "dry heat" process, the use of a positive catalyst such as litharge, in addition to sulphur, is indispensable.

OXIDATION IN ABSENCE OF LIGHT

Comparatively little is known regarding the mechanism of the changes which take place during the perishing of vulcanized rubber, beyond the fact that the final products resemble those of raw rubber in properties and composition; that oxidation takes place in the absence of light if the material has been overvulcanized and is probably promoted by the presence of various catalysts.

Recent work, however, has shown that marked alterations take place on aging in the tensile properties of overvulcanized rubber prior to oxidation setting in,[4] and it is possible that in this preliminary physical change oxygen is again functioning as a catalyst —a suggestion which is now under investigation.

WAYS IN WHICH LIGHT AND OXYGEN OPERATE TO PRODUCE CHANGES

1. Under ordinary conditions the action of light and oxygen would appear to take place in two stages, the first being an alteration in the state of molecular aggregation during which oxygen functions mainly as a catalyst and the second a series of chemical reactions in which the active participation of oxygen is promoted by the formation of an autocatalyst, probably a peroxide.

2. The development of the former alteration, which constitutes "tackiness," is probably further promoted or retarded by other

[1] Joint meeting of Faraday Society and the Physical Society of London, 1920. Published in The India-Rubber Journal, December 4, 1920, page 21.

[2] Helbronner and Bernstein, Le Caoutchouc et la Gutta-Percha, 1915, 12. 8720.

[3] I. I. Ostromyslenski, Journal of the Russian Physico-Chemical Society, 1915, 47, 1453-61, and The India Rubber World, November 1, 1916, 65.

[4] Annual Report on the Progress of Applied Chemistry, 1919, page 338.

catalysts, while the final transformation into resinous compounds of indefinite composition, known as perishing, is possibly effected by an entirely different set of activating and inhibiting agents.

3. Though the reduction in the solution viscosity which characterizes the first effects of light and oxygen on rubber can be reproduced by the application of either heat or mechanical working in the cold, it is doubtful whether the changes thereby produced in the rubber are in other respects analogous.

4. In the presence of sulphur and under the influence of a light source rich in ultra-violet, in place of depolymerization, a change resembling vulcanization is induced.

5. In the absence of air, tackiness will not develop in the solid as a result of exposure to daylight, while a benzene-rubber solution under similar conditions sets to a gel which liquifies on reexposure to air.

6. In the absence of actinic light, rubber, either solid or in solution, undergoes no reduction in viscosity as a result of exposure to air, but if previously submitted to a limited amount of mastication tends to regain its initial properties. This change is, however, partially inhibited by oxygen.

7. The efficiency of sulphur as a vulcanization agent, unless supplemented by the presence of an appropriate accelerator, is neutralized by the presence of oxygen.

8. Under certain conditions oxygen would appear capable of assuming the function of a vulcanizing agent.

In considering the foregoing summary of the work in connection with the changes resulting from the action of oxygen and light on rubber, it will be well to remember that the little which is known is either related to chemical properties or else to one physical characteristic, namely, viscosity.

CARBON BLACK INDUSTRY IN LOUISIANA[1]

The natural gas fields of Louisiana are considered the greatest gas fields in the United States. The principal gas areas are located in Caddo, Bossier, Cuachita and Morehouse parishes extending across the northern border of the state and in Terrebonne parish on the Gulf Coast. The latter has wells yielding the largest volume, some of them having been estimated at a volume of 90,000,000 cubic feet per day. The Cuachita-Morehouse field, approximately 30 miles long and 18 to 20 miles wide, is unquestionably the greatest gas field known, with wells ranging from 4,000,000 to 40,000,000 cubic feet daily capacity.

The protection of this great natural gas asset with its enormous unknown reserve has become a most serious problem. Natural gas is recognized as a public asset which can yield greater benefit to a larger number of people when utilized for domestic consumption than in any other way. It is questionable, therefore, if the public guardians of such resources should permit the use of natural gas for manufacturing purposes which mean little in a direct way to the community or the state, as, for example, its use for the manufacture of carbon black.

CARBON BLACK PLANTS

There are possibly ten plants in the state now making carbon black from natural gas. They are consuming 70,000,000 cubic feet of gas per day. Unless some check is applied there will be 20 of these plants within another year, which will consume 140,000,000 to 150,000,000 cubic feet of gas per day. At this rate the entire supply of natural gas would be used for the manufacture of carbon black probably within a few years, whereas the economic distribution of this gas throughout the state would result in untold benefit to hundreds of thousands of citizens for a long period of time.

It is not the purpose of the state to hoard the natural gas supply, and where found in isolated localities it is willing to permit its use for other than domestic consumption. It is the purpose of the state, however, to conserve the gas and to make it of economic value to its people.

The state is now requiring all carbon plants using natural gas to extract its gasoline content before burning the gas for carbon. All carbon companies are required to secure a permit from the state before erecting their plants. These permits are to be renewed every twelve months; renewal is dependent upon the supply of gas.

[1]Address of Hon. M. L. Alexander, Commissioner of Conservation of Louisiana, before the American Institute of Chemical Engineers, December, 1920, New Orleans, Louisiana.

METHODS OF ANALYSIS

CHEMICAL EXAMINATION OF ANTIMONY SULPHIDES[1]

A. van Rossem and P. Dekker have investigated the methods proposed by Weber and Sweet[2] and Repony[3] for the analysis of antimony sulphide as regards (1) degree of acidity; (2) free sulphur; (3) moisture and water of crystallization; (4) calcium sulphate; (5) adulterations. They express their conclusions as follows:

Determining the percentage of free sulphur in antimony sulphide by extraction methods with organic solvents (carbon bisulphide and acetone) is impracticable, as antimony pentasulphide is decomposed by the solvents, free sulphide being liberated.

A method has been devised for determining free sulphur in an indirect way. This can be used on the condition that little or no trisulphide is present.

C. O. Weber's method by dissolving antimony pentasulphide in strong ammonia was extensively tested. It was found that this method can be used only when (a) trisulphide is absent, (b) dissolving the pentasulphide in ammonia of the smallest possible concentration.

The methods of Weber-Sweet and Repony for determining moisture and water of crystallization, calcium sulphate and impurities were revised.

INDIRECT DETERMINATION OF FREE SULPHUR

One grain of antimony sulphide is boiled with 25 cc. of strong hydrochloric acid (specific gravity 1.18) for about ten minutes, then diluted with water and the insoluble part filtered off on a Gooch filter. Should the addition of water produce a white precipitate add a little more hydrochloric acid. The crucible is washed with hydrochloric acid, then with water, and dried at 90 degrees C. The sulphur present is extracted with carbon bisulphide and weighed.

WATER OF CRYSTALLIZATION OF CALCIUM SULPHATE

Heating at 120 degrees C. expels only three-quarters of the water of crystallization of calcium sulphate. It can be fully expelled only by heating at 300 degrees C.

ADULTERATIONS IN ANTIMONY SULPHIDE

Different investigators determine possible adulterations by treating the antimony pentasulphide with caustic potash or soda solution causing such impurities as kaolin, iron oxide, etc., to remain behind. For example, after extraction with carbon bisulphide and water, Repony dissolves the remaining part in ten per cent caustic soda solution on the water bath. At the Institute five samples were tested in this way. Thus it appeared that when the heating on the water bath was prolonged, the quantity of insoluble material became greater, due to the fact on dissolving antimony pentasulphide in caustic soda solution, insoluble sodium antimoniate is formed.

The insoluble part of the five samples referred to was yellowish white, and was entirely soluble in hydrochloric acid, which proved that none of the samples tested contained adulterations insoluble in acid. In order to state the nature of the adulterations analysis of the part insoluble in caustic soda solution is necessary.

[1] Special communication of the Netherland Government Institute, Delft, to The India-Rubber Journal, October 30, 1920.

[2] Le Caoutchouc et la Gutta-Percha, 15, 9468 (1918).

[3] The India Rubber World, April 1, 1919, page 360.

AGING OF VULCANIZED PLANTATION RUBBER

The following is quoted from a report by Dr. H. P. Stevens,[1] The investigation was supplemental to a former one carried out with the usual rubber and sulphur mixing containing ten per cent of sulphur because it was desired to ascertain how far the results thus obtained hold good for mixings containing other ingredients of technical importance. For this purpose a series of progressive cures was made with a mixing consisting of 60 parts of rubber, three parts of sulphur, and 37 parts of zinc oxide. The tests were carried out with three different types of raw rubber, namely: (1) plantation pale crêpe, (2) plantation smoked sheet, and (3) fine hard Pará as a control. The vulcanized specimens were subjected to physical tests at intervals over a long period, and the percentage of combined sulphur was determined shortly after vulcanizing and again after an aging period of three and one-half years. The vulcanized specimens were preserved in a dark cupboard, but were not otherwise protected from atmospheric agencies.

In previous reports it was shown that a rubber vulcanized with ten per cent of sulphur, with no other ingredients, is approximately stable when preserved under ordinary atmospheric conditions for two or three years, provided that the coefficient does not exceed three units. Under these conditions the breaking strain improves over a period and then gradually decreases, but only very slowly. The vulcanized rubber may therefore be regarded as aging satisfactorily from a technical standpoint.

The present results show that the figure for the safe limit of the coefficient must be revised in the case of rubber compounded with five per cent of sulphur and a filler. In this case the rubber with a coefficient of three units shows fairly rapid deterioration on prolonged aging. After one year the rubber with this coefficient has reached the maximum breaking strain and has fallen again to approximately its original value. During the second year the rubber loses about 30 per cent of its original value, after which the breaking strain decreases more slowly and the curve tends more to the horizontal. The approximately stable specimens are those cured to give a coefficient of two or a little higher, certainly not higher than 2.5 units.

In this connection it may be noted that a cure giving a coefficient of three or thereabouts for the rubber compound with ten per cent of sulphur will give a coefficient of about two units for the rubber compound with five per cent of sulphur and filler. It may be that the period and temperature employed in vulcanizing are factors affecting the stability of the vulcanized product. Further experiments are required before any definite conclusions can be reached.

Comparing the three types of rubber, smoked sheet and fine hard Pará give curves more similar in appearance to each other than to pale crêpe. The loss in tensile strength of the aged samples of the latter is more pronounced than with either smoked sheet or fine hard Pará. With this type of mixing, smoked sheet shows up particularly favorably as compared with pale crêpe, and confirms the general impression obtained from previous experiments in which mixings containing zinc oxide were compared with the usual rubber sulphur mix. The latter type of mix, although suitable for general purposes, cannot be taken as universally representative of all types of mixings. It is not merely a matter of dilution with inert constituents and resulting diminution of effect. It has been found, for instance, that zinc oxide, ordinarily regarded as an inert mineral, has nevertheless the power of activating certain organic accelerators in a remarkable degree. It is, therefore, not surprising that zinc oxide should bring out differences between smoked sheet and pale crêpe which are not apparent when tests are made on mixings containing rubber and sulphur only.

[1]The Bulletin of the Rubber Growers' Association, July, 1920, Volume 2, No. 4, Page 270.

TREATMENT OF CRUDE RUBBER WITH STEAM

The treatment of crude rubber with live steam[1] is claimed to provide a convenient process for eliminating the variations in the physical condition of raw rubber as received from the plantations as well as a convenient method of drying rubber.

According to the invention the raw rubber to be treated may be placed in a suitable container provided with means for the exhaustion of air and the introduction of steam. The steam pressure used varies according to the duration of the treatment, from 10 to 15 pounds per square inch for seven hours, to 60 pounds per square inch for three hours. For any particular lot of rubber the best results are obtained by taking viscosity tests from a sample.

VISCOSITY TEST

The viscosity test above mentioned may be made with one per cent of rubber in benzol in the following manner:

A sample of the steam-heated rubber is dried in a suitable oven at 100 degrees F. It is then cut in small pieces and shaken in a flask at intervals until the rubber has completely dissolved. It is then allowed to settle and the solution carefully decanted into a viscometer of the Ostwald type. The test is conducted in a water bath thermostatically controlled.

PURE ANTIMONY PENTASULPHIDE

Most grades of antimony pantasulphide contain calcium sulphate in proportions ranging from 30 to 55 per cent. Some rubber goods manufacturers object to the presence of calcium sulphate, owing to its water of crystalization, and nearly all recognize its defect as a filler on account of the relatively large size of its particles. The Rare Metal Products Co., Belleville, New Jersey, has developed a pure pentasulphide of antimony, free from adulteration, and containing 16 per cent free sulphur. It is claimed that this material will produce a handsome red tube of fine texture at a cost lower than when the adulterated product is used.

THE REDUCTION PRODUCTS OF PARANITRANILINE RED AS VULCANIZATION ACCELERATORS

By André Dubosc

When paranitraniline is treated with nitrate of soda in the presence of hydrochloric acid, a diazo combination is obtained which with a solution of β-naphtolate of soda generates paranitrobenzene-azo-β-naphtol or paranitraniline red, the formula of which may be written thus:

$$C_{10}H_6 < {}^{OH}_{N} > N - C_6H_4NO_2$$

This body is well known by dyers and calico printers, who cause its formation on the textile direct, by foularding the fabrics in a solution of β-naphtolate of soda, followed, after drying, by immersion in a solution of diazoparanitraniline.

Paranitraniline red under reducing action, particularly of hydrosulphites or of aldehyde sulphoxylates, reduces and divides, forming two bodies, aminonaphtol and paraphenylene diamine, both of which are excellent accelerators. The reaction takes place according to the following equation:

$$\underbrace{C_{10}H_6 < {}^{OH}_{N} > N - C_6H_4NO_2}_{\text{Paranitraniline red}} + \underbrace{5\,(Na_2S_2O_4.\ 2CH_2O)}_{\text{Sodium aldehyde sulphoxylate}} + 8H_2O =$$

$$10\,(NaHSO_3) + 10\,(CH_2O) + \underbrace{C_{10}H_6 < {}^{OH}_{NH_2}}_{\text{Aminonaphtol}} + \underbrace{C_6H_4 < {}^{NH_2\,(1)}_{NH_2\,(4)}}_{\text{Paraphenylene diamine}}$$

Thus by the action of hydrosulphites two powerful accelerators can easily be obtained from a well-known coloring matter and this method is general for all combinations of naphtolates with diazoted amines.

[1]British patent No. 150,043.

CHEMICAL PATENTS

THE UNITED STATES

Composition for Sealing Punctures in Pneumatic Tires, consisting of ground wood, comminuted mica, soapstone and water.—Nelson O. Selby, Middletown, Ohio. United States patent No. 1,363,438.

Vulcanized Rubber Consisting Before Vulcanization of a mixture of rubber, inert matter, selenium, and an accelerator of the aromatic series.—Charles R. Boggs, Arlington Heights, Massachusetts, assignor to Simplex Wire & Cable Co. United States patent No. 1,364,055.

THE UNITED KINGDOM

Plastic Compositions Suitable for Use as Substitutes for india rubber, artificial leather, insulation, paints, varnishes and cements are obtained by mixing alkyl, aryl or aralkyl ethers of cellulose, starch, dextrine or other carbohydrates, or of their derivatives or conversion products, with the viscous oily liquids obtained when acetylene reacts in the presence of aluminum chloride with the hydrocarbons occurring in tar oils and possessing a boiling point above 140 degrees C. Mixing may be effected with or without the use of volatile solvents, and to the mixture may be added other plastic substances, softening substances, dyes, filling materials and pigments.—L. Lilienfeld, 1 Zeltgasse, Vienna, Austria. British patent No. 149,319.

Synthetic Resinous or Asphalt-like Bodies Obtained by treating phenols with oxygen under pressure.—F. Fischer, 2 Kaiser Wilhelm Platz, Mulheim, Germany. British patent No. 149,979.

Synthetic Resins. Polymerized Coumarone, Indene, Etc.—The Barrett Co., 17 Battery Place, New York City, U. S. A. British patent No. 149,982.

Rubber Sponges Are Formed so as to Have Large and Small pores in different parts of the sponge, either by vulcanizing together superimposed layers of two different compounds which will yield on vulcanization portions having large and small pores, or layers of the same compound, one part of which has been masticated more than the other. A compound which yields small pores consists of Pará rubber, milk of sulphur, lithopone, crimson sulphide of antimony, or vermilion ceresin wax, pine oil, together with ammonium carbonate or amyl acetate. In a compound for yielding large pores, larger proportions of ammonium carbonate or amyl acetate are used. Precipitated chalk and zinc oxide are used in place of lithopone, and turpentine may partially replace pine oil.—G. W. Beldam, Boston Lodge, Windmill Road, Ealing, London, and A. U B. Ryall, Glamorgan House, Brentford, Middlesex, England. British patent No. 151,084.

A Composition for Use Inside a Pneumatic Tire to Render it self-sealing when punctured, consists of flakes of pliable matèrial, such as mica, rubber, waterproofed fabric, paper, etc., mixed with a paste made from finely ground china clay, silica, chalk, alumina, etc., and water or other liquid, such as treacle or a solution of glue or gum.—W. M. Brothers, Clifton Lane, Ruddington, Nottinghamshire, England. British patent No. 151,499.

Anti-corrosive composition which may be used to impregnate a cement or concrete layer to form a damp-proof course, consists of asphalt dissolved in a volatile solvent, such as benzol or petrol, metallic oleates or stearates of calcium, and addition of crude rubber, gutta percha and mineral filling materials.—C. H. Ivinson, 72 Coombe Lane, Wimbledon, and G. S. Roberts, 74 Earl's Court Road, both in London. British patent No. 151,666.

THE DOMINION OF CANADA

Waterproofed Fabric and Vulcanized Article.—William Beach Pratt, Wellesley, Massachusetts, U. S. A. Canadian patents Nos 206,483 and 206,484. These relate to the same subject matter (Toron) as United States patents Nos. 1,349,909-1,349,914, inclusive. See The India Rubber World, LXIII, No. 1, 29-30.

Coated Product Comprising a Backing of Woven Fabric already provided with a pyroxylin coating and on top of this a coating containing pyroxylin and an adhesive adapted to become adherent upon the application of water.—The Canadian Fabrikoid, Limited, Montreal, Quebec, Canada; assignee of the Du Pont Fabrikoid Co., Wilmington, Delaware, assignee of Harry J. Hoan, Newburgh, New York, both in U. S. A. Canadian patent No. 206,524.

Balloon Fabric, Made of Two Plies of Suitable Thin Textile materials united by an intermediate gas-tight layer of birdlime which has been thinned by heating to about 180 degrees F. and mixing gradually therewith alcohol and to which a solution of perchloride of mercury in water has been added in the proportion of one-tenth per cent by weight of bird-lime before thinning.—Charles Angus Cleghorn, Brackenside, Woburn Sands, County Bedford, England. Canadian patent No. 206,614.

Tire Filling Composition, Consisting of Celluloid, Eight ounces; shellac, four ounces; rosin, two ounces; ether, two ounces, and alcohol, 20 ounces.—Albert F. French and William I. French, assignee of a half interest, both of Detroit, Michigan, U. S. A. Canadian patent No. 206,795.

Leather Substitute, Consisting of Impregnating a Fibrous material with a mixture of gas tar and linseed oil varnish, drying the impregnated material at 100 to 110 degrees C. to evaporate the benzol, followed by a period of aging.—Anhydat Leder Werke, A. G., assignee of Kurt Haring, both of Hersfeld, Germany. Canadian patent No. 206,809.

GERMANY

Rubber, Gutta Percha, Balata, Etc., Are Improved as to their plasticity and adhesiveness by being heated with a rubber solvent, such as petroleum naphtha or benzene, phenol, aniline or their homologs, the solvent being subsequently removed. The products are easily soluble, plastic, adhesive and capable of absorbing the usual compounding ingredients. Ungarische Gummiwaren-fabrik, A. G. German patent No. 323,732.

OTHER CHEMICAL PATENTS

GERMANY

PATENTS ISSUED, WITH DATES OF ISSUE

No. 320,741 (February 27, 1918.) Method for the prevention of oxidation of synthetic rubber products. Badische Aniline-und Soda-fabrik, Ludwigshafen.

331,031 (December 6, 1917.) Method for making solutions of bigh viscosity out of such artificial rubbers as do not dissolve readily in ordinary solvents or whose solutions are not viscous enough. Accumulatorenfabrik Akt. Ges., Berlin.

331,334 (February 15, 1918.) Method for making rubber-like masses. Graf Friedrich de la Rosée, Garmisch-Partenkirchen.

331,943 (December 29, 1917.) Method for making a substitute for hard rubber. Ehrlich Gabriel, Frankfurterstrasse 2, Siegen i. w.

332,305 (March 28, 1918.) Method for the prevention of oxidation of synthetic rubber products. Badische Anilin-und Soda-Fabrik, Ludwigshafen.

332,347 (January 16, 1919.) Method for increasing the elasticity of synthetic or natural rubber. Farbenfabriken formerly Friedrich Bayer & Co., Leverkusen.

LABORATORY APPARATUS

LABORATORY VENTILATION

Laboratory ventilation, especially that of laboratory hoods, is as important as it is difficult. The use of metal pipes for ducts has until recently not proved satisfactory owing to their rapid corrosion. Tile pipes, while not subject to corrosion, are difficult to erect and connect, and are liable to breakage and always unsightly.

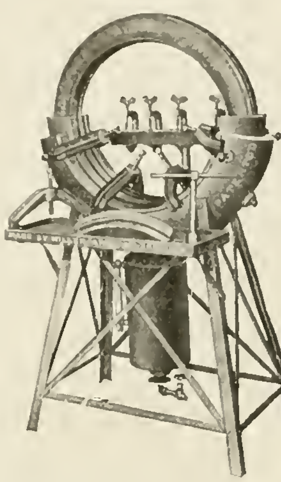
All these difficulties seem to be overcome by the use of special ducts consisting of a combination of sheet iron, with a basic protection coating of asphalt and treated on the inside with a special acid-resisting paint.

"Crude Rubber and Compounding Ingredients" should be in the library of every progressive rubber man.

New Machines and Appliances

SECTIONAL VULCANIZER AND RETREADER

Many tire factories and rubber repair shops are acquainted with the merits of this machine, which is claimed to be suitable for all sorts of work, such as rim cuts, blowouts, bead curing and retreading. Sand or air bags are used with it.



Miller's All-in-One Vulcanizer

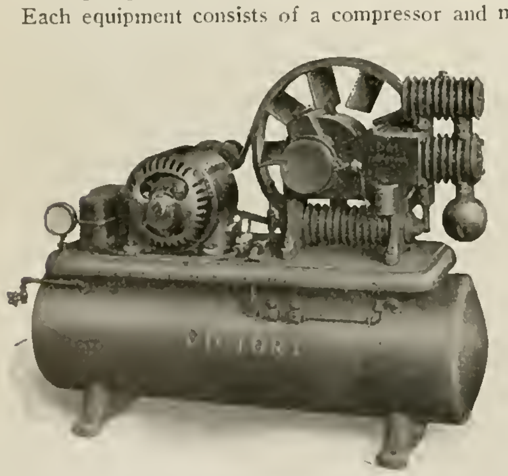
The vulcanizer proper is made in a full half circle, with exceptionally deep cavity, and the steam space extends up the side wall, in order that the bead molds can be used, and the entire surface heated. The inside surface of the vulcanizer is machined accurately to produce a well-shaped tread, with a true and smooth surface for the bead mold to rest on. On either end of the cavity there is an extra long, air-cooled flange to prevent marking or marring the tires. The clamps have extra large screws and are very strong. The greater number of these clamps employed the easier it is to get a well-distributed pressure with the sand or air bags. A hinged joint permits the placing or removing of as many clamps as desired. The bead molds are made of cast iron or aluminum, as preferred.

The rigid and well-constructed stand is of angle iron. The regular outfit includes five pressure clamps, pressure plate, clincher and side-bead molds. When requested, the manufacturer supplies a steam boiler, arranged for gas connection, or equipped with an improved type gasoline force feed burner, having an eight-gallon oil tank, hose and necessary valves.—Charles E. Miller, Anderson Rubber Works, Anderson, Indiana.

AIR COMPRESSOR FOR GIANT TIRES

This compressor is especially designed for inflating giant pneumatic tires and other heavy service, and should be of practical use in garages, tire and vulcanizing shops, filling stations, etc.

Each equipment consists of a compressor and motor, automatic controller, belt tightener and belt, substantially mounted over a 30-gallon steel air tank. The other fittings are composed of a 300-pound pressure gage, with needle connection and needle valve, and 25 feet of air hose. The tank base is made to be bolted to the floor. All moving parts, with the exception of the fly-wheel, are enclosed. There are no nuts or detachable parts of any kind to work loose inside and cause trouble. Due to the enclosed construction and the intake muffler the compressors are claimed to be practically noiseless.



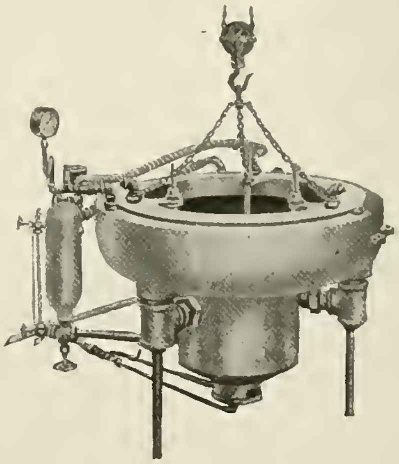
Globe Victory Air Compressor.

The smaller size has a ½-h.-p. motor and a capacity of 2¾ cubic feet a minute, and a speed of 225 revolutions per minute. The tank is guaranteed under a working pressure of 200 pounds. The larger size is supplied with a 1-h.-p. motor, having a capacity of 4¼ cubic feet a minute and a speed of 350 r. p. m. The guaranteed working pressure of the tank is 250 pounds.

Where portable units are desired, a truck attachment is furnished and 16 feet of cord with plug for electric connection. This is so arranged that there is perfect stability and freedom from vibration when the compressor is in operation. The wheels are lowered only when it is necessary to move the apparatus.—Globe Manufacturing Company, Battle Creek, Michigan.

TIRE REPAIR VULCANIZER

This vulcanizer, for which is claimed the saving of time and labor in repairing and retreading tire casings, consists of a full circle mold with a removable top and a one-piece stationary lower section, having specially designed heat chambers in each. The heat circulates around the entire tire tread and through the condenser, so that no heat reaches the bead.



Harris One-Operation Retreader

The self-contained steam generator of three-gallon capacity has an automatic steam condenser and a water gage. The mold can be operated for a week continuously without loss of time to replenish water and get up steam again. The condensing of the water over and over again softens it and eliminates any corrosive effect upon the condensing chamber. The improved type of burner with which the vulcanizer is equipped is said to have a very low fuel consumption. Sixty pounds of steam can be raised in 40 minutes.

With this type of mold, sand bags are not used, but air bags are substituted. The idea is that in vulcanizing the whole surface in one operation there is insured perfect evenness of temperature and uniformity of cure. The evenly distributed pressure of the air bag produces a tread which is free from cracks and with side walls of the proper strength and finish. It has been stated that the time ordinarily required to make a complete cure is 45 minutes.

The aluminum matrices are made to fit inside the mold face and are interchangeable. The regular equipment consists of three sizes of molds with four changeable matrices each.

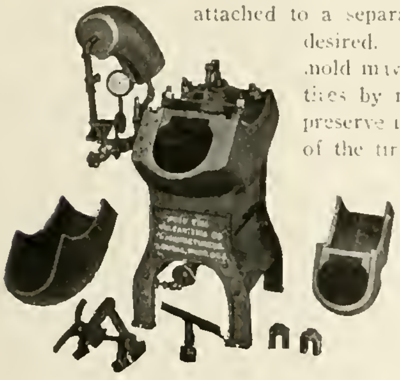
A tube plate which can be clamped on the mold top is furnished for vulcanizing tube patches. The whole apparatus is compactly built and simple to operate.—Edward Harris, Inc., Los Angeles, California.

REPAIR VULCANIZER FOR TRUCK TIRES

This machine will handle 6, 7 and 8-inch pneumatic truck tires, all in the one cavity, by means of reducing shells. This is done by milling out the cavities and the inside of the reducing shell on the same mill as the outside, an exact fit being secured between the cavity and the reducing shell.

The inside curing core supplied with the outfit has a clamp which is designed to give pressure at all points on the tire, from

the center of the tread down to the toe of the bead. The bead molds are machine finished and polished and made to fit accurately all tires of their respective sizes. Bead molds are all made of the same diameter. The flat tread tire molds are made in 6, 7 and 8-inch sizes only, and can be attached to a separate steam generator when desired. However, the round tread mold may be used to cure flat tread tires by making negative pads to preserve the tread pattern. Marking of the tires at the end of the mold is eliminated because the diameter of the reducing shells is milled to conform to the circle of each respective tire.

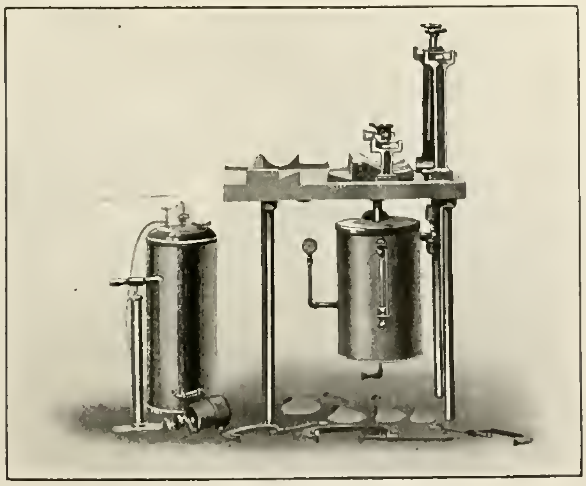


Truck Tire Vulcanizer

The vulcanizer can be used as a self-contained unit generating its own steam, by means of gas, gasoline or kerosene portable burner outfits. By eliminating the burners, and running an inlet pipe at the top and an outlet pipe of the steam line at the bottom on the other side, it can be connected to a separate steam supply. The additional fittings consist of a steam gage with safety valve, filler valve for the generator, water level valve or indicator. The frame-work is of heavy cast iron.—Auto Tire Vulcanizing Co., Inc., Lowell, Massachusetts.

RUBBER FOOTWEAR REPAIR VULCANIZER

A device of interest to both the tire repair man and the progressive cobbler is the vulcanizer shown herewith for the repair of rubber footwear, inner tubes, hot-water bottles, etc. It opens up a profitable field for the vulcanizer or shoe repair man, when regular business is slack.



Rubber Boot and Shoe Vulcanizer

The vulcanizing table consists of a series of molds on the hot plate, the size of which is 32 by 17 inches. The molds are designed to conform to the different shapes taken by the various angles of a boot or shoe, permitting the repair to be made no matter where the rip, tear or worn out spot may be. The vulcanizing is done on the outside, as no boot lasts or other inside contrivances are used. It is claimed that this outfit will resole, reheel and put patches on the edges, sides, back of the heel, or instep. In addition, it will repair hot-water bottles, hospital sheets, rubber gloves, tennis shoes, rubber coats, football bladders, inner tubes; in other words, any sort of a rubber article.

The illustration shows the device complete with vulcanizing table mounted on strong legs and the steam boiler in place. The gasoline force-feed burner is ready to be attached to the boiler. The gasoline supply tank is equipped with gage, hand pump and necessary connecting hose. The boiler can be arranged to use gas, or, wherever steam is available, the vulcanizer is sold without the boiler.

From 60 to 65 pounds of steam are required for vulcanizing. The average job requires from 15 to 20 minutes. Seven to fourteen jobs can be accommodated on the table at the same time.—Vulcanizing Machine & Supply Co., Jackson, Michigan.

SANITARY RUBBER CEMENT MIXER

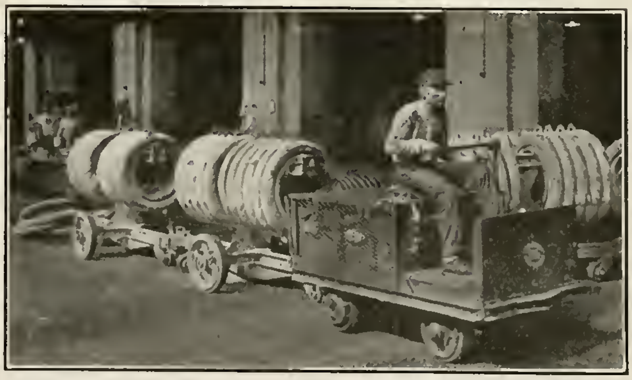
A time saver for mixing small quantities of rubber cement is the electrically driven churn shown herewith. The motor is arranged for either direct or alternating current. Connections for operating are made to an ordinary electric light socket. It is also supplied in the following types and sizes: portable, combination hand and belt power; stationary, combination hand and belt power; and portable hand power. Capacities range from 8 to 25 gallons.

Superior Electric Churn

The barrel of the churn is made of non-absorbent glazed stoneware. The cover is annealed glass ½-inch thick and the sealing ring is of thick rubber, easily removable for washing. The frame is of varnished pine. All metal parts attached to the barrel are finished with aluminum. The bearings are of steel. A shaft and bracket are attached to the frame for reducing the speed.—Superior Churn & Manufacturing Co., Northville, Michigan.

ELECTRIC TRACTOR FOR RUBBER PLANTS

For hauling tires and cores to and from the vulcanizing room, and other work of a similar nature, the industrial tractor has proven indispensable. The truck shown in the illustration is claimed to haul a load of 3,100 pounds each trip and makes the round in four minutes. A statement has been made to the effect that some of these trucks have been in operation for over seven years and have travelled approximately 210,000 miles.



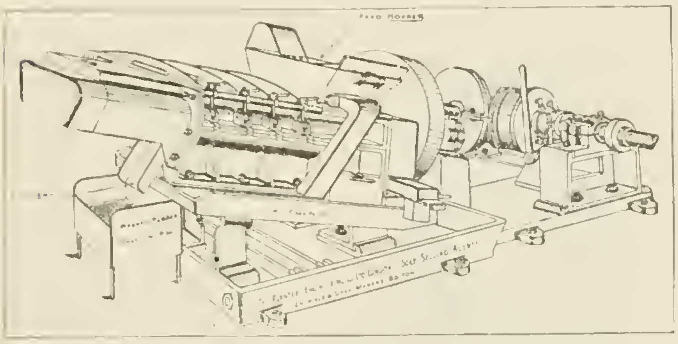
Electric Factory Tractor

Each of the four wheels is carried on its own knuckle, thus eliminating road shock to the steering mechanism. The rebound springs which support the frame over the drive wheels protect both the equipment and the operator against jarring when the

drive wheels drop into holes in the floor or yard. The motor is especially designed to require the minimum amount of power to drive or lift whichever the case may be. The tractor frame is so constructed that there is a wide clearance under the truck. The reduction gear or lift motor is well out of the way of any dirt or water. Solid rubber tires are used.—Elwell-Parker Electric Co., Cleveland, Ohio.

PLANTATION BARK AND SCRAP RUBBER WASHER

This machine is designed to quickly and thoroughly wash plantation rubber scrap and bark, removing all traces of dirt and sand, preserving the nerve and strength of the rubber. It consists



Continuous Plantation Scrap Washer

of a main roller specially grooved, revolving in a heavy cast iron casing, accurately bored, and heavily ribbed with a secondary roller, used as a feed roller. The rollers are raised at such an angle that the delivery end is higher than the feed end.

The rubber scrap is fed into the machine and passes round between the main roller and the casing, while at the same time it is moved along the surface toward the discharge and where it is delivered in a clean, macerated and amalgamated condition. The average length of the pieces is one inch in diameter by four inches long, ready for passing through the sheeting machines.

The best materials and workmanship are employed in the construction of the machine, which is simple throughout. All moving parts are enclosed. It is designed for a direct drive through a friction clutch, from a main shaft, or fitted with tight and loose pulleys for belt drive. From 10 to 12 h.p. is required to operate it. There is no possibility of oil running on to the rollers or sand and dirt getting into the bearings. The stated capacity of the washer per hour is 350 pounds of wet bark and scrap rubber.—The Planters Engineering Co., Limited, 28 Martins Lane, London, England.

MACHINERY PATENTS

MACHINE FOR FORMING BATTERY JARS

The purpose of this invention is to provide a machine that will eliminate most of the hand labor necessary in forming battery jars and to also provide a means for heating the mold.

The operation of the machine shown in Fig. 1, is as follows: The mold is placed in position on the hot plate. Air under pressure is admitted to the piston *A*, causing it to move upward, carrying the plunger to the top of the mold. At the same time, plunger *B* forming the cover of the mold is raised to its full extent. This allows a mandrel to be inserted between the plungers and placed within the cup *C*. The mandrel is rounded at the corners, while the cup *C* is square at the corners. The space between the corners of the mandrel and the cup *C* is designed to receive the surplus rubber which will flow thereinto by pressure. The rubber compound comes in square blocks of the same cubic area that will be required to form the complete jar. The rubber block is placed at the mouth of the mold and, as it is heated, becomes fluent and flows around the mandrel. The overflow spaces which receive the surplus rubber are located at the lower end of the mold. There is no opening at the top of the mold when the plunger *B* is in a compressing position, consequently the jar is completely formed before any surplus rubber escapes into the overflow spaces. The surplus rubber ordinarily remains on the bottom corners of the mandrel and can be broken off immediately, or ground off after the jar is vulcanized.

After the mandrel is in position, the mold sections are locked by operating a handle *D*. The uncured rubber is placed within mold on top of the mandrel and steam or compressed air is admitted into cylinder *E* which depresses the plunger *B*. This in turn compresses the rubber until all the space between the mandrel and the mold is filled. Within a suitable length of time, steam or air is exhausted from the cylinder *E* and the plunger *B* returns to its raised position. Handle *D* is then turned to unlock the sections of the mold, which spread by reason of a spring and thus freeing the mold sections from the jar. Piston *A* is next operated, and plunger *F* moves upward, carrying the cup with the uncured rubber jar out of the mold. The jar with the mandrel inside is removed from the cup and cured.—John H. Ten Brink and Alvin V. Martin, Muskegon, Michigan. United States patent No. 1,363,695.

LOOM ELEMENT FOR MAKING CORD FABRIC

This invention relates to an improvement in the method of making cord fabrics for tires, where it is desirable to lay the fabric over a core and evenly extend it in all directions. The weft threads are omitted and a selvage element is provided which prevents the fabric stretching prior to rubberizing or calendering, also increasing the inherent stability. The warp thread is distinct from the selvage element, which may be removed from the fabric after it is rubberized or calendered. It may be cut from any part of the work when desired.

The loom element shown in Fig. 2 is provided with a heavy base with an upright frame supported by a standard. The thread from the bobbins *A* are led upward to a central tube which is in an upright position and connects to the upper end of a tubular

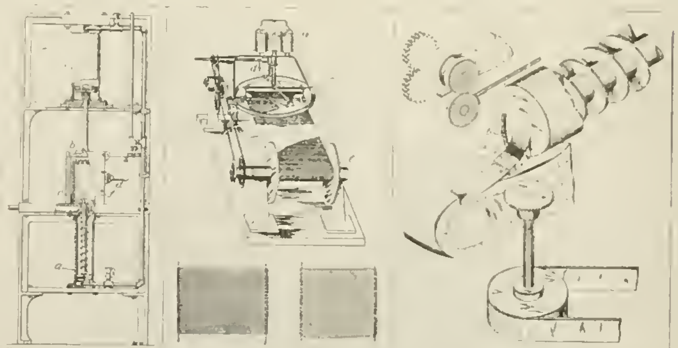


Fig.1. Machine for forming battery Jars Fig.2. Cord fabric Machine Element Fig.3. Foxing Machine

shaft. The thread passes downward through the tubular shaft and emerges at the lower end through a head *B*, bored to accommodate the thread. From here the threads are carried outward and passed through curved guides or eyes *C*, then brought into contact with the warp thread.

The warp thread is supplied by bobbin *D*. The tubular thread guides or eyes are mounted on a rotatable sleeve also connected to head *B*. The warp thread is continuously looped around the selvage element. In order to retain the selvage threads in their proper space relation during the process of looping and to guide the fabric toward the take-off, means *E*, space guides are provided. These guides so direct the course of the fabric as to produce a transverse distortion or the bias relation between the warp thread and the selvage thread. The guides consist of a

rotating roller on a shaft which extends lengthwise of the weaving zone and is journaled in brackets. The width of the fabric to be produced is regulated by these brackets.

A roller with flanged edges serves to hold the edged portion including the selvage of the fabric. The take-off *E* exerts a strain or a pull upon the fabric as it is produced, firmly engaging the fabric with the rollers so as it is formed the fabric is drawn down, about and under the rollers, then off to the take-off.—Howard I. Morris, assignor to the Savage Tire Co.—both of San Diego, California. United States patent No. 1,358,094.

MACHINE FOR PRODUCING AND APPLYING FOXING

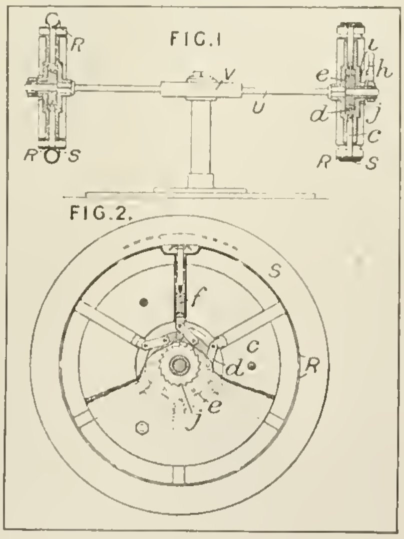
In the manufacture of rubber footwear, such as tennis shoes, sneakers and arctics, the foxing used as the intermediate strip between the edges of the sole and the edges of the upper is usually applied by hand. The object of this invention is to supply a mechanical means for this purpose and which is shown in Fig. 3.

Suitably supported by the frame of the machine is a hopper to which a feed nozzle or die *A* is attached. The rubber compound is placed in the hopper and forced through the nozzle *A* which is placed in close proximity to the feed wheel carrying the lasted shoe. The foxing is formed as extruded and is laid upon the proper portion of the shoe. Cement may be applied in the usual manner, or a small quantity of gasoline from tube *B* will cause the foxing to adhere without the use of cement. In order that the foxing may be laid smoothly in place the rate of speed of the shoe past the former *A* is greater than the speed of forming the foxing, keeping the strip under just enough tension to lay it evenly.

The insert shows another type of former consisting of contacting rolls, one of which has a peripheral groove, the width of the strip to be formed.—Louis A. Casgrain, Beverly, Massachusetts, assignor to United Shoe Machinery Corporation, Paterson, New Jersey. United States patent No. 1,363,308.

MACHINE FOR DEFLATING INNER TUBES

In the final stage of manufacture, inner tubes are inflated for the purpose of locating imperfections, and after inspection they are deflated, usually by a hand-rolling device. The invention here shown is designed to deflate the tubes, automatically and rapidly, in a manner consistent with economical production.



Inner Tube Deflator

Referring to the illustration the tube *S* is mounted over a series of plates *R* which are radially expanded through connections *c*, *d* to a rotary plate *e*. One of the arms *c* carries block *f* for unseating the valve during the expanding movement. The plate *e* is fitted with an operating-handle *h*, a ratchet *j* and pawl *i* being provided for locking the device when expanded. This holds the tube in shape while the air is exhausted.

A number of such devices may be carried on arm *U* from a central support *V* around which they revolve.—A. Shrader's Son, Inc., Brooklyn, assignee of M. C. Schweinert, New York City, both in New York, U. S. A. British patent No. 151,004 (not yet accepted).

OTHER MACHINERY PATENTS

THE UNITED STATES

No. 1,361,208 Inner tube mold having internal bulge around rim-forming portion to form annular recess at inner side of tube. N. G. Warth, assignor to The Climax Rubber Co. both of Columbus, O.
1,361,827 Tire casing curing rim. E. Cassel and F. H. Kunkel, Milwaukee, Wis.
1,361,840 Collapsible core for tires. G. E. Eckler, Akron, O.
1,362,169 Apparatus for molding and vulcanizing tires. C. Macbeth, Birmingham, assignor to The Dunlop Rubber Co., Limited, Regents Park, London—both in England.
1,362,189 Tire-vulcanizing apparatus. B. H. Rose, Lakewood, O.
1,362,640 Mold and process for making hollow rubber articles. F. T. Roberts, Cleveland, O.
1,362,717 Attachment for tire and tube molds. J. A. McLane, assignor to The Armorcord Rubber Co.—both of Morgantown, W. Va.
1,362,729 Vulcanizing apparatus for tires N. Y. Momitsa, Granite City, Ill.
1,363,109 Segmental tire core. W. S. Gillette, Bay City, Tex.
1,363,150 Tire mold and clamp. J. H. Mulloy, assignor to Morgan & Wright—both of Detroit, Mich.
1,363,163 Tire repair tool. C. Nickum, Zion, Ill.
1,363,441 Apparatus for building up plies of plastic material. F. A. Steele, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.
1,363,462 Beveling device for rubber tubes. A. E. Falor and F. J. MacDonald, Akron, O., assignors to The B. F. Goodrich Co., New York City.
1,363,802 Core stripper for pneumatic tires. W. M. Metzler, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.

THE DOMINION OF CANADA

206,446 Mold for forming tire liners. J. H. Grube, Los Angeles, Calif., U. S. A.
206,680 Mold for tires W. G. Martin, Toronto, Ont.
206,752 Rubber mixer. The Farrel Foundry & Machine Co., assignee of D. R. Bowen and C. F. Schnuck—all of Ansonia, Conn., U. S. A.
206,987 Rubber mixer. The Farrel Foundry & Machine Co., assignee of D. R. Bowen and C. F. Schnuck, coinventors—all of Ansonia, Conn., U. S. A.

THE UNITED KINGDOM

149,577 Apparatus for producing a shaped tire casing from a flat band. E. Hopkinson, 1790 Broadway, New York City, and H. V. Lough, 276 Washington street, Hartford, Conn.—both in U. S. A.
149,631 Cutter for trimming molded rubber, etc. E. Coquet, 12 chemin de Fontanières, La Mulatiere, Rhône, France. (Not yet accepted.)
149,736 Apparatus for coating electric conductors, wire, etc., with insulating, waterproofing, or other liquid or plastic material. F. C. Cook, Woodbridge Cottage, High street, Wargrave, Berkshire.
149,739 Electric cable-stripping tool. G. H. Scholes, Meadow Cottage, Dean Row, Wilmslow, and E. A. Claremont, Broom Cottage, High Legh, both in Cheshire.
150,163 Feeding devices for rubber-mixing machines. Wood-Milne, Limited, E. R. Pearce, and R. Tooley, Albion street, Gaythorne, Manchester.
150,269 Machine for kneading and mixing rubber. A. P. Lohman, Perkins Hill, Akron, Ohio, U. S. A. (Not yet accepted.)
150,306 Sectional core for tires. G. H. Wheatley, 1346 Rawson street, Chicago, Ill., U. S. A. (Not yet accepted.)
150,346 Tire-molding apparatus. Howe Rubber Corporation, Codwise avenue, assignee of J. Schmidt—both of New Brunswick, New Jersey, U. S. A.
150,373 Apparatus for molding and vulcanizing tires. Dunlop Rubber Co., 14 Regent street, Westminster, London, and C. Macbeth, Para Mills, Aston Cross, Birmingham.
150,717 Machine for covering tire cores with cord fabric, etc. A. Wolber, 76 rue des Arts, Levallois-Perret, Seine, France. (Not yet accepted.)
150,754 Rubber-forcing machine. J. W. Gomersall, 16 Maple avenue, Chorlton-cum-Hardy, Manchester.
150,792 Device for applying pressure to tires, etc., during vulcanization. T. Sloper, Southgate, Devizes, Wiltshire.
151,344 Apparatus for expressing air, gas and water from freshly coagulated raw rubber by perforating. S. C. Davidson, Sirocco Engineering Works, Belfast.
151,397 Mold for hollow rubber goods. F. T. Roberts, 1105 Lakeview Road, Cleveland, O., U. S. A.
151,500 Apparatus for making tires of concentrically wound layers of rubber. H. C. Higgin, 74 Knightsbridge, London.

GERMANY

DESIGN PATENTS ISSUED, WITH DATES OF ISSUE

756,971 (June 1, 1920.) Machinery for making seamless hollow rubber goods. Hans Glaser, Moritzberg near Hildesheim.
757,715 (April 10, 1920.) Vulcanization process. Mitteldeutsche Gummiwarenfabrik Louis Peter A.-G., Frankfort-on-the-Main.
757,574 (October 1, 1920.) Vulcanizing apparatus with press springs. Karl Henkel, Siegen i. W.

PROCESS PATENTS

THE UNITED STATES

No. 1,363,229 Forming composite mixture of bituminous material, vulcanized rubber, and water by heating, mixing with rubber, and vulcanizing. J. C. Burdette, assignor to Dryden Rubber Co., Chicago, Ill.

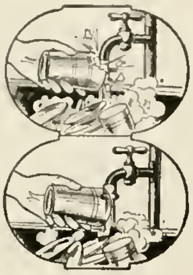
THE DOMINION OF CANADA

206,534 Preparing inner tubes for vulcanization. The Fisk Rubber Co., assignee of M. A. Marquette—both of Chicopee Falls, Mass., U. S. A.

New Goods and Specialties

RUBBER FAUCET ACCESSORY

A very useful and quick-selling household specialty with a strong appeal to the housewife is the "Perfection" anti-splasher and dish protector.



"Perfection" Anti-splasher and Dish Protector

It is made of two pieces of rubber. One is a gray rubber gasket which fits directly on the water faucet. The other is of extra quality white rubber, large enough to go over the gray ring and having a shoulder extension at the bottom forming a bumper which prevents breakage when glass or china is accidentally knocked against it. Two pieces of fine-meshed wire fabric are inserted over the opening between the two pieces of rubber and not only prevent water from splashing as it flows from the faucet, but serve to filter and purify it as it flows through them.—M. J. Geraty, 180 North Dearborn street. Chicago, Illinois.

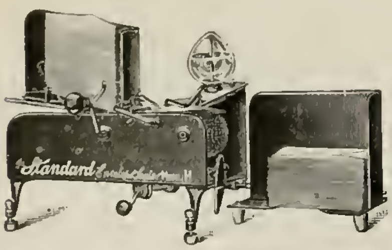
A HOLLOW EXPANSIBLE BOTTLE STOPPER

American Bottle Stopper

A distinctly American rubber product which has been well received in foreign countries also, is the American bottle stopper, which effects an instantaneous seal in bottles having various sizes and shapes, a function not shared by any other stopper. A push pin of nickel is located centrally in the red rubber stopper so that when the stopper is inserted in the neck of the bottle the pressure on the pin elongates the rubber. When this pressure is released the rubber expands, closing the bottle tightly. Pressing down on the pin reverses the action and permits the stopper to be withdrawn without effort. When in use the stopper hermetically seals the bottle and it is therefore especially adapted for containers of charged liquids and remedies composed of evaporative ingredients.—G. A. Kimber, 2041-2043 North Cicero avenue, Chicago, Illinois.

RUBBER IN THE MAILING MACHINE

Mailing machines are considered a necessity in many large offices and their practicability is universally recognized. The "Standard" envelope sealer has many new features not found on other machines. Among the rubber parts is the indestructible moistening roller which is partly submerged in water as long as the automatic filler-bottle contains water. This filler-bottle has a rubber valve to regulate the amount of water supplied to the roller. The letters are fed singly from the feed hopper by means of a rubber stripper onto the rubber belt which carries them under the moistening roller, and thence to the sealing hopper. This rubber feed belt deserves special mention, as it is made from the best rubber and its wide feeding surface insures long life and positive action. It is instantly removable without disturbing a single screw. The "Standard" envelope sealer is made in different models with both hand and motor drive.—Standard Envelope Sealer Manufacturing Co., Everett, Massachusetts.



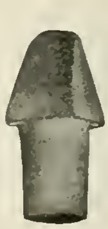
"Standard" Envelope Sealer, Model H

KNIFE SHARPENER PROTECTED BY RUBBER

A novel protective use of rubber is made in the "Kantbreak" knife sharpener, a household utensil made of a special mixture of corundum and alundum. It is reinforced by a steel rod running through the entire length, with a rubber tip at both ends and rubber mounting around the handle where it might come in contact with a hard surface if accidentally dropped. The "Kantbreak" knife sharpener puts a butcher's edge on a kitchen knife in a few strokes.—Pike Manufacturing Co., Pike, New Hampshire.

"Kantbreak" Knife Sharpener

A SIX-SIDED RUBBER PENCIL TIP

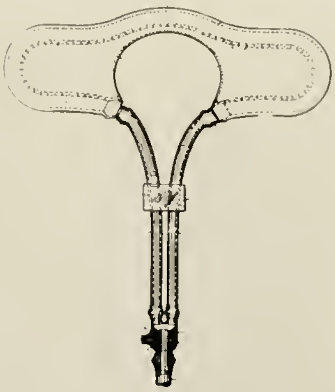


"Ruby" Pencil Tip

Owing to the easy adjustibility of the rubber tip upon the pencil, it has become an article of general popularity within recent times. A six-sided soft rubber eraser called the "Ruby" pencil tip has recently been put upon the market by a well-known manufacturer of drawing pencils, etc. It is made of the finest quality compound and manufactured to last, so that hardening with age has been reduced to a minimum. The sharp sides enable the user to erase thin lines without marring the rest of the text, and the flat sides erase large areas without smudging, thus lending a double practicability to the article.—Eberhard Faber Co., 37 Greenpoint avenue, Brooklyn, New York.

A SHOWER BATH WITHOUT WETTING THE HAIR

A shower-bathing apparatus now being sold permits a satisfactory shower bath to be taken without wetting the hair. It is called the "Simplex" and is portable and designed as an attachment to the double faucet of the ordinary bath tub. A shield of red rubber formed to fit around the neck and over the shoulders of the bather has perforated rubber tubing around the entire outer edge. This tubing below the shield in front is unperforated and the two ends pass through a perforated slide of sponge rubber by which the device is adjusted on the person. Below this slide the two ends of the tubing join in one and at the juncture point is placed a rubber valve which can be manipulated by the wearer to regulate the flow of water without bending down to the faucet. At the end of the single tube, which is about five feet long, is a "Fitsal" connector for the bath-tub double faucet. This connector was illustrated in our issue of October 1, 1918, and has a chain attachment to prevent it from being forced off the faucet by water pressure.



"Simplex" Shower-Bath Spray

The "Simplex" shower-bath spray device is made in medium and large sizes, of a good quality of soft, velvety red rubber, no metal touching the body. It is covered by United States patent No. 1,318,172, to Henry W. Patrick, Mansfield, Ohio.—The Simplex Shower Bath Co., Mansfield, Ohio; Stanley-Mateer Co., Inc., 350 Broadway, New York City representative.

THE "MARQUETTE" TIRE TOOL

Another convenience to the motorist is the Marquette tire-tool, a handy manipulator with a grip "like a giant's hand." It is said to be to a tire what a screw-driver is to a screw not an

The Quick Action Marquette Tire Tool

accessory, but a necessity. The clever construction of this simple tool utilizes leverage so that it takes tires off and rolls them on rapidly. It is guaranteed by the maker never to injure tires. The Marquette Manufacturing Co., Inc., St. Paul, Minnesota.

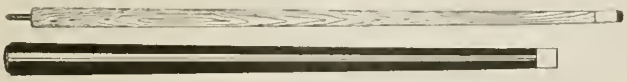
AN ELECTRICAL PNEUMONIA JACKET

Modern treatment of pneumonia and lung congestions prescribes the use of the penumonia jacket. An improved form is the "Vit-O-Net" pneumonia jacket, which is an evolution of this treatment that, the maker claims, has won the approval and endorsement of physicians who have used it. It is lined with rubberized cloth and is placed next to the body of the patient. It contains over 200 feet of a specially constructed, non-corrosive wire and it utilizes connection with an ordinary electric light socket to attain a warmth of from 110 to 130 degrees, according to conditions. The warmth is uniform around the entire thorax and is believed to dissolve and liquefy the congestive secretions in the lungs and to help to neutralize the waste, thus aiding nature to add to the patient's reserve strength. The Vitonet Corporation, 23 Flatbush avenue, Brooklyn, New York.

"Vit-O-Net" Pneumonia Jacket

BILLIARD CUE WITH VULCANITE BUTT

Hard rubber finds an acceptable use in the billiard cue made with highly polished black or mottled vulcanite butt and a maple shaft. The cue is fitted with an ivory tip and an ivory joint



Jointed Billiard Cue with Vulcanite Butt

effects connection between shaft and butt. A special feature of the vulcanite butt is that it is not affected by moisture from the hands, as it does not stain or discolor. It cannot warp or crack in use, is perfectly smooth, and in the opinion of some experts a delicate balance can be more easily attained by using a cue with a vulcanite butt.—The Brunswick-Balke-Collender Co., 623-633 South Wabash avenue, Chicago, Illinois.

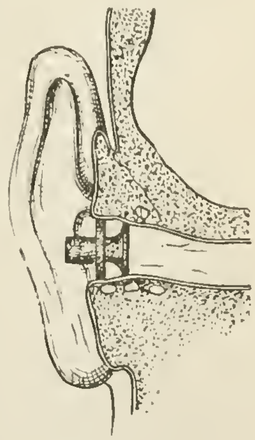
A PUNCTURELESS CUSHION TIRE FILLER

A relief from tire troubles is of interest to every motorist, and this is accomplished by the use of "Alastic" tire cushions, the maker asserts. These punctureless tire cushions are made of a resilient composition molded in various sizes to fill the tire completely and eliminate air and inner tubes. The maker also claims the "Alastic" tire cushion is not affected by heat or cold, rides like air, will stand up round as long as properly confined in the tire and is transferable from one tire to another as the tires wear out. Alastic Tire Cushion Co., 1419-1421 Locust street, St. Louis, Missouri.

"Alastic" Tire Cushion

PROTECTS THE EAR DRUM

A protective device of soft rubber to be placed in the ears when bathing is called the "Gem" ear drum protector. This invention is scientifically made to keep out water and other foreign substances and obviate pressure while not interfering with the function of hearing. It is claimed that they can be worn with perfect comfort, are easily inserted and removed, and will not fall out owing to the soft rubber disks clinging to the ear cavity. They prevent injury to the ear drums from high diving and are much preferable to cotton placed in the ears for protection.—United States patent No. 1,355,276, F. A. Schultz; Deodoral Co., distributer, Hasbrouck Heights, New Jersey.

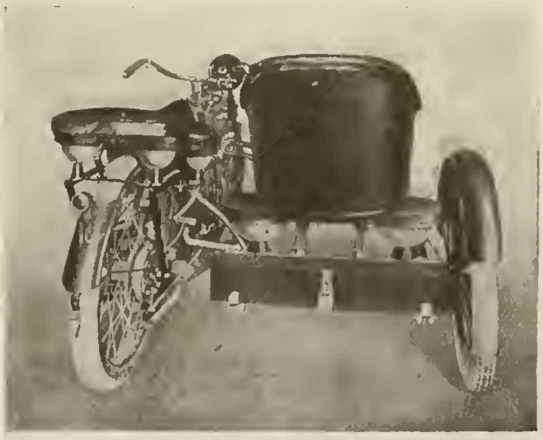


"Gem" Ear Drum Protector

TO CUSHION VEHICLE SEATS

A spring specially suited for use on automobiles, motorcycles, motor trucks, bicycles, etc., has been patented under the name of the Seibel air spring. It is claimed to eliminate nearly all the shocks transmitted by all-metal springs and to greatly enhance the pleasure of riding in any vehicle on which it is used. The shock absorbing principle utilized in pneumatic tires is here adapted to cushion vehicle seats.

The Seibel air spring consists of a metallic casing mounted on a single curved metal arm above a dome-shaped air adjuster.



Application of Seibel Air Springs

A flexible casing with inner tube and check valve depends from the metallic casing, enclosing an air chamber which cushions the seat and absorbs all shocks by pressing against the air adjuster.

The illustration shows the air springs in use on a motorcycle with side car, and their position beneath the seats is clearly seen. A motorcycle so equipped is no longer subject to objectionable and unhealthful vibrations, shocks and jolts. The elasticity desired is entirely under the control of the operator.—Seibel Air Spring Co., 785 Market street, San Francisco, California.

THE "JON-CON" TIRE PROTECTOR

A new tire protector combines the merits of being easily applied or removed, does not heat in service and successfully reinforces the tire carcass. The protector is made in one continuous molded piece of firm and elastic rubber with a central reinforcing ply of frictioned duck to render it proof against blow-outs in case of minor casing cuts.

"Jon-Con" Tire Protector

The protector is particularly effective against piercing by nails. These naturally pass through the tire tread; meeting the yielding protector they do not pass through, but are bent harmlessly parallel to the road surface by the travel of the wheel.—The Jon-Con Tire Protector Co., 2124 North 15th street, Philadelphia, Pennsylvania.

AN INFLATABLE AUTOMOBILE BACK CUSHION

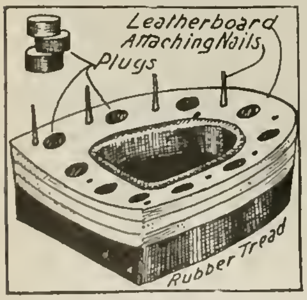
Among the instruments of comfort for motorists is an automobile back air cushion that, according to the claims of the maker, "makes the Ford ride like a Packard." Its use lessens fatigue and makes it impossible to feel vibration, jar or jolt in the shoulders or small of the back. The cushion is shaped to fit at the back of either front or rear seats, and has a pneumatic cushion inside. The outer covering is of imitation leather, corduroy, or any material desired, to harmonize with the upholstery of the car.—Metropolitan Air Goods Co., Athol, Massachusetts.


Pneumatic Automobile Back Cushion

RUBBER AND LEATHERBOARD HEEL

In an attempt to overcome the difficulty in satisfactorily attaching the ordinary rubber half-heel, a Massachusetts man has invented a heel made of rubber and leather board, for which he claims distinct advantages.

The upper part of the heel is of layers of leatherboard and the lower part of rubber. These are molded together, forming a positive union between the base and tread, as well as effectually waterproofing the leatherboard. The edges of the leatherboard are then painted the same color as the rubber.

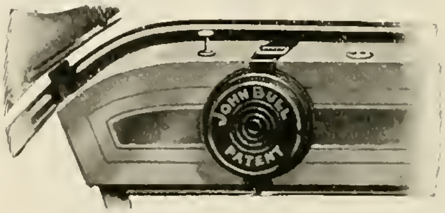


The Conant Heel

On the tread face of the heel is the trade mark, "American Main Spring," and the representation of a frog, together with small depressions for the insertion of the nails to fasten the heel to the shoe. No washers are used in this heel, but on the opposite face, alternating with the places around the edge where the nails will come through the leatherboard, appear small round rubber spots. These are rubber dowels that project from the rubber part of the heel, extending upward through round holes in the leatherboard. Also, around the central suction cup of the heel, which is ¼-inch deep, rise rubber walls as a suitable protector inside the leatherboard. Inside the vacuum cup is the name of the inventor of the heel, and the notice, "Patent pending."—Leon Conant, 7 Water street, Boston, Massachusetts.

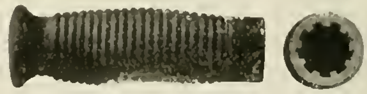
RUBBER AIDS WHEN AWHEEL

Of British manufacture are "John Bull" knee grips and cushion grips for use of motor-cyclists. The knee grips are made with an outer shell of rubber of special design, enclosing air, held in shape by a flat plate inserted in the back. A circular projection of rubber inside the shell prevents collapse under pressure from the knees. The knee grip is in reality a pneumatic cap for the knees, a single stout strap securing both grips to the tank.



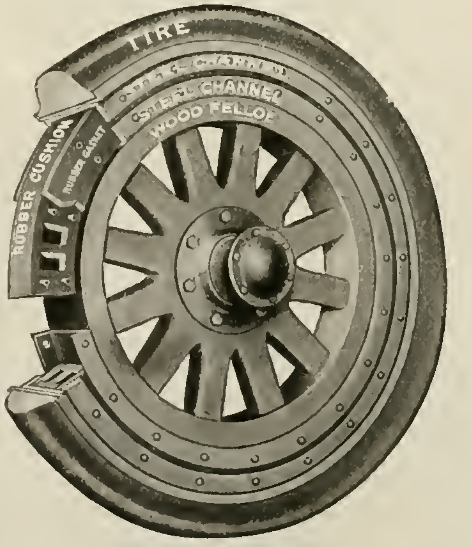
"John Bull" Knee Grips

"John Bull" hand grips are made of resilient rubber with molded air chambers, in sizes for ⅞-inch and one-inch bars, with open ends for inverted levers and closed ends for outside levers. These are said to give relief from aching shoulders, wrists, or hands due to excessive vibration. Both the knee grips and the hand grips are made by the same manufacturer.—The Leicester Rubber Co., Limited, Post Office Place, Leicester, England.


"John Bull" Cushion Grips

THE MORAND CUSHION WHEEL

The cushion wheel for motor trucks is apparently under continuous development. An improved form of one previously noted is the latest Morand cushion wheel shown in the illustration. These wheels are built to standard S. A. E. specifications for both single and dual pressed-on type solid tires only and are claimed to be equally serviceable for light or heavy duty trucks. The inner molded rubber cushion is shown, containing rectangular cavities which afford space for the rubber to be displaced under compression. The cushion, with a rubber gasket on each side, is bolted between steel channel rims and interposed between the felloe of the wood wheel and the solid tire base. It can neither creep nor climb. The wheel travels without side swaying, which permits greater speed with perfect safety to the truck and its load.—Morand Cushion Wheel Co., 800-902 South May street, Chicago, Illinois.



Morand Cushion Wheel

HOLIDAY GREETINGS, CALENDARS, SOUVENIRS

Again the holiday season has brought to The India Rubber World the greetings and kind wishes of the rubber and allied industries. We take this opportunity to acknowledge these courtesies and to assure our friends of our cordial and continued interest in them and their varied activities.

CARDS

W. H. Salisbury & Co., Inc., Chicago, Illinois, manufacturer and dealer in rubber products, sends to the trade, on a card bearing its well-known red and green trade mark, the season's greetings and best wishes for 1921.

The Spreckels "Savage" Tire Co., San Diego, California, has sent out a holiday card bearing the picture of a very young Indian chief and greetings from "Little Heap" and his people.

The Chicago Rubber Clothing Co., Chicago, Illinois, sends a holly-decked card wishing a merry Christmas and a happy New Year to all its friends.

The Oak Rubber Co., Ravenna, Ohio, has sent to the valued members of its large circle of business friends a card bearing wishes for success in the New Year.

The Dunlop Tire & Rubber Co., Limited, Toronto, Canada, has sent a cheerful card bearing the representation in gold of one of its tires with a sprig of holly in the center, and the pleasant and appropriate greeting, "May You Travel on the Circle of Prosperity During 1921."

The Mason Tire & Rubber Co., Kent, Ohio, has distributed an art hanger on which a very attractive girl, the product of Haskell Coffin's gifted brush, invites the beholder to ride with her on Mason tires.

Charles E. Wood, 287 Broadway, New York City, crude rubber broker, is a business man who realizes that his biggest asset is the good will of his customers and business acquaintances, and who is not afraid to tell them so. A handsome engraved card announces this pleasant fact, together with other friendly statements.

A strikingly colored poster representation of "Christmas on the Portage Path," showing a solitary woodsman and two Indians at a twilight camp in the forest, decorates the folder which carries the holiday wishes of the Portage Tire & Rubber Co., Akron, Ohio.

Lee Tire & Rubber Co., Conshohocken, Pennsylvania, sends a tastefully engraved greeting card surmounted by a traditional Christmas scene of the Wise Men following the Star.

A holly-decked, gold-bordered folder with the cover showing a representation of a snow-covered, brightly lighted factory under a star-filled sky, bears best holiday wishes to the trade from The Black & Decker Manufacturing Co., Towson Heights, Baltimore, Maryland, maker of special machinery.

Compliments of the season are fittingly conveyed by an engraved card from The J. H. Day Co., Cincinnati, Ohio, manufacturer of rubber machinery, wishing to all its friends a merry Christmas and a Happy New Year, 1920-1921.

CALENDARS

A set of useful calendar blotters, one for each month, bearing an appropriate verse from some famous poem and decorated with a colored reproduction of a painting illustrating the poetical selection, is a holiday remembrance of E. H. Clapp Rubber Co., Boston, Massachusetts, rubber reclaimer.

A painting by Zula Kenyon, "The Land of Laughing Water," showing an idyllic scene in the days when Indians were the only inhabitants of the West, adorns the panel calendar issued by The Oak Rubber Co., Ravenna, Ohio, manufacturer of toy balloons.

A very colorful painting by Emilio Vasarri, "In the Days of the Caesars," is reproduced on the wall calendar presented by Elmer E. Bast, Chicago, Illinois, manager of The Acme Belting Co. and of the United & Globe Rubber Co. It shows a group of Roman ladies amusing themselves at games in the peristyle of a nobleman's palace.

A panel calendar with the picture of an extremely pretty girl is the gift of L. J. Mutty Co., 175 Congress street, Boston, Massachusetts, maker of automobile top fabrics. It does not need the caption to tell that this young person is "Sweet Sixteen."

The Rubber Regenerating Co., Trafford Park, Manchester, England, sends its greetings all the way across the Atlantic in the form of a wall calendar, on which the months of the year surround a pad of large clearly numbered leaves with the date of each consecutive day, intended to be detached daily. The calendar is decorated with a charmingly soft-colored reproduction of a painting by F. Gresley of historic "Haddon Hall" and its picturesque surroundings.

A handy desk memorandum calendar refill is the thoughtful remembrance of the New Jersey Rubber Co., Lambertville, New Jersey, reclaimer of rubber.

Lavelle Rubber Co., 413-421 N. Franklin street, Chicago, Illinois, manufacturer of mechanical rubber goods, has issued a very practical wall calendar with large figures, each leaf displaying the current month centered, with the past and next following months at top and bottom, respectively.

A painting of the Indian maiden Minnehaha, seated by a moonlit forest stream, is shown on the large-size calendar issued by the Pioneer Asphalt Co., Laurenceville, Illinois, maker of mineral rubber. The background of the calendar represents an Indian blanket with gay-colored, characteristic designs breaking the soft gray of the fabric.

A clear-type, large size wall calendar with leaves for every month and all holidays printed in red, is sent by The Schilling Press, 137-139 East 25th street, New York City, "printers of quality."

The General Electric Co., Schenectady, New York, has brought out a striking large three-color calendar, each leaf showing a photograph of some different phase of the application of electrical energy to modern industry. The surrounding decorations are in poster effect and show sources of electricity, electrical machinery in process of manufacture, electrical apparatus in the home, in the office and on land and sea.

F. R. Henderson & Co., New York City, crude rubber importer, has thoughtfully sent a refill for the convenient leather desk calendar with which that firm presented the trade last year.

From Lockwood, Greene & Co., 60 Federal street, Boston Massachusetts, comes a large calendar printed in sepia ink on ivory paper, illustrated by photographs of twelve model factories constructed by this engineering firm for various companies throughout the United States, including several rubber goods manufacturers.

The 1921 addition to the series of calendars which the Monatiquot Rubber Works Co., South Braintree, Massachusetts, has issued for the last several years, bears the portrait of Chief Wampatuck. The calendar is large size, printed in brown ink on sepia paper, and the stern profile of the Indian chief in war bonnet strikes a distinctly decorative note.

A combination of calendar and catalog is the souvenir of F. E. Myers & Brother, Ashland, Ohio, manufacturer of pumps and special machinery. A large wall panel, topped with a colored picture, bears a calendar pad surrounded by pictures of various pumps, each numbered in red with its style number for ready reference.

A handsome polished brass easel desk calendar has been distributed by the Allen Tire & Rubber Co., Allentown, Pennsylvania, with a return post card entitling the signer to a 1922 refill at the end of the year. The pad is small, but clearly numbered, with holidays in shaded type, and shows the moon's phases.

The J. H. Stedman Co., scrap rubber merchants, South Braintree, Massachusetts, has sent out a calendar bearing the fifteenth

of a series of old New England scenes. The subject on the 1921 calendar is the old Town Mill, Nantucket, Massachusetts, which is the principal objective of the many tourists to that island.

The North British Rubber Co., Limited, Edinburgh, Scotland, has issued a substantial large-size wall calendar, with daily slips, showing a rocky headland surmounted by a medieval castle silhouetted against the evening sky.

SOUVENIRS

The Niagara Sprayer Co., Middleport, New York, manufacturer of rubber sulphur, has presented its friends with a very convenient miniature pocket almanac and notebook, bound in red morocco, containing the holidays and holy days of the year, the moon's phases and various astronomical data, with oiled leaves for carrying stamps and blank leaves for inscribing the few facts one wishes to carry with him at all times.

John Royle & Sons, Paterson, New Jersey, maker of special rubber machinery, sends "a friendly little book of empty leaves" – a diary for 1921—which contains besides the blank leaves some matter of interest to the trade and maps and tables worth frequent reference.

H. Muehlstein & Co., Third avenue and Harlem River, New York City, dealer in scrap rubber, sends a leather-bound loose-leaf notebook, of vest pocket size, stamped with the recipient's name in gold lettering.

An attractive and useful sole-leather wallet, fastening with two snaps, is the Christmas souvenir to friends in the trade of the Somerset Rubber Reclaiming Co. of New Brunswick, New Jersey.

E. W. Clapp Rubber Co., rubber reclaimers, 49 Federal street, Boston, Massachusetts, distributed a handsome and useful Christmas remembrance to the trade in the form of a gold-filled automatic pencil.

THE EDITOR'S BOOK TABLE

"YEARBOOK OF THE NETHERLANDS EAST INDIES, EDITION 1920." Compiled by the Sub-Department of Commerce of the Department of Agriculture, Industry and Commerce at Buitenzorg, Java. Albrecht & Co., Weltevreden. Cloth. 276 + 60 pages, 7 x 10¾ inches.

The Netherlands East Indies Yearbook differs considerably from the year-books published in other countries, which often contain chiefly statistical material. The main object of the edition of 1920 is to give the world public a general idea of the conditions prevailing in the Dutch East Indian colony and of the results achieved by Holland as a colonial power. Consequently much that was included in the first edition, published in 1916, has been curtailed. Subjects generally considered include: Location, and Topography; Government; Health Regulations; Agriculture, including Forestry, which covers rubber planting; Commerce, etc. It is the intention of the department to treat various subjects more in detail in succeeding year-books, so that in the course of time a set of year-books will contain a more complete representation of several important branches of service. The edition is published in Dutch and English. It is an imposing volume, beautifully illustrated with two-color half-tones from photographs taken in the islands and contains many useful maps and graphs.

NEDERLANDSCH-INDISCH RUBBERJAARBOEK (NETHERLANDS East Indies India Rubber Year-Book). Fourth edition. Compiled by K. Goelst. Nederlandsch-Indisch Rubbertijdschrift, Batavia, Java. Card board. 244 pages.

Owing to the increased expense of printing, paper, etc., this little book has been somewhat modified and appears in stiff board covers, instead of the green cloth binding used in the three former editions.

As before, the contents cover the doings of the past year (in this case 1919), as far as concerns rubber associations and departments of agriculture, both without and within the Dutch possessions in the East. There are reports of the activities of experiment stations throughout the Netherlands East Indies, valuable statistics of the number and extent of estates, exports from the various Java and Sumatra districts, trade and planting notes, rules of the local planters' unions. Among the articles included are: "Coagulants," by Dr. O. de Vries; "Spots on Sheets," by J. C. Hartjens, and "Spontaneous Coagulation," by Dr. O. de Vries and W. Spoon. A review of rubber diseases during 1919, lists of definitions and conversion tables of weights, measures, prices are also included

NOMINATIEVE STATISTIEK DER RUBBERONDERNEMINGEN IN Ned.-Indie (Statistics of Rubber Estates in Netherland Indies) 1920. Compiled by K. Goelst Het Ned.-Ind. Rubbertijdschrift, Batavia, Java. Stiff board covers, 67 pages.

Similar statistics had been published by the Netherlands East Indies Association for the rubber trade, but after having published data for 1917, the association stopped this work. Now the publishers of the Nederlandsch-Indischtijdschrift have taken over the publication of a similar little book and intend to publish revised editions every year.

The appearance of the book has been greatly improved and pains have been taken to get as much and as accurate information as possible. Altogether 576 estates in the Netherlands East Indies, covering an area of 486,149 bouws (1.754 acres equals one bouw) and having had an estimated crop of 71,067,760 kilos during 1920, are treated. First come the Javanese estates grouped in alphabetical order under the various residencies. The districts in Sumatra, then Borneo and Celebes follow. Next to the name of each estate are the name of the manager, address, total area, area planted to Hevea, area planted to Ficus, area in bearing (all in bouws), output of 1918, output of 1919, estimated output of 1920 (in kilos), dividend for 1917, dividend for 1918, capital, proprietor and attorney in the Netherlands East Indies. As all this data is given for each estate in one compact paragraph with no special indication of its meaning except a figure, a loose card with the explanation of these figures is added with each copy of the book.

RECOMMENDED PLAN OF COST ACCOUNTING CONTROL FOR the Members of the Rubber Proofers' Division of The Rubber Association of America, Inc. Codey & Marvin Co., Boston, Massachusetts. Paper, 6 by 9 inches, 29 pages. Graphs and diagrams.

A very practical and comprehensive plan of cost accounting applicable to plants engaged in proofing of cloth, whether devoted wholly or partially to such work, is graphically set forth in this timely contribution to the literature of the rubber industry. It is the aim of the authors to correct the demoralizing effect of the haphazard pricing of products due to a lack of proper knowledge or to an over-eagerness of many manufacturers to get business. Even a casual glance at the method presented will reveal many important factors of cost that lie between gross sales and net profits. Particularly serviceable is the formula showing in detail the successive stages of cost accumulation, and the mode of analyzing and recording each item of expense. Especially valuable, too, are the charts for ledger accounts, plan of cost control, and the forms of factory order cost sheets.

PROCEEDINGS OF THE TWENTY-THIRD ANNUAL MEETING OF the American Society for Testing Materials, Vol. XX, Parts I and II, 1920 Published by American Society for Testing Materials, Philadelphia, Pennsylvania. Part I, 848 pages; Part II, 511 pages. Paper, 6 by 9 inches.

Part I comprises committee reports on various classifications of materials followed by numerous tentative and revised specifications on testing ferrous and non-ferrous metals, cement, lime, gypsum and clay products, and miscellaneous materials. Among the reports and specifications of special rubber interest are the following: Committee D-11 on Rubber Products; Committee D-13 on Textile Materials with appendices referring to factors affecting the breaking strength of cotton fabrics and the accuracy of testing machines used for that purpose; tentative specifications for Insulated Wire and Cable (30 per cent Hevea rubber), and

Adhesive Tape; Tentative Tests for Molded Insulating Materials; Tentative Methods for Testing Textiles; Standard Specifications for 2⅝-inch Cotton Rubber Lined Fire Hose for Private Department Use, 2½, 3 and 3½ inch Double Jacketed Cotton Rubber-Lined Fire Hose for Public Fire Department Use.

Part II comprises technical papers relating to metals, cements, road materials, etc., followed by articles on testing apparatus and methods of testing. The only technical paper on rubber products is that by J. M. Bierer, Construction of Steam Hose, which was published in The India Rubber World, August, 1920, page 724.

NEW TRADE PUBLICATIONS

A revised and enlarged edition of date sheets, edited by A. A. Somerville, for the loose-leaf book distributed by R. T. Vanderbilt Co., 50 East 42nd street, New York, has recently been issued. The data includes 34 pages of notes and tables on technical matters relating to crude rubber compounding, curing, costing, fabrics, and a variety of useful conversion tables of temperature weights and measures, etc. Additional sheets are devoted to the compounding materials in which the Vanderbilt company specializes.

Colonel Samuel P. Colt, Chairman of the United States Rubber Co., in a review of the rubber industry, predicts that there will be more tires consumed in 1921 than in 1920, or in any previous year in the history of the world. Could such an optimistic statement come from a more reliable and conservative source?

The Apsley Rubber Co., Hudson, Massachusetts, has issued its new price-lists of rubber boots and shoes, including its three regular and Middlesex brands, and of Apsley canvas footwear. The lists are dated January 1, 1921, and are subject to change without notice. Like the new lists of other firms the reductions average 10 per cent or more.

The B. F. Goodrich Co., Akron, Ohio, on the Occasion of its fiftieth anniversary, has issued a four-page folder bearing a personal inspirational message from B. G. Work, its president, to the friends and customers of the company.

"Wires and Cables," published by the General Electric Co., Schenectady, New York, groups in one binding five bulletins dealing with wires and cables, one of which relates to conductors insulated with rubber. Choice of cables for various kinds of service is considered, together with the characteristics and construction features of each type of product for the various classes. There are also many tables of capacity, test voltages, dimensions and classifications of cables.

The December number of "The Osborn Bulletin" published periodically by The Osborn Manufacturing Co., Cleveland, Ohio, contained an optimistic article based on sound facts, entitled "How's Business?" by R. W. Wheeler, sales manager of the brush division.

"Free Air," a monthly magazine for tire dealers, published by The Delion Tire & Rubber Co., Baltimore, Maryland, has made its initial appearance, and creates a favorable impression. It is a snappy little 16-page booklet, printed in two colors, and will be sent gratis to any tire dealer mailing his request to the publishers.

"The Michigan Tire News," Vol. I, No. 1, has been published by the Wildman Rubber Co., Bay City, Michigan, to serve as a bulletin to the stockholders of the company and to acquaint the public generally with the possibilities of investment in the rubber industry. It is a well-printed and illustrated four-page bulletin, 11 by 16 inches.

A very complete catalog has been issued by A. Klipstein & Co., 644-652 Greenwich street, New York City, importers and exporters of chemicals, colors, oils, etc., listing the various commodities under class heads. For the convenience of buyers the original packing and approximate gross weights of the articles have also been listed. Prices have been omitted, owing to their extreme fluctuations. A feature of the catalog is the separate classification of specialties under the industry in which they are used. Under the head of the rubber industry are enumerated various accelerators, acids, alkalis, colors, compounding ingredients, gums, oils solvents, vulcanizing ingredients and waxes.

"Cotton and Cotton Manufacture" is the title of a booklet issued by The First National Bank of Boston to be a companion to the booklet, "Wool and Wool Manufacture," recently distributed by them. It is a brief analysis for the layman and explains all the details of the industry, but untechnically and in an easily readable style. Beginning with the history, distribution and cultivation of cotton, the book describes the selling methods and grading of the staple, the process of manufacture, from the receipt of the raw cotton at the mills to its delivery as finished goods, and finally the position of the United States in the industry is discussed. The book is the work of a member of the staff of the bank and is profusely illustrated from photographs showing distinctly many of the intricate processes of manufacture. Copies may be obtained upon application to the First National Bank of Boston, Commercial Service Department.

"Bank and Public Holidays Throughout the World" (1921), is the useful publication of the Guaranty Trust Co., New York City. From its convenient and accurate tabulations it will be found that if some indolent soul of cosmopolitan bent decided to celebrate all the holidays of all the nations of the world, including Sundays, he would allow himself the slender margin of sixty-odd working days in which to earn his bread and butter. What will happen to the workaday world when new holidays commemorating events in the world war are allotted and celebrated is a matter of conjecture. However, the value of a compilation of holidays is inestimable to firms doing international business, especially if banks are closed on these occasions.

"SILVERTOWN" FAN BELT

Fan belts for motor cars have become an indispensable accessory, as motorists are attaching more and more importance to this item of equipment. The average owner is aware of the importance of proper engine cooling and knows the danger of a belt ceasing to function in a place where it could not be readily repaired.

Efficient and reliable is the "Silvertown" cord fan belt, made of cotton cords impregnated with rubber solution and surrounded by a rubber cushion. This construction has just the proper "give," but grips firmly and is said to withstand the hardest drives. The "Silvertown" fan belt is made in both "V" and "flat" styles for use on different types of motors.—The B. F. Goodrich Co., Akron, Ohio.

"COPPER QUEEN" BELTING FOR INDUSTRIAL USE

A friction belt that has a good reputation in the industrial fields of the world is the "Copper Queen" duck belting with red friction surface. It is specially adapted to general transmission work of a severe nature, such as saw mills, reduction plants, paper mills and the like. The duck employed in its manufacture possesses flexibility combined with strength and the heavy tenacious friction is compounded primarily for endurance. "Copper Queen" belting is made in sizes 2 to 12-ply, from 1 to 60 inches wide and can be obtained in special widths and plies to suit extraordinary requirements.—Pioneer Rubber Mills, San Francisco, California.

The National Automobile Show

The Twenty-first Annual National Automobile Show, under the auspices of the National Automobile Chamber of Commerce, was held in New York City, January 8 to 15, 1921. The exhibits fully occupied four floors of the Central Square Building, formerly known as Grand Central Palace. Eighty-eight makes of cars were shown, while the exhibitors of automobile accessories numbered 231.

The popular interest in the exhibition was evidenced by the continuous throngs that viewed the exhibits daily. The spirit of the show was in accord with that of the leading national authorities in automobile matters, by whom the prediction is made that there will soon develop the most gigantic building program ever known in the history of any nation. Reasons for this hopeful outlook are found in the pressing need for public works neglected for three years because of the war's demands, high costs and labor shortage. With the passing of these abnormal conditions the repair and development of industrial, trade and transportation facilities will respond to the urgency of national needs.

AUTOMOBILE REGISTRATION

An idea of the influence of the automobile as a factor in modern social and industrial development may be had by noting the rapidly increasing numbers of motor cars registered in the United States. The official report of passenger cars and trucks registered in this country in 1919 was 7,604,016 and 9,295,252 in 1920, an increase of 22.2 per cent. To maintain the present number of cars in service will require a normal replacement of a million per year, each car being conservatively valued at $1,000, and, in addition, the unknown, but doubtless large, increase in registration, possibly 22 per cent as of last year. In that event 2,000,000 more cars will be required, a total of 3,000,000 new cars for 1921. These items of car building will require 12,000,000 tires for initial equipment. Spare tires and replacement of worn tires for cars already in use will bring the total estimated demand for tires in 1921 to approximately 35,000,000.

In connection with the show it was noted that designers and makers of cars have endeavored with marked success to simplify the motors and lubricating systems, strengthen the chassis and perfect the driving control. These features are for the benefit of the increasing class of owner-drivers, by adding the elements of dependability, durability, ease of operation and reduction of cost of upkeep.

RUBBER AND MISCELLANEOUS PASSENGER CAR ACCESSORIES

The accessory exhibits occupied all of the fourth floor space and a small proportion of that of the third floor. Something for every motoring need would seem to have been included in the great variety of accessories shown. Those in which rubber formed an essential feature included the product of the following manufacturers.

Auto Pedal Pad Co., Inc., 318 West 52nd street, New York City. Rives' "Neverslip" auto pedal pads molded in designs for every car. Also Rives' adjustable accelerator pad and heel rest.

Automatic Safety Tire Valve Corporation, 1753 Broadway, New York City. "Lox-on" air chuck. "Whistler" tire pressure indicator.

Breeze Metal Hose & Mfg. Co., 248 South street, Newark, New Jersey. Flexible metallic hose.

Coffield Tire Protector Co., Dayton, Ohio. High grade molded endless protector of rubber for insertion between tube and casing.

Eastern Rubber Co., Philadelphia, Pennsylvania. Demonstration of "Magic Rubber Mend" for repair of cuts and punctures in tubes and soft rubber articles generally.

Elgin Rubber Ace Co., Elgin, Illinois. "Rubber Ace" inner tires consisting of two annular interlocking sponge rubber members molded to fit and completely fill a tire casing for which very specific claims of practical utility are made.

Jon-Con Tire Protector Co., 2124 North 15th street, Philadelphia, Pennsylvania. "Jon-Con" tire protector, and endless molded rubber band reinforced by a centrally inserted duck ply.

James Martin, 134 West 52nd street, New York City. Martin cord tires, ribbed and non-skid.

Martin Tire Corporation, 903 Sixth avenue, New York City. Cord and fabric tires, red and gray inner tubes.

Rawhide Products Corporation, Inc., 1834 Broadway, New York. "Miracle" blow-out patches, non-puncturable by reason of a ply of raw hide interlaminated with rubberized duck. Also "Miracle" fan belts made non-stretchable by a single central ply of rawhide, the outer plies being of 8-ounce frictioned duck, and a red rubber cover, lightly cured and with edges stitched through and through.

Sewell Cushion Wheel Co., 1300 Gratiot avenue, Detroit, Michigan. Sewell cushion wheel.

Weldo Patch Manufacturing Co., 230 Fifth avenue, New York. Demonstration of the self-welding "Weldo-Patch," applied to mend holes, cuts and tears in inner tubes, rubber shoes, water bottles or other soft rubber goods without cement or vulcanization.

S. S. White Dental Manufacturing Co., 7 Union Square, New York City. Flexible shafts.

Collins Puncture-Proof Tube Co., Hackensack, New Jersey. Special red inner tube containing a self-healing puncture fluid.

Interesting displays of motor batteries were those of Electric Storage Battery Co., Allegheny avenue and 19th street, Philadelphia, Pennsylvania; Hartford Battery Manufacturing Co., Milldale, Connecticut; Luthy Storage Battery Co., 1170 Broadway, New York; A. H. Lyons & Co., Girard Building, Philadelphia, Pennsylvania; Paul M. Mako & Co., Inc., 1402-12 Atlantic avenue, Brooklyn, New York; Philadelphia Storage Battery Co., 1789 Broadway, New York; Westinghouse Union Battery Co., Swissvale, Pennsylvania; Willard Storage Battery Co., 246 East 131st street, Cleveland, Ohio; Witherbee Storage Battery Co., Inc., 643 West 43rd street, New York City.

Among the exhibits of accessories not of rubber many were of special interest, such, for example, as the following:

Link-Belt Co., 202 Hunting Park avenue, Philadelphia, Pennsylvania. Link-Belt silent chain, front end drives.

Morse Chain Co., Ithaca, New York. Morse front end silent chain drives.

Salmon Falls Manufacturing Co., 50 State street, Boston, Massachusetts. Toron-treated tire fabrics and toronized tires. Demonstrations were in progress by means of a Scott testing machine with autographic recording device, showing the value of Toron in uniformly enhancing the holding power of friction on tire-building fabric.

A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, New York. Universal tire-valves, dust caps, pressure gages, pump connections, etc.

C. A. Shaler Co., 21 Jefferson street, Waupun, Wisconsin. Vulcanizers and equipment for tire and tube repair. Shaler road lighter headlight lenses.

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania. Rectigon battery charger; Mazda lamps; automobile wiring systems and small motors for household purposes.

News of the American Rubber Industry

FINANCIAL NOTES

The following is the condensed balance sheet of The Mason Tire & Rubber Co., Kent, Ohio, as at the close of business October 31, 1920:

Assets

Current:				
Cash balances		$114,149.33		
Accounts and notes receivable	$739,186.41			
Less reserves	18,000.00	721,186.41	$835,335.74	
Inventories				
Finished goods at factory and branches		$1,782,044.87		
Work in process		172,779.01		
Raw material and supplies		670,389.37	2,625,213.25	
Total current assets				$3,460,548.99
Other assets:				
Miscellaneous investments			$103,500.00	
Transportation claims			5,683.82	109,183.82
Fixed Assets:				
Real estate			$67,500.00	
Buildings	$1,388,952.27			
Machinery and equipment	1,739,542.36	$3,128,494.63		
Less reserve for depreciation		182,957.50		
As appraised by American Appraisal Co.			2,945,537.13	
October 31, 1920, at sound market values. dormitories (at cost)			205,000.00	3,218,037.13
Deferred Charges:				
Miscellaneous deferred and prepaid expenses				160,540.77
Good will, trade marks, etc			$2,211,409.53	
Less capital surplus			935,639.50	1,275,770.03
				$8,224,080.74

Liabilities and Capital

Current:				
Accounts and notes payable			$834,586.07	
Dividends payable			46,268.00	
Total current liabilities				$880,854.07
7% Serial Gold Notes: (Maturing May 1, 1921)				50,000.00
7% Serial Gold Notes: (Maturing November 1, 1921, to May 1, 1926 inclusive)				650,000.00
Accrued:				
Accrued taxes and royalties				38,420.02
Reserve:				
For tire adjustments				20,000.00
Capital:				
Preferred stock		$5,458,920.00		
Common stock "A"		500,000.00		
Common stock "B"		383,462.50	$6,342,382.50	
Payments on capital stock subscriptions			65.048.42	6,407,430.92
Surplus:				
Auditors' balance November 1, 1919			$45,671.51	
1919 income tax and other adjustments			32,581.57	
Profit for year			527,669.69	
Less dividends		$414,834.22	$605,922.77	
Less adjustments		13,712.82	428,547.04	177,375.73
				$8,224,080.74

Contingent liability October 31, 1920, on trade acceptances discounted, as verified by correspondence with all banks, was $155,-035.11. Estimated income and profits taxes for year, for which no reserve was set up, approximately, $75,000.

CLEVELAND STOCK EXCHANGE QUOTATIONS

The following are closing quotations of January 20, supplied by The App-Hillman Co., Second National Building, Akron, Ohio:

	Bid	Asked
American R. & T. Co., com	45	70
Amazon Rubber Co., The	..	45
Firestone T. & R., com	85	90
Firestone T. & R., 6% pfd	85	90
Firestone T. & R., 7% pfd	77	80
General T. & R. Co., The, com	200	250
General T. & R. Co., 7% pfd	80	85
Goodrich, B. F., Co., The, com	42	43
Goodrich, B. F., Co., The. pfd	79	83
Goodrich, B. F., Co., The, 5-yr. 7% notes	89	90½
Goodyear, T. & R. Co., The, com	22	23
Goodyear T. & R. Co., The, 7% pfd	46	47
India T. & R. Co., com	100	130
India T. & R. Co., 7% pfd	..	80
Mason T. & R. Co., The, com	17	20
Mason T. & R. Co., The, 7% pfd	65	70
Marathon T. & R. Co., com	..	4
Miller Rubber Co., The, com	85	90
Miller Rubber Co., The, 8% pfd	85	88
Mohawk Rubber Co., The	120	130
Portage Rubber Co., The, com	23	25
Portage Rubber Co., The, 7% pfd	40	45
Republic Rubber, com	1¼	1½
Republic Rubber, 7% pfd	..	37
Republic Rubber, 8% pfd	18	22
Rubber Products Co., The	..	100
Star Rubber Co., com	..	100
Star Rubber Co., 8% pfd	..	100
Swinehart T. & R., com	25	40
Swinehart T. & R., 7% pfd	..	70
Phoenix Rubber Co., com	..	20
Phoenix Rubber Co., pfd	..	90
Standard Tire Co., com	..	125
Standard Tire Co., pfd	..	90

NEW YORK STOCK EXCHANGE QUOTATIONS

January 25, 1921

Ajax Rubber Co., Inc	37	36¼	36½
The Fisk Rubber Co	14½	14¼	14¼
The B. F. Goodrich Co	40⅞	40¾	40⅞
The B. F. Goodrich Co., pfd	83	83	83
Kelly-Springfield Tire Co	47⅞	46½	47⅞
Kelly-Springfield Tire Co., pfd	93	94	94
Keystone T. & R. Co., Inc	11⅞	11⅝	11⅞
Lee R. & T. Corp	20	19⅛	19⅛
United States Rubber Co	69¼	67¾	68½
United States Rubber Co., 1st pfd	103	103	103

DIVIDENDS DECLARED

Company	Stock	Rate	Payable	Stock of Record
American Wringer Co	Pfd.	1¼%	Jan. 15	Dec. 31
Canadian Connecticut Cotton Mills, Limited	8% par. pfd.	2% q.	Jan. 1	Dec. 23
Corn Products Refining Co	Com.	$1 q.	Jan. 20	Jan. 3
Corn Products Refining Co	Com.	$0.50 q.	Jan. 20	Jan. 3
Corn Products Refining Co	Pfd.	$1.75 q.	Jan. 15	Jan 3
Eagle-Picher Lead Co., The	Pfd.	1½% q.	Jan. 15	Jan. 2
Firestone Tire & Rubber Co	Pfd.	$1.50 q.	Jan. 15	Jan. 1
Fisk Rubber Co., The	1st pfd.	1¾% q.	Feb. 1	Jan. 21
Franklin Rubber Co	Com.	6% an.	Jan. 10	Dec. 31
General Electric Co	Com.	2% q.	Jan. 15	Dec. 8
General Electric Co	Com.	2% stk.	Jan. 15	Dec. 8
General Tire & Rubber Co	Pfd.	1¾% q.	Jan. 1	Dec. 20
Goodrich B. F., Co., The	Com.	$1.50 q.	Feb. 15	Feb. 4
Goodrich, B. F., Co., The	Pfd.	1¾% q.	Apr. 1	Mar. 22
Goodrich, B. F., Co., The	Pfd.	1¾% q.	July 1	June 21
Hodgman Rubber Co	Pfd.	2% q.	Feb. 2	Jan. 15
Hood Rubber Co	Pfd.	1¾% q.	Feb. 1	Jan. 20
India Tire & Rubber Co., The	Com.	2% q.	Jan. 3	....
India Tire & Rubber Co., The	Pfd.	1¾% q.	Jan. 3	....
Kelly-Springfield Tire Co	Com.	$1 q.	Feb. 1	Jan. 14
Kelly-Springfield Tire Co	Com.	3% stk.	Feb. 1	Jan. 14
Kelly-Springfield Tire Co	8% pfd.	$2 q.	Feb. 15	Feb. 1
Lee Rubber & Tire Corporation	Com.	$0.50 q.	Mar. 1	Feb. 15
Manufactured Rubber Co., The	Pfd.	1½% q.	Jan. 12	Jan. 8
Miller Rubber Co., The	Com.	$1 q.	Jan. 20	Jan. 1
Mohawk Rubber Co., The	Com.	$1 50	Jan. 1	....
New Jersey Zinc Co., The	Com.	2% q.	Feb. 10	Jan. 31
Philadelphia Insulated Wire Co	Com.	$1.50 q.	Jan. 15	Jan. 10
United States Rubber Co	Com.	2% q.	Jan. 31	Jan. 15
United States Rubber Co	1st pfd.	2% q.	Jan. 31	Jan. 15
Westinghouse Electric & Manufacturing Co.	Com.	2% ($1) q.	Jan. 31	Dec. 31
Westinghouse Electric & Manufacturing Co.	Pfd.	2% ($1) q.	Jan. 15	Dec. 31
Wrigley, Jr., Wm. Co	Com.	$0.50 m.	Feb. 1	Jan. 25

NEW INCORPORATIONS

Air Container Co., January 13, 1921 (New Jersey), $250,000. A. G. Fitzgerald, Boston, Massachusetts; G. G. Tennant, T. M. Kane—both of Jersey City, New Jersey. To manufacture tires.

American Rubber Holding Co., December 17, 1920 (Delaware), $1,000,000. M. M. Lucey, M. B. Reese, V. P. Lacey—all of Wilmington, Delaware.

Co-operative Rubber & Mfg. Co., January 13, 1921 (Delaware), $600,000. A. W. Britton, S. B. Howard, R. K. Thistle—all of New York. To manufacture tires.

Gasen Manufacturing Co., September 24, 1920 (Pennsylvania), $50,000. G. H. Shreiner, president; G. L. Whallen, vice-president; L. R. Whallen, secretary; R. W. Shreiner, treasurer—all of Lancaster, Pennsylvania. To manufacture and sell automotive equipment and accessories.

Gotham Co., Inc., December 20, 1920 (New York), $100,000. Julius H. and Gustav Cohn, both of 251 West 92nd street, New York City; A. H. Cohn, Larchmont—both in New York. To manufacture rubber goods.

Great West Rubber & Footwear, Ltd., October 22, 1920 (Canada), $200,000. D. R. Yates, president; R. W. Wallace, vice-president G. F. Bletcher, secretary and treasurer. Principal office, Lethbridge, Alberta, Canada. To distribute Dunlop tires, accessories and mechanical goods.

Hard Fibre & Insulation Corp., January 21, 1921 (New York), $50,000. W. E. Dancink, 52 West 76th street; A. N. Sohmer, 237 West 107th street; J. W. Canter, 952 Simpson street—all in New York City.

Kay Fowler, Inc., October 29, 1920 (Massachusetts), $25,000. C. Kay, G. F. Merrill, both of Gloucester; L. F. Fowler, Rockland—both in Massachusetts. Principal office, Boston, Massachusetts. To buy and sell leather, rubber and canvas goods.

King Tire Co., Inc., January 11, 1921 (New York), $50,000. Jos. and Louis Wertheimer, both of 214 West 69th street; P. Turk, 215 West 68th street—both in New York City.

Liberty Airless Tire Corp., January 4, 1921 (Delaware), $2,000,000. A. J. Kingsbury, L. B. Phillips, D. D. Wharton—all of Dover, Delaware. To manufacture tires and tubes.

Mason & Feldman Mfg. Co., Inc., January 17, 1921 (New York), $10,000. Jacob and Fannie Mason, I. Feldman—all of 2854 West 24th street, Brooklyn, New York. To manufacture wood and rubber heels.

Norfolk Corp., The, August 28, 1920 (Massachusetts), $50,000. R. A. Keppler, 427 Grove street, Brooklyn, New York; M. C. Baker, 407 Huntington avenue, Boston; B. W. Flanders, Monponsett; P. N. Fitzpatrick, 210 Malden street, Malden; R. W. Baldwin, 11 Mayo street, Needham—all in Massachusetts. Principal office, Boston, Massachusetts. To manufacture, buy and sell rubber goods.

Raymond Rubber Co., September 9, 1920 (Rhode Island), $10,000. R. Rodgers, R. S. Wilber, J. A. Bennett—all of Providence, Rhode Island. Principal office, Providence, Rhode Island. To buy, sell and manufacture all kinds of automobile tires, etc.

Rosa Tire Sales Co., Inc., January 21, 1921 (New York), $10,000. E. Rosa, 2243 Arthur avenue, Bronx; J. B. Finkelstein, H. Lenitz, both of 38 Park Row—both in New York City.

Rubber Process Co., November 16, 1920 (California), $200,000. H. Hill, R. H. Hubbell, F. H. Evers, H. W. French, W. D. Smith—all of San Francisco, California.

Schlesinger Tire & Supply Co., Inc., January 21, 1921 (New York), $5,000. C. Mellen, 2150 East 19th street, Brooklyn; R. C. Schlesinger, 835 Riverside Drive; R. S. Lazarowitz, 240 West 35th street, New York City—both in New York. To deal in automobile supplies, etc.

Stedman Products Co., December 16, 1920 (Massachusetts), $50,000. B. Ayer, W. G. Brooks, both of South Braintree; J. H. Stedman, Cedar street; M. A. Turener, May avenue; A. N. Hunt, 29 Vine street, all of Braintree—both in Massachusetts. To manufacture and deal in rubber goods, etc.

Stokes Asbestos Co., December 20, 1920 (New Jersey), $1,000,000. William J. B. and Joseph Oliver Stokes, both of Trenton; R. J. Stokes, Princeton—both in New Jersey. Principal office, Hamilton Township, Mercer County, New Jersey. Agent in charge, Robert J. Stokes. To manufacture, buy and sell rubber and asbestos, etc.

Tire Fusing Corp., December 24, 1920 (New York), $10,000. J. Zito, 3200 Broadway, New York City; D. Klein, 963 Kelly avenue; C. Selnik, 1042 Southern Boulevard, both of Bronx—both in New York. To deal in tires.

Universal Tire Co., January 7, 1921 (Delaware), $7,500,000. M. M. Lucey, M. B. Reese, L. S. Dorsey—all of Wilmington, Delaware. To manufacture tires, etc.

Virginia-Carolina Rubber Co., Inc., April 28, 1920 (Virginia), $200,000. R. J. Bell, president; T. Bell, treasurer; C. L. Shackelford, secretary. Principal office, Richmond, Virginia. To manufacture automobile tires and by-products.

PERSONAL MENTION

A. B. Jones, vice-president of The B. F. Goodrich Co., has resigned from the executive board, but will continue as an official of the company. His resignation was accepted at a meeting of the board of directors held in New York City on January 19, 1921. Mr. Jones recently returned from an eight months' trip abroad, during which he visited the rubber-producing areas at the Straits Settlements, China, Japan, Egypt and practically all European countries. During the world war he was in charge of transportation for the American Red Cross in France.

William C. Potter has been elected chairman of the board of directors of the Guaranty Trust Company of New York, to succeed Alexander J. Hemphill, who died December 28, 1920. Mr. Potter is well known for his mining and metallurgical operations and has been for several years actively connected with the Guggenheim interests. He has also been associated as director with many companies, among them the Continental-Mexican Rubber Co., the Intercontinental Rubber Co., and the Continental Rubber Co. In 1911 he became president of the Intercontinental Rubber Co. Mr. Potter will withdraw from other executive activities and will devote all his time to his new duties as chairman of the board of the Guaranty Trust Company.

F. W. Potts, for several years northwestern district manager for The Republic Rubber Co., with headquarters at Minneapolis, has resigned, effective January 15. No announcement has been made of his future plans.

H. J. Moyer, who has represented Yarnall-Waring Co. and Nelson Valve Co. in the Chicago territory for several years, will in future represent the Yarnall-Waring Co. exclusively in that field, as district manager, with offices at 58 West Washington street, Chicago.

H. H. Clark, of the C. Kenyon Co., Brooklyn, New York, manufacturer of waterproof clothing, tires, etc., was elected president of the Advertising Club of the Brooklyn Chamber of Commerce when it was organized with seventy members on January 12, 1921.

COLONEL COLT PREDICTS PROSPEROUS RUBBER YEAR

Colonel Samuel P. Colt, chairman of the United States Rubber Co., who has exceptional facilities for gauging the currents of general trade, takes issue in a recent review of the rubber industry with those who can see only hard times ahead. "We know from experience," he said, "that the pendulum swings too far in each direction, and I believe that the rubber business along with other lines will gradually reach a healthy plane which will be satisfactory to both producer and consumer."

After pointing out that in no other line were movements of prices and volume of business more mixed in 1920 than in the rubber industry, that with the curtailment of manufacturing in the United States and the inability of Central and Eastern Europe to absorb a normal amount of crude rubber, the price of the latter had dropped within the year from a high of 55 cents a pound to 16½ cents for first crêpe, resulting in a large surplus of crude rubber, which excess was tending to restrict planting, he found, nevertheless, many encouraging conditions.

The capacity of the plants producing rubber footwear was absorbed during 1920 without undue accumulation of stocks; and, with ordinarily favorable weather conditions, Colonel Colt said, the volume of 1921 footwear business is likely to be at least normal. Overstocking with mechanical rubber goods will, he believes, correct itself early this year, and then a good demand will set in. He notices already an improvement, which he is sure will soon expand, in the manufacturing of pneumatic tires, of which there had been over-production, and predicts that more tires will be consumed in 1921 than in 1920. While realizing all the difficulties now handicapping the exporter, he is confident, however, that the selling of American goods in foreign countries will become increasingly easier through the establishment of new levels of exchange, which though far from normal will at least be reasonably steady.

AMERICAN DUNLOP ENTERPRISE HALTED

A letter from the directors of the Dunlop Rubber Co., Limited, to *The Financial Times*, London, states some interesting facts concerning the finances of the American branch of the Dunlop company, the substance of which follows:

"Within the past few weeks the company has been called upon to assume the responsibility of providing the additional finance required to place the American Dunlop company in a position to complete the construction and installation of its factory and to provide sufficient working capital to enable that company to carry out its first year's trading program.

"While the Dunlop Rubber Co. is under no liability to provide this additional finance, the board recognizes that it is in the interests of the company that the American enterprise should be carried on, and in accordance with the statement made at the last meeting of shareholders held on September 10 last, the greater part of the sum of £1,000,000 has been remitted during the last few weeks.

"The directors, however, feel very strongly that the American company should now take steps on its own initiative to provide the further funds required to bring the undertaking to completion, and important negotiations, in which this company is assisting, are now pending for this purpose."

This letter should do much to quiet the wildly exaggerated rumors in connection with the Dunlop rubber and cotton commit-

ments, *The Financial Times* asserts, further stating that the position in respect to these is "nothing of a nature to frighten one." Although the British Dunlop company, as stated in this letter from A. Cunningham, its secretary, is not responsible for the financing of the American undertaking, it is naturally concerned that the good-will of the world-famous name of Dunlop should not be jeopardized, and to that extent the British company cannot afford to be indifferent to the fortunes of its kindred undertaking.

The directors of the Dunlop Tire & Rubber Corporation of America are: Pierre du Pont, chairman of the E. I. du Pont de Nemours Company and of General Motors; Anson W. Burchard, vice-president and director of International General Electric Company, Schenectady, New York; Robert W. Pomeroy, director of the Manufacturers' and Traders' National Bank, Buffalo, New York; J. Westren, managing director of the Dunlop Tire & Rubber Goods Co., Limited, Canada; F. C. Walcott, 120 Broadway, New York; P. D. Saylor, vice-president and general manager; Sir Harry McGowan, K.B.E., chairman of Explosives Trades, Limited, (now Nobel Industries, Limited), Dunlop Rubber Co., etc.; L. M. Bergin, managing director.

Operations at the Buffalo plant being practically suspended the following statement was made by the company on January 12.

"The directors have decided that general conditions in the automobile industry are such that they are justified in slowing down their program until conditions improve. April 1 is the probable date of resumption of activities, although it may be much sooner if the conditions justify."

Approximately $36,000,000 has been spent by the company since building operations were started a year and a half ago.

MEETING OF RUBBERIZERS AND DYERS OF RAINCOAT FABRICS

A meeting of a group of rubberizers, cloth converters and dyers interested in the manufacture of raincoats was held in New York City on January 5, 1921. The purpose was to discuss the dyeing and finishing of goods intended for rainproof garments and to arrive at an understanding regarding the elimination of those dyestuffs and methods of dyeing which result in the deterioration of the rubber used in proofing after brief aging.

Many raincoat manufacturers have sustained serious losses due to the fact that cottons, silks, cotton mixtures and other fabrics bought from the converters frequently contain metal salts injurious to the rubber coating. Fast-colored goods that are not incompatible with rubber are required by the raincoat manufacturers. This is a chemical problem to be settled by the dyers and dyestuff manufacturers in cooperation with the rubberizers.

The interests of the dyer of cloth are in conflict with those of the rubberizer and, perhaps for the first time, a concerted effort has been made to discuss the questions involved and arrive at practical recommendations to meet the situation. These recommendations are embodied in the following resolutions adopted by those present under the chairmanship of Dr. Wallace P. Cohoes, representing Joseph Bancroft & Son, Wilmington, Delaware.

Copper should not be present in fabrics for rubberizing purposes and in the test if any blue color is obtained from a 10-gram sample after incinerating, and is dissolved in nitric acid, and treated with ammonia, the copper might be considered in excess.

It was decided that chrome can be allowed as an oxide.

Samples tested by leaching out with water should not show presence of chromates or chromium salts.

That a committee representing dyestuff manufacturers, dyers, converters, and rubberizers be appointed to cooperate and make the necessary tests to determine the effect of chromium compound upon rubberizing.

It was decided that manganese be eliminated. Tests for manganese to be as follows: That when a 10-gram sample of cloth is ignited and fused with sodium carbonate, no green coloration should be noted.

It was decided that vanadium should not be used in the dyeing of merchandise for rubberizing.

It was decided that no restriction be placed upon iron pending a series of experiments similar to those for chromium.

It was decided that ether extracts should not show an excess of 2 per cent in the fabrics dyed and finished for rubberizing purposes.

Dr. Cohoes, chairman, appointed the following committee on specifications; E. Montalent, of H. A. Metz Co., representing dye manufacturers; J. F. Warner, of the Bronx Co., representing finishers; Alfred L. Helwitz, of Alfred L. Helwitz & Co., representing converters; Harold D. Mitchell, of the Vulcan Proofing Co., representing rubberizers.

The following were among those present at the conference:

John Bancroft, Jr., D. S. Ashbrook, and Dr. Wallace P. Cohoes representing Joseph Bancroft & Son, dyers and finishers, Wilmington, Delaware; Dr. J. F. Warner, chemist for the Bronx Co., dyers and finishers, New York City; Dr. Lothar E. Weber, rubber chemist, Boston, Massachusetts; Dr. Frederick J. Maywald, rubber chemist, Newark, New Jersey; Dr. Allen Rogers, rubber chemist, Pratt Institute, Brooklyn, New York; Drs. Dano and Mattice of the National Aniline Co., New York City; Messrs. Philip Clarkson and Emil Montalent of H. A. Metz Co., dyestuff manufacturers; A. L. Helwitz of Alfred L. Helwitz & Co., cotton converters.

MOTOR AND ACCESSORY MANUFACTURERS' ASSOCIATION

At the annual meeting of the Motor and Accessory Manufacturers' Association, held at Hotel Biltmore, New York City, January 12, F. C. Glover and H. L. Horning were elected to the board of directors to succeed Christian Girl and E. W. Beach, who have been identified with the Association both as members and directors for many years. L. M. Wainwright and E. H. Broadwell were reelected as directors, their terms having expired this year. The board of directors now includes, besides these members, C. E. Thompson, W. O. Rutherford, G. Brewer Griffin, J. M. McComb, G. W. Yeoman, A. W. Copland, C. H. L. Flinterman, and E. P. Hammond. The following day the board held a meeting for the election of new officers, naming E. H. Broadwell president to succeed Charles E. Thompson, who has served for two years. Mr. Broadwell until this year served as vice-president of the association. Other officers elected were: W. O. Rutherford, first vice-president; A. W. Copland, second vice-president; H. L. Horning, third vice-president. True to a tradition of the association, L. M. Wainwright was reelected treasurer, and G. Brewer Griffin was reelected secretary and assistant treasurer.

The parts and units makers continued last year's departure from precedent by holding a "speechless" banquet and show in the grand ballroom of the Hotel Commodore, January 12, which was attended by approximately 600 men connected with the Association. The entire cast of the Ziegfeld Midnight Frolic was transported from the New Amsterdam Roof to the Hotel Commodore, where the show was presented under automotive auspices, many features being especially arranged to appeal directly to members of the industry.

PNEUMATIC-TIRED TRACTORS

Even the steel tires of tractors are giving way to pneumatic tires. Tractors thus tired are giving excellent service in sawmills for hauling lumber dollys, moving dump wagons, switching railroad cars at docks, and transporting heavy pieces on skids or rollers; general hauling with regular trailers, and in logging camps where they tow loaded trucks to the main roads. It is claimed that a tractor equipped with pneumatic tires can get better traction, has greater mobility, can be handled with remarkable advantage in plowing and cultivating, and that it can travel faster in pulling a load on rough or even ground.

THE RUBBER TRADE IN THE EAST AND SOUTH

By Our Regular Correspondent

NEW YORK AND EASTERN NOTES

Work is progressing on the new factory building which the Hudson Tire & Rubber Corporation is erecting at Yonkers, New York, the foundations being already completed. The contract was awarded and the building will be erected under the supervision of the Osborn Engineering Co., Cleveland, Ohio, who designed it. Reinforced concrete construction will be employed and the building will be adapted for extension as business warrants. Machinery of the latest type will be installed to manufacture the Hudson non-skid cord tire, in all sizes, including giants for heavy duty truck service, and the Hudson solid truck tire. Production is expected to start in the Spring.

After forty years of service as manager of the sundries sales department of the American Hard Rubber Co., New York City, Philip H. Campbell has retired. The company has sent out a handsomely engraved card announcing with regret Mr. Campbell's retirement and naming G. Brette Glaenzer sales manager of the sundries sales department.

Paramount Rubber Consolidated, Incorporated, Philadelphia, Pennsylvania, will open offices on the twelfth floor of the Cuyler building, 120 West 32d street, New York City, on February 1. The new address will combine the company's New York office and display rooms. Paramount Rubber Consolidated, Incorporated, has a factory at Little Falls, New Jersey, for the manufacture of rubber play balls, solid balls, plain and decorated, and patented molded designs.

Among the thirty-five new members elected to The Merchants' Association by the directors at a recent meeting of the board were: Joseph Chalfin, 80 Washington street, dealer in crude and scrap rubber; and S. A. Pardee, R. & J. Dick Co., Inc., 55 Barclay street, manufacturer of balata belting, both of New York City.

The Kelly-Springfield Tire Co., New York City, has rented for a term of years its new building at 10th avenue and 54th street, originally intended for a storehouse and service station.

The Advance Rubber Co., formerly at 8th avenue between 17th and 18th streets, has removed to its new plant at 21-39 Gardner avenue, Brooklyn, New York, where it is now operating. The company reports orders for tires coming in daily and good business in mechanical lines. The additional space in its new plant will be utilized in manufacturing additional lines of mechanical goods.

The Rouden Manufacturing Co., Inc., 1361 Atlantic avenue, Brooklyn, manufacturer of rubber goods and metal ware, has been declared bankrupt. Ralph K. Jacobs has been appointed receiver.

The Powertown Tire Sales Company, 955 Main street, Buffalo, New York, was incorporated under the laws of Delaware in November, 1920, with a capitalization of $1,200,000. H. J. Crowder is general manager and the company has a contract with the Powertown Tire Corporation of the same address to handle the entire output of Powertown cord tires. The company has taken over the store of Spencer B. Bedell, Waterbury, Connecticut, who has the exclusive sale of Powertown cord tires in Bristol and Torrington in the same state and in Springfield, Massachusetts.

The British-American Manufacturing Co., Springdale, Connecticut, manufacturer of waterproof textiles and fabrics, has been placed under the receivership of William F. Gillespie and Clinton R. Martin. Suit was brought by the Bankers Trust Company of New York, one of the principal creditors.

PENNSYLVANIA NOTES

A petition in involuntary bankruptcy against the New Castle Rubber Co., New Castle, Pennsylvania, was filed in the United States Court at Pittsburgh, Pennsylvania, December 23, 1920. E. M. Underwood, local referee of the Court, appointed E. W. Bedel as receiver for the company. Liabilities were reported to be $4,500,000 and assets $1,500,000. The New Castle Rubber Co. was originally incorporated for $500,000 and acquired the property of the New Castle Forge & Bolt Works. The plant was well equipped and did a large business under the management of W. E. Dursten until the slump in the rubber business last summer.

The accompanying photograph of the Allen Tire & Rubber Co.'s new plant at Allentown, Pennsylvania, shows the first and second units which were completed and went into production last month, turning out "Allen" tires and tubes. The company, of which Wilmer Dunbar is president, started building operations in April, 1920, and on January 3, 1921, the plant was in operation—a re-

Plant of the Allen Tire & Rubber Co., Allentown, Pennsylvania

markable record under present conditions. The main building is 260 feet long and 60 feet wide, two stories in height, and is of brick, concrete and steel construction. A power house 80 by 60 feet is located on the north side and does not show in the picture. The company is reported to be plentifully supplied with raw materials and to have orders on hand for its product for months ahead.

SOUTHERN NOTES

A. M. Fisher has been appointed manager of the Atlanta, Georgia, branch of The Mason Tire & Rubber Co., Cleveland, Ohio.

The Delion Tire & Rubber Co. has moved to its new plant in Baltimore, Maryland, which is considered one of the most up-to-date tire factories in the country. The company is planning an extensive advertising campaign for 1921 and entirely new policies in effective dealer cooperation.

Earl E. Harrington, who has just begun his service as general superintendent of the Delion Tire & Rubber Co., Baltimore, Maryland, is a native of Akron, and has grown up in the rubber industry. Since leaving college he has been connected with the Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio; Firestone Tire & Rubber Co., Akron, and the Goodyear Tire & Rubber Co., working on tire production and construction engineering problems in the technical service division of the development department of the latter company for the past five years. Mr. Harrington is considered one of the most progressive young superintendents in the country.

The textile mill and tire factory of the Cumberland Tire & Rubber Co., Louisville, Kentucky, are about ready for operation. The company will produce a cord fabric exclusively and has a capacity of about five times its own requirements. The surplus production has practically been contracted for. The officers of the company are: A. L. Henry, president; F. W. O'Brien, vice-president and general manager; D. D. Thompson, treasurer; C. C. Hagan, secretary. The company's capitalization is $1,500,000.

THE RUBBER TRADE IN NEW JERSEY

By Our Regular Correspondent

TRENTON NOTES

The Stokes Asbestos Co., which was recently incorporated with a capital of $1,000,000, to manufacture rubber and asbestos articles, has completed its new plant adjoining the works of the Thermoid Rubber Co. The new plant consists of two complete units erected on a ten-acre tract. One of the buildings is four stories, 200 by 80 feet, while the other is one story, 200 by 150 feet, and the floor space comprises two acres. The Thermoid company will continue making automobile tires, tubes, brake linings and hose in the old part of the plant, while the new part will be used by the new company solely for making asbestos yarn and textiles for the Thermoid company. Special machinery has been installed for this purpose. The officials of the new company are: William J. B. Stokes, head of the Thermoid Rubber Co.; Joseph O. Stokes, of the Joseph Stokes and the Home Rubber companies, and Robert J. Stokes, secretary of the Thermoid Rubber Co.

William J. B. Stokes, treasurer of the Thermoid Rubber Co., who has been confined to his home for some time by illness, is now able to be about again and attend to business as usual.

Officials of the Thermoid Rubber Co. recently tendered the office force a banquet at the Hildebrecht restaurant, the affair being the third annual Christmas party. Following the dinner dancing was enjoyed. Edmund W. Craft, purchasing agent of the company, played the rôle of Santa Claus. John T. Spicer, head of the publicity department, was postmaster. Seventy-five persons attended.

Louis P. Destribats, one of the founders of the Ajax Rubber Co., Inc., has resigned as general manager, and the position is now being filled by William McMann, of Detroit, Michigan. Mr. Destribats will continue as vice-president and a member of the board of directors. Mr. McMann was formerly associated with the United States Tire Co. at Detroit. It was the intention of the Ajax Rubber Co. some time ago to erect a plant at Detroit, and Mr. McMann was to supervise the construction of the factory and manage it. Later it was decided to abandon the proposition and build additions to the Trenton plant to take care of future orders.

The Ajax Rubber Co., Inc., has made its annual contributions of money to the various Trenton hospitals.

"Broughton Night," in honor of John S. Broughton, president of the United & Globe Rubber Co., was recently observed by Trenton Forest, No. 4, Tall Cedars of Lebanon. Mr. Broughton was the first Past Supreme Grand Tall Cedar.

William L. Blodgett, formerly secretary of the Hamilton Rubber Manufacturing Co., Trenton, and Mrs. Blodgett have gone to Florida, where they will spend the winter along the Indian river.

William H. Callen has opened a tire vulcanizing establishment on North Willow street, Trenton, and reports business good. Mr. Callen was previously employed in a Trenton tire factory.

Joseph Papier, proprietor of Joe's Tire Shop, East Front street, Trenton, will shortly open a branch tire and accessory shop at Broad and Perry streets.

Charles J. Hetzel, tire and accessory dealer, Trenton, has filed a voluntary petition in bankruptcy in the United States District Court. His liabilities are $20,102.33, and his assets $6,757.17. His stock is valued at $3,000. Mr. Hetzel was the Trenton agent for Oldfield tires and has been engaged in business for some time.

A portion of the plant of the Puritan Rubber Co., Trenton, was destroyed by fire on January 18. The burned building was a two-story brick structure, 60 by 80 feet, used partly for reclaiming purposes and the top floor for storage. Considerable rubber was destroyed and the reclaiming machinery badly damaged. C. L. Seifert, head of the company, believes the fire was caused by spontaneous combustion. The company intends to rebuild at once with a modern addition. The damage caused is estimated at several thousand dollars.

MISCELLANEOUS NEW JERSEY NOTES

Chancellor Lewis has issued an order requiring the Louis H. Forester Co., of 132 Bloomfield street, Hoboken, New Jersey, to show cause why a receiver should not be appointed. Allegations of insolvency are made against the concern by the Essex Rubber Co., Trenton, which has a claim for merchandise. The assets of the Forester Company are placed at $47,000. The Essex Rubber Co. also charges that two judgments aggregating $2,500 have been recovered against the Forester company in the New Jersey Supreme Court.

The New Jersey Rubber Co., Lambertville, New Jersey, has installed a fire-extinguishing sprinkler system. The plant has been idle for some weeks and the spare time is being used in making improvements and alterations that will enable the work to run more satisfactorily when operations are resumed.

A jury in the Essex County Court, New Jersey, returned a verdict for $1,433.33 in favor of the Gillette Tire Co., of Newark, against Joseph Pansulla, Mannie Kessler, Samuel Hirsch and Louis Silverman, who were found guilty of conspiracy to defraud, by falsely establishing credit. The tire company charged that the defendants established a business in Newark under the name of the Simpson Tire Co., bought tires on credit, and after operating for a month, discontinued business without paying for them. The Fisk Rubber Co. also obtained a judgment against two of the firm.

The Economy Tire Exchange, Inc., of Newark, New Jersey, has been incorporated, with $100,000 capital, to deal in tires. The incorporators are: Hyman Cohen, Harry A. Harrison, and Harry Settel, all of Newark.

J. Claude English, whose garage and tire shop at Asbury Park, New Jersey, was recently destroyed by fire, has taken out a permit for the erection of a new structure at Asbury avenue and Main street.

The intermediate department of the Newport Chemical Works, Incorporated, which was located at 120 Broadway, New York City, has been transferred to Passaic, New Jersey.

"MIRACLE" FAN BELT

Ordinary motor fan belts of duck and rubber are more or less liable to stretch, thus necessitating the trouble of being shortened and rejoined. The latest development in motor fan belts is found in the "Miracle" fan belt, the feature of which is a single strip of rawhide inserted in the center of light rubberized duck plies. This feature effectually prevents stretching and greatly prolongs the durability of the belt in service. On the exterior, the belt has a rubber covering, and is stitched through and through to hold the plies against separation, since owing to the presence of rawhide in the construction the belt can be cured only by acid or vapor cure.—Rawhide Products Corporation, 1834 Broadway, New York.

THE RUBBER TRADE IN MASSACHUSETTS

By Our Regular Correspondent

With new price lists on rubber boots, shoes and canvas footwear revised in accordance with the falling raw material market and wage schedules equitably adjusted to present conditions, increasing activity is beginning to be felt in this important branch of Massachusetts rubber goods manufacture. The new price lists, effective January 1, 1921, but subject to change without notice, show average reductions of 10 per cent or more, based on careful consideration of the manufacturing conditions likely to prevail during the present year. The cooperation of retailers through early orders to cover their requirements for the coming season is being urged in order that at normal factory capacity and minimum prices the supply may meet the demand as normal buying conditions are resumed. The open winter in many sections of the country is curtailing the sale of rubber footwear considerably, but it is hopefully recalled that February and March are usually among the best selling months. Canvas footwear orders, while not yet heavy, are encouraging, and output in most factories will increase during the present month.

MISCELLANEOUS MASSACHUSETTS NOTES

An increase in the number of employes from 25 in 1908 to 1,700 in 1920 is one measure of the growth of the Converse Rubber Shoe Co., of Malden. Production during the past year has been the largest in the history of the company. With two shifts of gum shoe makers, the daily ticket exceeded 19,000 pairs in December, the output of rubbers, gaiters and arctics being considerably above normal at that season of the year. It is anticipated that the total sales figure for the fiscal year ending March 31, 1921, will be over $7,000,000, an increase of over 50 per cent. Rapid progress has been made by the tire division, also operating with two shifts, and Converse tires are rapidly coming to the front. While the night shifts have been discontinued the factory is operating full time with no curtailment of operating force other than to increase its efficiency. The capital stock of the company has recently been increased from $3,000,000 to $4,000,000 by an issue of 10,000 additional shares of non-redeemable preferred stock at not less than par.

Damage of $3,000 was caused recently by a fire in the cement shed of the Converse Rubber Shoe Co., Malden, Massachusetts. The blaze was due to spontaneous combustion and the building, a structure 25 by 12 feet, was destroyed. A quantity of benzine in the shed burned fiercely for a short time, but firemen protected the other buildings.

Shortly before Christmas an $87,000 bonus distribution was made by the Boston Rubber Shoe Co., Malden, Massachusetts, to its employes. This was the result of action taken by the factory council last May, when it was suggested that instead of a straight weekly increase in wages the company lay aside a bonus each week, to be payable before Christmas.

The will of the late Harry E. Converse, former president of the Boston Rubber Shoe Co., of Malden, was offered for probate early in January before Judge Chamberlain in the Plymouth County Probate Court. There is an estate of $1,400,000 personal and $250,000 real. The greater part of the property goes to the family, there being no public bequests. Moorfield Story, Parker Converse, Edward N. Benson and Frank B. Bemis are named executors. A clause in the will asks that no one shall wear mourning for the deceased or otherwise change the usual habits of living.

Lester Leland, vice-chairman of the United States Rubber Co., has been elected president of the Boston Rubber Shoe Co., Malden, succeeding the late Colonel Harry E. Converse, whose obituary was published in our January issue. Mr. Leland is a brother-in-law of Colonel Converse and has been vice-president of the company. Colonel Harry P. Ballard, treasurer, has been elected vice-president to succeed Mr. Leland and will perform the duties of both offices.

The canvas footwear department of the Hood Rubber Co., Watertown, Massachusetts, was closed from January 1 to 24, adding some 300 operatives to the 900 from the tire department, previously closed, who were temporarily out of work.

Alfred A. Glidden, general superintendent of the Hood Rubber Co. plant at Watertown, who has been with the company since 1896, has been promoted to manager of the industrial development department. Charles Roper, who has been in charge of the footwear department, succeeds him.

On the afternoon of December 31 gold pieces were presented to 221 employes of the Boston Woven Hose & Rubber Co., Cambridge, Massachusetts, men and women, who had been with the company from ten to forty years. The meeting was held in the gaily decorated cafeteria, with music by the Bowohoco orchestra, and singing by the whole assemblage. General Manager George E. Hall spoke frankly regarding the inevitable liquidation of commodities and labor demanded by the times. He expressed the hope that for a time at least it might be possible to maintain the present wage scales of the older employes, although new employes would be taken on at a lower rate. To do this, he said, would require increased individual efficiency, as it made no difference to the company whether wages were reduced 10 per cent or efficiency increased 10 per cent.

In an effort to encourage wider reading of trade, business and technical magazines by employes, the service department of the Boston Woven Hose & Rubber Co., of Cambridge, has established a reading club which maintains a route list for each of its many industrial magazines, each person being allowed the use of any publication for three days. The low club-rate subscription to The India Rubber World is to encourage reading clubs.

The Metropolitan Air Goods Co., Athol, Massachusetts, maker of pneumatic rubber goods for campers, sportsmen, etc., is now in its new factory and expects to be prepared for business on its general lines after the middle of January.

BOSTON NOTES

J. D. Cary, a veteran tire man of national experience, has been appointed New England distributer for McGraw tires in Boston. He joins the company after a sojourn of two years on the Pacific Coast. Years ago he sold Morgan & Wright bicycle tires. For a decade he was with The B. F. Goodrich Co., subsequently joining the Kelly-Springfield Tire Co., which he served as branch and district manager, and in the general sales department.

The annual sales convention of the tire division of the Converse Rubber Shoe Co., of Malden, Massachusetts, was held January 17 and 18, at the Boston Athletic Association, with representatives of the firm from all parts of the country attending. The speakers at the morning sessions were F. R. Goodell, general sales manager; Dr. E. A. Wullenweber, production manager; D. W. Boyn, service manager, and C. C. Parlin, of *The Saturday Evening Post.* After luncheon both days the party visited the factory, returning to Boston for dinner at the Hotel Lenox, and later attending the theatre. The dominant note of the convention was one of enthusiasm and confidence.

George F. Willett, president of the Boston Belting Corporation, has advised preferred stockholders in a recent circular letter that the corporation is now free from debt, every creditor having been paid in full, and that both the preferred and common stocks are backed by substantial assets. This fortunate outcome in a financial tangle which for a time threatened disaster is very largely attributable to the forceful and intelligent action of Frederic C. Hood, who as trustee managed the corporation and held its common stock purchased by Mr. Willett in 1919 until final payment had been made.

All of the capital stock and assets of the Boston Belting Co., and all assets of the Boston Belting Corporation relating to the mechanical rubber goods business were purchased in 1919 by W. E. Hardy, F. H. Rice, H. H. Whitesel and associates, who are, respectively, president and general manager, treasurer and director, and sales manager of the original Boston Belting Company which was never dissolved. Thus the mechanical rubber goods business of this, the oldest rubber concern in the country, has been successfully continued without a break by men associated with Thomas A. Forsyth, former head of the firm, and is today in a healthy growing condition. Final figures of gross sales for the year 1920 have not yet been completed, but it is expected that the total will be in the neighborhood of $1,400,000, with net earnings of close to 10 per cent for the $500,000 common stock.

RES-PRO INDUSTRIES INC.

One of the latest successful arrivals in the special fabrics field is the Res-Pro Industries, Inc., which was incorporated July 22, 1920, under the laws of Delaware, with a capitalization of $3,000,000, to manufacture the "Res-Pro" products under the patents and processes owned by this parent company, which will sell its products to its subsidiaries. The officers are: James J. Clifford, president; Luther S. Newell, vice-president in charge of production; Rolard B. Respess, who is the inventor of the Res-Pro processes, vice-president in charge of new developments and patents; William J. Bingham, secretary; Judge W. Lloyd Allen, treasurer and counsel; John W. Clifford, factory manager.

Present Plant of Res-Pro Industries Inc., Canton, Massachusetts

The unwoven sheet fabric manufactured by this company was fully described in The India Rubber World, June 1, 1919. Raw cotton batting is passed through pressure rollers where special compounds of rubber, etc., are forced into the fiber. It is then dried and pressed, forming a tough, strong, durable sheet fabric adapted for use as insulating material, flexible tubing, belting, tires, fire hose, shoe soles and heels and various other rubber goods, and as a general leather substitute in auto tops, wall coverings, bookbinding, etc.

The Res-Pro Industries Inc. has secured the plant of the C. C. C. Fire Hose Co., Canton, Massachusetts, a going company incorporated under the laws of Maine with a capital of $50,000, which will make various "Respro" products and be operated as a subsidiary to the parent company. The names of the officers and directors of the C. C. C. Fire Hose Co. were published in The India Rubber World, January 1, 1921.

Another subsidiary of the Res-Pro Industries Inc. is the Res-Pro Insulating Co., which was incorporated in September, 1920, with a capitalization of $1,000,000, to manufacture and market insulating materials for the electrical industry. L. O. Duclos is general sales agent for this company.

PLYMOUTH RUBBER CO. OPERATING UNDER RECEIVERSHIP

Involuntary proceedings in bankruptcy were filed against the Plymouth Rubber Co., of Canton, on December 18, in the United States District Court for the District of Massachusetts. The claims of the petitioning creditors were small, aggregating only about $3,000, that of the Monatiquot Rubber Works Co., of South Braintree, for $2,684 being the largest. Prior to the filing of the petition, funds of the company amounting to $100,000 in four local banks were attached in connection with a suit by A. D. Juilliard & Co., of New York City, claiming $75,000 damages for alleged breach of contract. The company's difficulties are said to be due to a heavy shrinkage in inventory values with a reduced demand for its products.

Subsequently on December 27, Judge Morton appointed as receivers Arthur H. Weed, Percy A. Atherton and Guy Murchie, all of Boston. The receivers have taken possession of the business, are having an inventory taken, and will start operation of the various departments as business requirements seem to justify. The Gem duck department was opened January 3 and the tape department on January 6.

FIBER BASE RUBBER HEEL

Each year, in response to increasing demand, a greater number of shoes is equipped with rubber heels by the shoe manufacturers. Accordingly, since rubber heels are in the shoe factories to stay, the problem of their proper application has become a very important one. The technical skill of every manufacturer has been taxed to solve the questions that have arisen in regard to processing the rubber half-heel. The degree of attachment secured between leather and rubber leaves much to be desired. The failure to obtain a positive union between the base and rubber tread is the reason why the use of the rubber half-heel heretofore has not been consistent with good shoemaking. Its application has at best been an example of refined shoe cobbling. The growing demand of the trade for the employment of rubber half-heels has led to many improvements in their design, shape, construction and composition.

One of the more recent and successful improvements for the attachment and processing of such heels concerns the permanent union of the rubber tread to a fiber stock base by means of hot vulcanization. The method involved has been perfected, whereby a rubber tread and several plies of leatherboard base are molded and cured securely together. The plies of leatherboard are pierced by a suitable number of nails for attachment of the heel to the shoe. The vulcanized union with the rubber tread is supplemented by a series of interlocking rubber rivets passing through perforations in the leatherboard plies, from the rubber side, thus serving as reinforcement. In this construction washers are eliminated and the heel is better adapted for processing in the shoe factory.

In this type of heel the rubber and fiber parts being positively united, but one nailing operation is required for proper attachment. The leatherboard is said to be perfectly adapted to the operations of skinning, scouring and finishing and a distinct saving is effected by avoiding the assembly of parts, cementing, double nailing, and the use of a leather lift necessary with the ordinary rubber half-heel.

When worn out the rubber portion can be removed without disturbing the nails as they pass completely through the tread and head against the leatherboard base.

For the rubber manufacturer there is the advantage that all parts employed in its construction are visible in the finished heel and the mold overflow is reduced to a feather at the face plate.

In repair work it is claimed that the rubber tread may be more quickly replaced than in the case of practically any other type of heel.—Conant & Co., 7 Water street, Boston, Massachusetts.

STORAGE OF BENZOL OR NAPHTHA

Benzene storage tanks, especially those placed underground or in cellars, have an element of danger in explosion or poisoning by emission of vapors or leakage. Such tanks should be surrounded by inert gases and the outlet and inlet pipes by a casing in order to prevent the above occurrences.

THE RUBBER TRADE IN RHODE ISLAND

By Our Regular Correspondent

The general depression in industrial affairs which has been growing steadily worse during the past three months is now making itself keenly felt in the rubber manufacturing plants of Rhode Island and it is claimed that the outlook in the rubber business is far from encouraging. This affects all lines of boot and shoes as well as tires of every description and while hopes are expressed for an early revival the present indications do not warrant excessive optimism.

Because of the very open winter and for other reasons the local plants have had less work than has been experienced in several years. In the rubber boot situation Government sales of large quantities of rubber boots that were bought for the army during the war have lessened the demand, already reduced because of weather conditions.

Nearly 4,000 employes of the National India Rubber Co. at Bristol are out of work owing to the shutting down of the factory on January 14 for an indefinite period. This shutdown affects the shoe department to a greater extent than it does the wire division, which will continue production on approximately the present scale of five eight-hour days per week, although it is expected that there may be a curtailment made in this division early in February.

Following a meeting of the factory council about the middle of the month the official notice of the shutdown was posted at the plant reading: "Keds division will complete all work laid out on the ticket, each department shutting down as its work is completed.

"The last day's outside cutting will be January 13. Thereafter all departments of the Keds department will be considered as closed indefinitely until further notice. About February 26, 1921, we will issue statement as to later program.

"The wire division will continue production on approximately the present scale of five eight-hour days per week for the remainder of January. It is also intended to continue a partial production during February, which may be announced some time during the first week in February.

"In the mechanical division only such men will be retained as are necessary for current repairs and maintenance and the working time after January 28 will be curtailed as much as possible.

"The traffic and shipping departments and central stores department will perform only such work as is absolutely necessary, which will mean a radical curtailment after January 28, 1921.

"In any and all departments of the factory it will be our policy to utilize the services of salaried men and women from departments which are shut down and we resume the right to give them preference in all cases over persons working upon an hourly basis.

"Further curtailment of clerks will be managed as individual cases in which the person concerned will be interviewed by the head of the department." This is signed by E. I. Cooper, factory manager, and Sam Connery, chairman of the factory council.

By the closing of the National India Rubber Co.'s plant it became necessary to also close the DeWolf Inn for an indefinite period, and which for the past five years had been an ideal home for the young women employed at the factory. Five years ago the National management purchased the DeWolf Inn to accommodate the large number of out-of-town employes who worked at the plant but were unable to obtain boarding places in the town. At one time when the factory was running on full time there were 170 women at the Inn, but there were only about 70 there when it closed its doors because of the shutdown of the factory. Likewise the Day Nursery on High street which has been maintained by the National management is also closed.

The total amount of money received for enrollment in the fourth roll call of the American Red Cross in Bristol was $2,246.90, of which the sum of $1,424.70 was secured at the factory of the National India Rubber Co.

Officials of the Woonsocket Rubber Co. about the same time that the notices were posted at the National plant in Bristol caused notices to be posted in the Alice Mill that it would go on a short-time working schedule to become effective January 20. The new schedule called for 34½ hours a week, which means a six-hour day for five days a week with 4½ hour on Saturdays. Heretofore the plant employing over 1,600 operatives has been running 48 hours a week. It is claimed by the management that business conditions necessitated this action.

The Woonsocket plant of the American Wringer Co., which in normal times employs 900 hands, announced a 20 per cent wage reduction effective January 17. The plant has been partially shut down since November 20, only about 150 employes being kept at work. No date has been set for the reopening of the plant, although the officials say that indications are promising for a resumption of work in the near future. The company announced price reductions of its products on October 10, and again on January 6.

The Manson-Sherman Manufacturing Co., which was recently incorporated under the laws of Rhode Island, to be located in Providence, with a capital stock of $20,000, has secured a plant at 88 Sprague street, Providence, and will manufacture elastic braids and woven tapes for the electrical and clothing trades. The new concern will begin with an equipment of three narrow fabric looms having a combined capacity of 116 shuttles on single tapes and 50 flat braiders for making one-quarter and narrower elastic braid.

The Revere Rubber Co. has been making extensive alterations and improvements in its garage on Hemlock street, Providence, so that it will afford accommodations for at least thirty cars. The company is also erecting a steel building to be used for the housing of the small locomotive that is used for yard and switching purposes in handling freight cars on the spur tracks that enter the company's plant.

Charles A. Roberge is the sole owner of the business that is being conducted at 88 Front street, Woonsocket, under the firm style of the Roberge Truck Tire Sales.

The J. M. Gibbons Tire Co., 103 Aborn street, Providence, is owned and conducted by J. M. Gibbons, of Providence, and A. C. Anderson, of East Providence.

Edward M. Hayes et al., have given a chattel mortgage for $15,000 to the Ajax Rubber Co., Inc., on tires, tubes, auto accessories, etc., at 119 Broadway, Providence.

THE RUBBER TRADE IN OHIO

By Our Regular Correspondent

That the rubber tire industry is due for a real revival is the opinion of Akron rubber men, based upon automobile registration figures for the past year, gathered and given out by The B. F. Goodrich Co. A total of 9,295,252 automobiles were registered in the United States last year, which is an increase of 1,691,236, or 22.2 per cent over the previous year, and the largest increase in the history of the automotive industry. In 1919 the increase was 1,457,300.

Estimates based upon this number of automobiles indicate that with each automobile wearing out four tires a year, the new index figure used by Akron rubber men, the number of tires required for the coming year will be not less than 37,000,000 and will furnish employment for approximately 120,000 men and women.

If these figures prove to be correct, the production for the year will be only approximately 11,000,000 less than it would have been last year, when the peak production was estimated to be six tires for the 8,000,000 cars then in operation.

This will also be reflected in the crude rubber market, because it is authoritatively estimated that not more than 72,000 tons are now in the country, and also in the fabric market, since the large

stocks on hand when the depression struck the automotive and tire industries have dwindled considerably during the past five months.

Indications are that the bottom has finally been reached and that slowly but surely the industry will work itself back to a more normal basis, with but little hope of getting back to the position it occupied in July of last year. The turn of the year saw in Akron a slight gain in production. Most of the factories made arrangements to lengthen the working hours, and thereby increased production from 15 to 50 per cent, although several of the factories actually decreased production for the month. Manufacturers generally look upon the situation with more optimism and believe that a few months will see larger production.

Conservative estimates by rubber men at the first of the year placed the unfilled orders for January shipment on the books of the larger Akron factories at $50,000,000, and considering the slightly increased production, and the fact that many tires still remain in stock, it would not be surprising if shipments this month amount to at least that figure.

That business can remain at this almost peak figure for the year is not believed by anyone in the industry, because the orders are looked upon as accumulations held up until after the taking of inventories by the dealers and orders from automobile manufacturers in anticipation of their needs during the next few months.

Akron bankers and rubber manufacturers have used every effort to avoid a price war in the tire business and indications now are that their efforts will be successful.

When the crash in the tire business came many of the smaller companies unloaded large lots of tires at job lot prices, and while the larger companies continued to have on hand large amounts of raw materials purchased at peak prices, the smaller rubber companies could go into the cheap markets and purchase supplies.

With cheaper raw materials and cheaper labor these smaller companies were in a position to go into the tire market with lower prices, and for some little time it appeared that in their determination to get business they would do so, in some instances at prices not profitable to themselves.

However, the more conservative heads of the smaller companies felt that while these tactics might work for a while, they were in business for a legitimate profit, and so decided to maintain prices at the decreased levels placed by the leaders in the industry.

One Akron banker pointed out several times that if tire manufacturers operated on a conservative basis, and each and all went after business with a determination to get his share at a profitable figure, the industry would revive, whereas if the various companies went out to sell goods regardless of profits, with the main thought being the getting of business, the rubber industry was due for a worse crash than it has experienced.

Among the interviews given out by rubber men regarding better business, was the statement of W. O. Rutherford, sales manager of The B. F. Goodrich Co., to the effect that the dealers' stocks are practically exhausted and that the tire manufacturers must produce goods to meet the demand of the 9,000,000 automobiles in the United States if they are not to be run on the rims.

It is true the upturn was not as large the first of the year as was anticipated by rubber men. Henry Ford suddenly and unexpectedly closed his factory, which meant a decrease in tire sales and had a general demoralizing influence on the automobile manufacturers and in turn on the tire manufacturers.

AKRON NOTES

That a spirit of optimism prevails is indicated by the erroneous stories circulated regarding the number of men needed in Akron. These stories gained wide credence, with the result that Akron manufacturers have had to use drastic methods to inform the country that no men are needed and that former employes will be given preference when men are again required in the industry.

That the days of extravagant wages and the "silk shirt" era in the rubber industry in Akron are over is made plain by the announcement on January 4 of a decrease of 12½ per cent in the wages at The Goodyear Tire & Rubber Co. and a reduction of 15 to 20 per cent in salaries in the office. The reduction was favorably voted upon by the Goodyear Industrial Assembly, made up of representatives of the workmen in the factory and the men and women in the office.

More than one hundred business men in Akron sent letters containing the season's greetings to F. A. Seiberling, president of The Goodyear Tire & Rubber Co., just before Christmas. The movement was spontaneous and the replies from Mr. Seiberling indicated that the spirit with which they were sent was thoroughly appreciated.

The Akron automobile show during the last week of 1920 was one of the most successful ever held in the city, in spite of the financial depression. For some little time officials of the show association hesitated to put on the exhibition, but reports from practically every dealer who had space indicate that a very fair business was done and that a large number of orders were booked during the first few weeks of this year.

Henry G. Lubke, export manager of the General Tire & Rubber Co., returned from Europe recently with sufficient business to make increased production in the factory necessary. Mr. Lubke spent five months in Europe and states that conditions are rapidly improving, except in Germany, where the question of indemnity is holding back recuperation. He believes that export business to Europe will be as great during the present year as last, which was the banner year for his company. This is the fifth of the "Big Five" rubber manufacturing companies in Akron employing normally more than 1,000 men and having sales running well over $5,000,000 a year. A large portion of the business is done in foreign countries.

The Portage Rubber Co., of Barberton, Ohio, in the Akron district, is working upon refinancing plans involving $1,500,000 to take care of ready cash needs in the business for the coming year. At the time of writing, the officers of the company were still negotiating with eastern capitalists and bankers for the finances, but indications were that the plans would be consummated before the end of the month.

At the time of the postponed annual meeting of the stockholders the directors and the president, M. S. Long, were given authority to use their discretion to bring about the refinancing of the company. Mr. Long informed the stockholders that more than one-third as much business was on the books of the company as was done during the whole of the past year. The company did $5,000,000 worth of business during 1920, as was shown in the annual report given out at the regular annual meeting in November.

The company has outstanding at present $1,536,000 worth of preferred stock and $2,765,000 worth of common stock. Some stock has been subscribed, but not paid for and is not included in the figures. During the past two years its business has greatly increased under new management and the company is generally looked up as being in a comparatively strong position.

The B. F. Goodrich Co. was the host to the American Institute of Electrical Engineers at a convention held in Akron and Cleveland, January 14. The engineers took luncheon at the company dining room and made an inspection trip through the factory. The principal topic of discussion at the meeting was the application of electrical power to the rubber industry.

The refinancing program of The Goodyear Tire & Rubber Co., involving $50,000,000, which has been under way since late in the Fall, has not been completed. Another meeting of stockholders was called for January 21, and subsequently postponed until February 1, at which time the directors hope to announce the completion of the plans.

The preferred stockholders have given their approval of plans to mortgage the company's property for $50,000,000, and negotiations by the officials, which have been under way for two months,

are being continued in New York. The first definite statement regarding the financial conditions of the Goodyear company was given out at the preferred stockholders' meeting, December 23, in the form of a report of the auditing by Price-Waterhouse & Co.

Assets are given as $153,070,840, from which is subtracted the first deficit shown since 1903, before providing for possible losses on contractual obligations for rubber and fabric of $15,647,653.56.

A total of $10,787,494 has been charged off for depreciation on the Akron plant, Akron and branch automobiles, and furniture and equipment at branches.

Outstanding preferred stock is $65,497,700; common stock, $61,111,650; total bills payable, $23,879,812, not including $4,388,-086 in rubber and fabric acceptances payable, and $12,711,168 in bills payable, including Federal taxes due.

The Sumatra rubber plantation is valued at $5,003,257, and subsidiary companies, wholly owned, $13,352,158. Inventories less reserve, are given at $41,167,758.

At this writing the company has orders on its books which practically demand doubled production, but factory activities will not increase until the financial difficulties are ironed out.

The story of the rise of L. C. Rockhill to the directorate of The Goodyear Tire & Rubber Co. is the story of a man who thirteen years ago chose rubber goods manufacture as one of the great future industries, and remained with it, working with all his might. Mr. Rockhill started with the Goodyear company in the repair and accessory department, shifted to the aeronautical department, then to the tire sales department, in which he went to the top, and has recently been elected a member of the board of directors to succeed J. P. Loomis.

Albert L. Ely, formerly in charge of the patent department of the Firestone Tire & Rubber Co., Akron, has opened offices in connection with the law offices of Herberich, Burroughs and Smith, Herberich building, Akron, and will practice patent and trade mark law exclusively.

The India Tire & Rubber Co., Akron, has established an export department, in charge of Lynn Harvey, formerly assistant export manager for the Miller Rubber Co., Akron. Mr. Harvey recently returned from a business trip covering Australia, Tasmania, New Zealand and Hawaii, and reports good business in those regions.

The Interlocking Cord Tire & Belt Co., Akron and Mogadore, Ohio, is in the hands of Elihu Harpham, an Akron realtor who was appointed receiver last month by Judge W. I. Ahern in the Common Pleas Court on petition of certain stockholders and officials of the company.

CLEVELAND NOTES

The general offices and Cleveland salesrooms of The McGraw Tire & Rubber Co. have been removed from 1900 Euclid avenue and are now located in the Cook building, Prospect avenue and 46th street, Cleveland, the company having under lease 30,000 square feet of space, which gives ample room for maintenance of the necessary stock of tires in all sizes.

Dexter C. Hathaway has joined the sales force of The McGraw Tire & Rubber Co., Cleveland, in the capacity of Cleveland district sales manager, having general direction of sales in Western Pennsylvania, Western New York, Ohio, West Virginia and Kentucky. Mr. Hathaway will also devote time to the development of the company's business with commercial accounts.

The McGraw Tire & Rubber Co., East Palestine and Cleveland, Ohio, was taken over last month by the Maynard H. Murch Co., Cleveland, Ohio, investment bankers, to protect the preferred stockholders, and in accordance with the right reserved by the Murch Company, who bought $2,500,000 preferred stock in August, 1919.

R. G. Herzberger has been appointed a Cleveland territorial manager for The Goodyear Tire & Rubber Co., Akron.

MISCELLANEOUS OHIO NOTES

At the second annual stockholders' meeting of the New Tread Tire Co., Columbiana, Ohio, January 10, 1921, the following directors were elected: S. W. Tidd, C. V. Calvin, Eric P. Altenburg, C. R. Heck, O. W. Altenburg, S. J. Heck, W. O. Wallace, E. L. Dieffenbacher and R. F. Luce. Officers for the coming year are: S. W. Tidd, president; C. V. Calvin, secretary and treasurer; Eric P. Altenburg, vice-president and general manager. The New Tread Tire Co. manufactures "Marvel" cord and fabric tires and reports a very successful year, with sales showing 100 per cent increase over the preceding year.

At its annual stockholders' meeting, held at East Palestine, Ohio, January 10, The McGraw Tire & Rubber Co. elected John Morgan president and William S. Marlatt secretary and treasurer for the present year. The following directors were chosen: John Morgan, L. M. Keyes and Charles W. Wheeler, of East Palestine; William S. Marlatt, W. S. Quinlan, Maynard H. Murch, Mac S. Bethel and George E. Randles, of Cleveland; R. V. Mitchell, Canton—all in Ohio; C. H. Coffin, Chicago; Martin J. Gillen, New York City. The company has moved its offices from 1900 Euclid avenue to 4810 Prospect avenue, Cleveland, Ohio.

The Master Tire & Rubber Co., Dayton, Ohio, which was incorporated in May, 1920, to manufacture 30 by 3½-inch cord tires exclusively, reports the demand for a quality tire of this size to more than justify the belief which led to the company's incorporation. During 1920 the company's plant was running to capacity, 500 tires per day. The plant was closed during the month of November, but is now operating at full capacity and has bright prospects for 1921. Its future plans include the erection of a six-story plant adjoining its present unit, which will have a production capacity of 2,000 tires daily, and it is hoped to have this building ready for operation by the Spring of 1922.

A new salesman for The Mason Tire & Rubber Co. is George V. Armstrong, who will cover part of the state of Ohio, with headquarters at Portsmouth, Ohio. Mr. Armstrong has had several years of experience in tire selling with the Ajax Rubber Co., and the Kokomo Rubber Co.'s branches in Cincinnati.

Removal has been completed of the machinery, materials and manufacturing equipment of the Polack Tyre & Rubber Co. from Bridgeport, Connecticut, to Willoughby, Ohio, where the Polack company will be operated as a subsidiary of the Buckeye Rubber Products Co. In New York City the latter company will maintain an office, warehouse and service station, for Polack tires, at 527-529 West 23d street.

The International Golf Ball Co., Newark, Ohio, was organized in December, 1919, under the laws of that state, with an authorized capital stock of $10,000, to manufacture Burke golf balls as a subsidiary of The Burke Golf Co. The capital has since been increased to $150,000, divided into $100,000 preferred stock and $50,000 common. The officers of the company are: Joseph Introcaso, president; George Emch, vice-president; and W. K. Wobbecke, secretary and treasurer. The amount of business developed during the first year of operation is attributed to the popularity of the Burke line of golf goods. The Burke "Grand Prize" golf ball was described in our issue of July 1, 1920.

The Mason Tire & Rubber Co., Kent, Ohio, at its annual meeting of stockholders, held December 14, 1920, reelected the directors and the following officers: O. M. Mason, president; John H. Diehl, first vice-president; R. W. McKinnon, second vice-president; William A. Cluff, secretary, and D. M. Mason, treasurer. The close of the fiscal year of the company was changed from October 31 to December 31, to coincide with the calendar year. The company reports 100 per cent growth during the year just ended.

THE GOODRICH GOLDEN ANNIVERSARY

The memory of a noted pioneer in the rubber industry, Doctor Benjamin Franklin Goodrich, was honored last month on the golden anniversary of the founding of The B. F. Goodrich Co., the parent factory of the "Rubber City." Officials and employes of the company, residents of the city, and thousands of friends and customers throughout the country joined in paying

B. G. Work, *President*

Dr. B. F. Goodrich, *Founder*

The B. F. Goodrich Co.

tribute to the memory of Doctor Goodrich and in observing the termination of a full half century of the company he established.

Doctor Goodrich, a resident of New York State, after serving as a surgeon during the Civil War, took up real estate and shortly found himself in possession of a small rubber factory at Hastings-on-the-Hudson, New York. Attracted by Akron's transportation advantages and an offer of financial assistance from a group of Akron men, he brought his equipment to that city. Manufacture was first started in a small, two-story brick building, 40 by 100 feet, with a force of 25 men. Today the plant comprises 63 buildings of brick and steel, covering 110 acres of land.

The first big stride in the growth of the Goodrich came with the popularity of the bicycle. When the high wheelers gave way to what was called the "safety" bicycle, pneumatic tires were introduced and Goodrich speedily took up their manufacture. Before this time, the company had taken the initial steps in the evolution of rubber-shod wheels by perfecting the solid rubber tire for carriages. The success of this carriage tire, followed by that of the pneumatic tire for bicycles, naturally led to the manufacture of tires for automobiles. The first one made was a crude affair, with many layers of fabric and a very heavy tread. Improvements came rapidly, however, and by the time automobiles passed the "freak" stage, a dependable tire was being made in quantity.

Although the manufacture of auto tires was a large factor in the latter-day growth of Goodrich, they are nevertheless only one branch of the organization's production. Mechanical rubber goods, rubber footwear, druggists' rubber sundries, and hard rubber goods also are manufactured in enormous quantities.

Doctor Goodrich lived to see the Goodrich organization well started on the road toward success, even though he died before the automobile was invented. He had done his work well and had trained men to take his place in developing the industry even further.

The editor of this journal is proud to add his words of appreciation. Doctor Goodrich was a singularly alert and forceful personality who radiated energy and optimism. To use his own phrase, he was "swindled into the rubber business" and was bound to win out if only for that reason. His early struggles were a succession of brilliant moves, sharp disappointments, but constant progress. One perfectly sane and then feasible plan was a combination of the then existing rubber manufacturers. His plan was viewed with suspicion by the old-timers and so he dropped it with disgust. He did remark, however, "We will go it alone and one day the Goodrich company will do more business than the whole lot of them."

Curiously enough he picked the man who was to do the greatest constructive work of the company, while that man was yet a boy. Speaking to the writer, he pointed out a thick-set, tanned youth of twenty, saying, "That is young Work. Just rode here from Boston on a high-wheel bicycle. Something of a feat. He joins our force shortly and will go clear to the top."

MANAGER OF THE MASON TIRE & RUBBER CO.

Dudley M. Mason, treasurer and general manager of The Mason Tire & Rubber Co., Kent, Ohio, one of the notably successful of the younger tire companies, was born in Middlesborough, Kentucky, on May 2, 1890. His education was obtained in the public schools of Des Moines, Iowa, and the Des Moines Business College.

Dudley M. Mason

Upon leaving college he was employed for a short time as secretary to the business manager of the *Des Moines Register and Leader*, then as editor of one or two house organs. For the past eleven years he has devoted himself to sales and organization work. During this time he formed the investment security house of Mason Brothers, in Cleveland, Ohio, followed by the organization of The Mason Tire & Rubber Co., The Mason Cotton Fabric Co. (since absorbed by the tire company), and The Mason Rubber Plantations Co. In 1915 the Mason factory was erected, and since that time he has been the treasurer and general manager. He was recently elected president of the Mid-West Rubber Manufacturers' Association.

Mr. Mason is a golf enthusiast and what recreation hours are not claimed by his wife and two boys are spent on the links.

LANCASTER "WIREGRIP" TIRE DISCONTINUED

The "Wiregrip" tire, formerly manufactured under patent, was discontinued some time ago, and the tire now being marketed by the same manufacturer, described and illustrated as the "Wiregrip" on page 262 of our January issue, is the "Lancaster Cord."—The Lancaster Tire & Rubber Co., Columbus, Ohio.

WELDO-PATCH

"Weldo-Patch" is high-grade black gum stock calendered on holland cloth. Cuts in inner tubes, hot-water bottles, rubber footwear or other soft rubber goods are repaired by applying a piece of weldo-patch over the buffed surface, previously cleaned with a thin solution of benzol cement, which is entirely removed by scraping from the surface before laying on the repairing material. No vulcanization is needed to effect a permanent repair.—Weldo-Patch Manufacturing Co., 160 Fifth avenue, New York.

THE RECORD OF MASON TIRES

In these days of deflation and uncertainty, of which the tire industry is bearing its share, records of continuous operation and steady expansion in production capacity and organization, both at home and abroad, make encouraging reading.

The Mason Tire & Rubber Co. began business in 1916 in a four-room suite of an office building in Kent, Ohio, with a capital of $250,000. The original building of the present plant had 40,000 square feet of floor space. This has grown under three successive yearly expansions into 375,000 square feet, including the textile division, comprised in eight buildings spread over a tract half a mile in length and one thousand feet in depth, adjoining the Erie railroad. The capital has increased, likewise by successive stages, to $10,500,000 and the production capacity from 321 tires per month to 42,000 per month.

Fabric Mill and Plant of The Mason Tire & Rubber Co., Kent, Ohio

Aside from the plant that is shown in the illustration, extensive housing plans are being carried out to accommodate the increase of population of Kent caused by the rapid growth of the new industry. A large number of modern houses have been built, including three units of a community center near the plant. In addition to this a plot of 140 acres near the city limits has been acquired which will be improved as needed.

The textile division includes the first cotton fabric mill ever built in the Akron district. It has 10,000 spindles, cost over $2,000,000, and is so planned that it can be increased five times over without disturbing operation in any way. This mill produces tire cord and fabric from the raw cotton and enables the company to control that quality and uniformity of product essential to tire success.

Three outstanding features of Mason tire progress in recent months indicate the company's anticipation of automotive needs. Chief of these is the "Mason Junior cord"—a cord tire sold at approximately fabric price and designed to meet the growing demand for cords. This tire can be put on the car singly, as needed, for replacement of fabric tires without the danger of injury to the mechanism that is common when oversize cords are so applied. Other achievements are the heavy duty solid tire of such design as to overcome faulty features of old style construction, and the Mason cushion tire for light truck work. The success that all of three types have met with indicates that the production capacity of every department will be taxed, notwithstanding the successive enlargements that have been made in recent years.

Mason tires are also made in metric sizes and are widely known abroad through the work of the export department, which has kept pace with the home market and now has accounts in practically every country in the world.

The Mason organization is one of the most enterprising members of the rubber industry. Its liberal policy and farsightedness as shown by its early announcement of the "satisfaction—no-mileage-limit" guaranty; its national advertising campaigns and the rapid increase of branches which now include the principal cities of the country—these indicate an executive personnel with its feet on the ground, and a forward marching intent which does not wait for fair weather.

THE RUBBER TRADE IN THE MID-WEST

By Our Regular Correspondent

MID-WEST RUBBER MANUFACTURERS' ASSOCIATION

The Mid-West Rubber Manufacturers' Association held its January luncheon and meeting at the Auditorium Hotel, Chicago, Illinois, Tuesday, January 4, at 1 p. m.

On account of the annual meetings and dinner of The Rubber Association of America, which were held in New York City on January 10; also the fact that it was so near the holidays, there was a small attendance but it was very enthusiastic.

The Board of Directors' meeting was called to order at 11 a. m. After luncheon President D. M. Mason gave an interesting talk on "Cost of Tire Production."

The next monthly luncheon and meeting will be held February 15, at the Chicago Athletic Association, 12 South Michigan avenue, Chicago, Illinois.

The factory of the Zeglen Tire & Rubber Co., 1316 Rawson street, Chicago, Illinois, is equipped for manufacturing 600 tires and 1,000 inner tubes daily. W. L. Copley, a well-known tire designer, for nine years connected with the Portage Tire & Rubber Co., Akron, as a department superintendent, has been engaged as general superintendent of the plant. The officers of the company are: J. P. Drish, president; S. Strzelecki, treasurer, and F. J. Kalodzinski, secretary.

The Robertson Resilient Wheel Corporation, 1697 Broadway, New York City, has taken a long lease of space in the Armour Postal Station building, 3019 Indiana avenue, Chicago, and will occupy as general offices about the first of February. This company's wheel was described in The India Rubber World, December 1, 1920.

F. A. Schenzinger, who had been with the Chicago office of the Roessler & Hasslacher Chemical Co. for 22 years, recently became a salesman for the Wishnick-Tumpeer Chemical Co., 365 East Illinois street, Chicago.

Arthur J. Straney, for many years district manager of sales for The B. F. Goodrich Rubber Co., in Los Angeles, has been promoted to take charge of the Indianapolis Goodrich branch.

MISCELLANEOUS MID-WESTERN NOTES

The Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin, has secured offices in the Railway Exchange Building, St. Louis, Missouri. The new office is a branch of the Chicago district office and has become necessary because of the increasing amount of business in the St. Louis territory. Harold Phillips, formerly office manager of the Chicago branch, is in charge.

New machinery and equipment in the factory of the Racine Rubber Co., Racine, Wisconsin, includes an increase to the power house and the installation of a new General Electric turbine of 1,250 kilowatt capacity, a 500 h.-p. boiler and a complete economizer for the boiler room. The new building, which was completed last summer, is four stories in height, 180 feet long by 80 feet wide. In the lower floor, which is an addition to the mill room, have been installed ten new mixing mills, 22 by 60 inches.

The Latex Tire & Rubber Co., Fond du Lac, Wisconsin, maker of tires, tubes and rubber products, reports a very bright outlook for the future. The company is erecting an additional three-story building, 60 by 80 feet, to cost about $55,000, which will be used for the manufacture of molded goods and tire sundries, and it is about to install new mills and calenders to cost in the neighborhood of $75,000.

The Jefferson Rubber Co., Jefferson, Wisconsin, is erecting a modern factory, 80 by 320 feet, to be devoted to the manufacture of super-quality products. The building will be completed within a short time.

At the recent annual meeting, the board of directors of the Inland Rubber Co., Chicago, elected E. B. McKay vice-president and general manager. Mr. McKay has been associated with the Inland Rubber Co. for about a year. Prior to this affiliation he had been first vice-president of the Empire Tire & Rubber Corporation, Trenton, New Jersey, with which he had been associated in executive capacities for a period of sixteen years. Mr. McKay's long and varied experience has gained him a large and friendly acquaintance in the rubber industry.

W. D. McLeish, formerly with the New York branch of the Gates Rubber Co., Denver, Colorado, has been appointed district manager of the Chicago branch, with headquarters in that city.

G. O. Sebree has joined the forces of the Gates Rubber Co., Denver, Colorado, as advertising manager. Mr. Sebree has held a similar position with eastern companies and until recently was associated with the Firestone Tire & Rubber Co., Akron, Ohio. He is said to be especially active and energetic in handling national advertising campaigns.

THE RUBBER TRADE ON THE PACIFIC COAST

By Our Regular Correspondent

Cautious buying by tire dealers is reported on the Pacific Coast, but there is also noted a marked depletion of retail stocks which, on the first sign of renewed public interest, may result in a flood of orders. Buyers are not yet convinced that tire prices have touched bottom, although manufacturers declare that the next price revision will be more likely upward than downward. A little better inquiry for repair stock has been remarked, while in mechanical rubber goods and druggists' sundries dealers have of late been marking time, fearing to load up until satisfied that prices have touched bottom. Here, as in other lines, retail stocks are quite low, according to manufacturers' advices.

LOS ANGELES AND VICINITY

T. W. McDevitt, president of the Pacific Cotton Exchange, Los Angeles, and K. M. Turner, have been attending a congressional committee hearing in Washington, D. C., on the proposition to grant Los Angeles official recognition as a long-staple cotton trading center. As the United States Cotton Futures Act antedates the development of long-staple cotton, there is no provision for the handling of Pima futures in the same manner as short-staple futures. Los Angeles cotton men hope to have this omission corrected, and, if successful, they predict a big revival in the cotton business in the Southwest, with Los Angeles as the main trading center. Half a million acres last year yielded a crop of $75,000,000, and the potential acreage is estimated at 15,000,000. During 1920 the shipments through the port of Los Angeles (where there is a high density compress) were 7,107 bales, as compared with 500 in 1919.

The Goodyear Tire & Rubber Company of California, Los Angeles, passed the dividend on its 7 per cent preferred stock on December 31. The same action was taken by the directors of the Goodyear Textile Mills Company on the 7 per cent preferred stock. While both concerns slowed down in production two months ago, the management expects that by March 1 the "full steam ahead" order will be given in both factories.

The Samson Tire & Rubber Corporation, Compton, California, has been running steadily on full time and for several weeks has been working overtime six days a week, trying to catch up on orders. Soon the company expects to put on an all-night shift. Plans are being made for further enlargement of the factory.

George T. Bell, president of the Tire Construction Co., Los Angeles, has bought out the interest of Edward Harris, secretary-treasurer, and now owns the concern. The two started in business in 1914. Robert Brunner is the manager.

Rapid progress is being made in the construction by the U. S. Compression Inner Tube Company's plant at Burbank, California. The new factory, it is said, will mean an investment of $1,000,000, employ nearly 1,000 men, and be in operation in about three months.

Plans are being launched by Boston and Los Angeles capitalists for manufacturing cord tire materials and plain tire fabrics on a large scale at Redondo, California. The concern, to be known as the Imperial Textile Co., contemplates an outlay of $7,000,000 on mills in which 33,000 spindles will be run and on building a company town of 200 houses, with stores, theatre, etc., and its water works, electric plant, and drainage system. Arrangements have been made to take for several years the entire cotton crop of the C. & M. ranch, one of the largest in California.

The Automobile Tire Co. of California has been incorporated with a capital of $150,000 by Harry A. Demarest, Edgar W. Demarest and Jacques A. Leuthold. The concern, which has its office and warerooms at 1006 South Broadway, Los Angeles, will do a general tire merchandising business.

Red rubber tube making is a new line for the Bell Rubber Co., Alameda and Seventh streets, Los Angeles, and several vulcanizers are being set up. The tube is laminated, and floats. The company also makes single and dual solid tires, and specializes on solid tire repairs.

An important change is being arranged by The B. F. Goodrich Rubber Co. for housing its Los Angeles branch. It now occupies a seven-story building on South Broadway, but within six months it plans to move into a concrete structure, one of the units of the Los Angeles Terminal Warehouse, that will afford 2½ times more space, direct railroad connection, elevators for loading supplies, a private street, and other advantages to enable it to handle its

rapidly growing business in tires and mechanicals. It is quitting retail service and supplying dealers wholly.

Guasti, House & Giulii, Perfection and Kelly-Springfield tire distributers, are building at Eighth and Merchant streets, Los Angeles, one of the finest tire supply houses on the Coast.

The Reliance Manufacturing Co., Pasadena, California, has bought the Coast rights to sell the retread molds of the Western Rubber Mold Co., of Chicago, and will distribute through the Rubber Products Machinery Co., of Los Angeles; the Vulcanizing Machine Co., of Seattle, and Waterhouse & Lester in Portland and San Francisco.

SAN FRANCISCO AND VICINITY

The large modern tire factory of the Coast Tire & Rubber Co., Oakland, California, which will start production shortly after the first of the year, is located on a six-acre site extending from East 12th street to East 10th street, and from 48th to 50th avenues, Oakland, California. It has a spur track connecting with the Western Pacific and the Southern Pacific main lines, which affords the company ample outlet for its product.

The main building occupies 60,000 square feet and includes receiving department, mill and calender room, fabric room, inner tube department, superintendent's and chief engineer's office, vulcanizing pits, finishing room and shipping department. Executive offices and power plant adjoin the main building. The equipment is of the latest type, arranged by an efficiency engineer to avoid lost motion and duplication of effort. The company will manufacture "Coast" cord and fabric tires, which are already well known on the West Coast.

H. G. Blanchard, who was associated with the United States Rubber Co. for fifteen years, and who was also consulting engineer for the Kelly-Springfield Tire Co., is now connected with the Coast Tire & Rubber Co., Oakland, California. Mr. Blanchard is recognized as one of the authorities in efficiency engineering and his ability will have ample opportunity and wide scope in his new connection.

The Standard Tire Co., Willoughby, Ohio, has opened a branch at 895 Post street, San Francisco, for the sale of Tiger-foot tires.

F. C. Newbauer has been appointed territorial sales manager in San Francisco by the Goodyear Tire & Rubber Co. Philip La Tourette succeeds Mr. Newbauer as manager of the Goodyear Oakland branch.

J. B. Magee, manager of the Southern California and Arizona branches of the United States Rubber Co., attended a recent conference in San Francisco of the company's coast representatives.

NORTHWESTERN NOTES

Seattle expects much benefit from the recent decision to reduce ocean rates on crude rubber from the Far East to Pacific Coast ports made by the Pacific Homeward Conference of Shipping Board operators in the Orient. In 1918 and 1919 Seattle led all other western ports in the importation of rubber, but last year trade fell off largely because of the high ocean freight rates. As the latter have been reduced from $22.50 to $12.50 per forty cubic feet, Seattle counts on a decided revival in its rubber imports.

J. V. Lynn has been appointed manager of the Seattle branch of the Spreckels "Savage" Tire Co., San Diego, California.

SOUTHWESTERN NOTES

The Ocotillo Products Co., Indianapolis, Indiana, which has a plant at Salome, Arizona, for the extraction of ocotillo gum, has shipped a carload of the material, described as having a rubber cellulose base, to Los Angeles to be used in waterproofing a large cement construction job. The company has just installed another large retort and is planning a considerable extension of the plant.

The Southwest Cotton Co., Phoenix, Arizona, has contracted for more than 20,000 acres of Pima Egyptian cotton in Imperial Valley at 60 cents a pound, and since the first of the year has been buying in the open market, much to the relief of many planters who had been holding their cotton. Up to January 1 there had been no open market for Pima. Prices for mixed grades of short-staple cotton range between 12 and 13 cents a pound.

Henry Blackman, general manager of the Savage Tire Sales Co., Wellington, New Zealand, was a recent guest of the management of the Spreckels "Savage" Tire Co., in San Diego, California.

SALES MANAGER OF THE DOMINION RUBBER SYSTEM

James Morris Salmon Carroll, sales manager and a director of the Dominion Rubber System, Limited, Montreal, Canada, is one of the best-known and most popular sales executives in Canada, as indicated by his election to the presidency of the Dominion Commercial Travelers' Association, an organization of some 11,000 active members.

J. M. S. Carroll

His life has been a varied and active one. Of Manx and Scotch ancestry, he was born at Ballarat, Australia, in 1877, and was educated at Douglas, Isle of Man; St. Malo, Brittany, and privately. After some years at sea, voyaging in sailing ships to many distant parts of the world, he revisited Western Australia, where he became connected with many important mining and construction enterprises, including Bunbury Harbor Works, Boulder Brown-Hill Railway, Menzies-Leonora Railway, Collie-Boulder Coal Co., etc. He also organized a sales agency specializing in mining and railroad construction supplies, explosives, etc., and visited mining fields in various parts of Australia, New Zealand, South and West Africa.

In 1902 Mr. Carroll went to Winnipeg, Canada, and joined the construction department of the Canadian Pacific Railway, going to Montreal in 1903. The same year, after a short period in the office of the vice-president of the Canadian Express Co., he joined the Canadian Rubber Co. of Montreal, Limited, as secretary to the general manager, also advertising manager. In 1905 he was transferred to the sales department where he has occupied the positions of Montreal branch manager, Quebec division manager, and, since 1914, sales manager.

Mr. Carroll is a director of the Canadian Rubber Co. of Montreal, Limited, Walpole Rubber Co., and the provincial sales companies of the Dominion Rubber System in the maritime provinces, Quebec, Ontario, Manitoba, Saskatchewan, Alberta and British Columbia. He is a member of the Montreal Board of Trade, Montreal Amateur Athletic Association, St. Andrews Society, and various Masonic bodies. He is devoted to outdoor sports and his clubs include the Engineers, Kanawaki Golf, Montreal, and the Circumnavigators, New York.

CANADIAN NOTES

The United Shoe Machinery Co. of Canada, Limited, has established a permanent representative in Calgary, Alberta, where supplies of parts of the stitchers will be carried in stock. This will mean better service to the repair man, as he can secure needed parts much sooner than formerly, when Toronto was the nearest supply point. A. L. Baldwin, Calgary, Alberta, is the

local manager, and will also call on the trade. He will personally inspect stitchers and see that they are in good order.

A discount of ten per cent was announced in Canada December 1 on all tennis and sporting goods, to apply not only on future sales, but also on those already placed for the coming season. Thus those who ordered before that date and who are entitled to the five per cent discount for early ordering retain this advantage. Although the drop in price is due in some extent to the slowness with which orders have come in, the change is mostly attributable to the falling off in the cost of materials.

The Dominion Rubber System (Ontario), Limited, recently received a gold medal from the Canadian National Exhibition for its display at the 1920 show. The company is to be congratulated on receiving this distinction.

The Dominion Rubber System (Ontario), Limited, held the annual "get-together" convention of its salesmen at the King Edward Hotel, Toronto, on December 29 and 30. It was attended by R. E. Jamieson, president of the company, and his assistants at the head office at Montreal, Messrs. Massie, Carroll, Rudolph and Morrisette. Ontario executive and department heads were present, together with 45 Ontario salesmen and representatives of all branches of the company. A big feature was the banquet and minstrel show, in which the humor was personal and of a decidedly rubbery flavor. It was a big surprise and a big success.

The new factory of the Tiger Tire & Rubber Co., Limited, Toronto, Ontario, Canada, began production the first week in January. The company is confident of a good season's business.

The new plant of the K. & S. Tire & Rubber Goods, Limited, 99 Paton Road, Toronto, Ontario, Canada, said to be the most modern tire plant in Canada, is just about completed, and is expected to be in operation in all departments by February 1. The company reports orders on hand from over a thousand dealers in Canada and has already sold the output for the coming season of 300 tires and 750 tubes per day.

A department has been installed for the manufacture of a full line of rubber goods for druggists, including the necessary hard rubber parts.

Legislation recently passed in Canada enables trade marks consisting of surnames, geographical names and marks of a desciptive nature, heretofore only registrable by an order from the Canadian courts, to be registered without the expense entailed by court procedure. The Trade-mark Office is empowered to grant registration of marks consisting of surnames, geographical names or adjectives implying descriptiveness upon the filing of evidence that such mark has acquired a secondary meaning and distinguishes the goods of the applicant.

This change of procedure should be of advantage to tire exporters having trade marks consisting of surnames which in the past have been rejected by the Canadian Trade-mark Office on grounds of non-registrability, since it would now appear that such marks can be registered without a great deal of difficulty.

Among the articles invoiced from the Vancouver Consulate General, Vancouver, British Columbia, for 1918, was rubber to the value of $1,060; in 1919 similar invoices showed exports of 3,096,583 pounds of rubber, valued $1,466,118.

Imports of gutta percha and india rubber manufactures at the port of Quebec in 1918 were valued $109,249 as against $191,444 in 1919. Of the latter imports, $182,778 came from the United States and $8,367 from the United Kingdom.

Rubber and its manufactures declared at the American consulates in the province of Quebec for shipment to the United States during 1919 were 2,008,262 pounds, valued $214,484, as against 870,882 pounds, valued $127,839, in 1918. Exports of rubber scrap to the United States in 1919 totaled 39,829 pounds, valued at $3,143. Rubber goods to the value of $427 were shipped to the Virgin Islands, to which there were no shipments whatever in 1918.

R. W. Ashcroft, director of publicity, Ames Holden McCready System, Montreal, Canada, has been appointed assistant to the president of that company, in addition to his other duties.

W. Youngblud has been appointed sales manager of the tire department of the Ames Holden McCready System, Montreal, Canada, vice E. C. Kabel, resigned. Mr. Youngblud has been for some time tire sales manager of the Quebec division of the Canadian Consolidated Rubber Co., Limited, and is well known to the tire trade of Canada.

The Joseph Stokes Rubber Co., Trenton, New Jersey, U. S. A., has completed its new plant at Welland, Ontario, but it is not expected that the factory will be placed in operation for some time because of the present business depression. The new factory is 100 by 120 feet, one story, of timber, steel and concrete, with a power house measuring 50 by 50 feet. The plant stands on a tract having 651 feet frontage along the Grand Trunk Railway. The company manufactures hard rubber goods, its trade being principally in the automobile industry. W. J. B. Stokes, head of the Thermoid Rubber Co., is vice-president.

A NOVEL COTTON PICKING MACHINE

A new vacuum cotton-picking apparatus has recently been demonstrated in Imperial Valley, California, which the inventor[1] claims, and many who have seen it in operation believe, will not only save two-thirds the labor, but will also enable ginners to gin one-third more because the cotton is picked in a cleaner manner.

The principal feature of the cotton picker is a suction fan, at one side of which is an upright 5-inch pipe opening into a horizontal header provided with four openings, into which are fitted four lengths of 1½-inch vacuum hose 12 feet long, terminating in metal nozzles to be thrust into the cotton bolls. The fan discharges into a 5-inch pipe, five feet long, with a V-shaped terminal containing a butterfly valve at the apex, not unlike a damper in a stove pipe, whereby the sacks suspended on the terminal may be alternately filled.

This apparatus is mounted on the front of a small farm tractor and can be easily removed to allow the tractor to be used for general farm work. The fan is driven by belt from a large pulley on the shaft passing through the right hand driving wheel of the tractor and so arranged that the fan may be operated, whether the tractor is in gear or not. A pointed hood can be placed in front of the machine so that the latter can nose its way between rows of plants. The cotton picker is operated by two men walking ahead with the suction nozzles, while two others walk at the side of the machine, also carrying similar nozzles. A fifth man operates the tractor and looks after the filling of the sacks.

A "Utilitor" tractor with the cotton picking attachment weighs but 810 pounds, and is driven by a 4-horse-power motor. A patent has been granted for the pulley driving the fan, and application has been made for three other patents covering other features of the apparatus. An early type of the machine, now discarded, combined picker and self-driven car as a single unit.—Hand & Cavin, manufacturers, 400 North Avenue 26, Los Angeles, California.

[1] Captain K. F. Hand, 1526 Winfield Street, Los Angeles, California.

RUBBER TRADE INQUIRIES

THE inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

(842) A reader desires the address of the manufacturer of molds for curing rubber hose in 500-foot lengths.

(843) A manufacturer requests the address of the maker of the rubber wood closet seats illustrated in our issue of April 1, 1920.

(844) An inquiry has been received for the address of the manufacturer of a machine for cutting washers.

(845) A correspondent desires information concerning sources of supply for rubber resin, particularly Pontianak resin.

(846) A European manufacturer desires the address of the present manufacturer of Wahl's shoe-varnishing machine described in our issue of December 1, 1920.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS

Addresses may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or from the following district or cooperative offices. Requests for each address should be on a separate sheet, and state number.

District Offices	Cooperative Offices
New York: 734 Customhouse.	Cleveland: Chamber of Commerce.
Boston: 1801 Customhouse.	Cincinnati: Chamber of Commerce; General Freight Agent, Southern Railway, Ingalls Building.
Chicago: 504 Federal Building.	Dayton, Ohio: Dayton Chamber of Commerce.
St. Louis: 402 Third National Bank Building.	Los Angeles: Chamber of Commerce.
New Orleans: 1020 Hibernia Bank Building.	Philadelphia: Chamber of Commerce.
San Francisco: 307 Customhouse.	Portland, Oregon: Chamber of Commerce.
Seattle: 848 Henry Building.	

(34,192) A manufacturing company in Greece desires to be placed in touch with manufacturers of waterproof cloth for automobile covers.

(34,204) A mercantile firm in England desires to secure agencies for the sale of chemical products, including acetic acid, formaldehyde, sodium hyposulphite, lithopone, zinc oxide and barytes. Quote c. i. f. English and Indian ports. Payment to be made against documents at port of destination.

(34,244) A mercantile company in Canada desires to secure an agency for the sale of suspender fittings, including elastic or webbing. Quote f. o. b. Canadian port. Payment cash against documents.

(34,256) A manufacturer in Canada desires to purchase machinery for making rubber stamps, and rubber and other supplies for stamp making.

(34,266) A mercantile firm in Egypt desires to secure the exclusive agency for the sale in Egypt and Sudan of rubber tires. Quote c. i. f. Alexandria. Payment cash against documents on arrival of goods.

(34,276) A company of merchants in Argentina desires to secure an agency from manufacturers for the sale of suspenders and garters, and artificial leather or leather substitute for upholstery. Quote f. o. b. New York or c. i. f. Argentine port. Payment 30 to 90 days' sight draft, or other terms.

(34,280) An inquirer in India desires to receive information and quotations on rubber-covered wire and cable for house work, made in accordance with British standards.

(34,282) A mercantile firm in Bulgaria desires to secure an agency for the sale of rubber cloth for clothing and other purposes, and fountain pens. Quote c. i. f. Varna or Bourgas.

(34,295) A commission company in Madeira desires to secure agencies for the sale of pneumatic tires and suspenders. Correspondence should be in Portuguese.

(34,301) A firm of shoe merchants in England desires to purchase rubber-soled tennis shoes for men, women and children. The firm is prepared to give an order for 5,000 pairs assorted, cheap lines for delivery in May, 1921. Quote c. i. f. ports of the United Kingdom. Terms: cash, packing to be included in cost.

(34,319) A merchant in the French West Indies desires to secure catalogs in French of articles which he plans to purchase, including rubber and leather fabrics for automobile hoods, insulated wire, inner tubes and repairing cement.

STEAM BAG FOR TIRE REPAIR

The "Perpetual" steam bag permits the application of heat to the inside as well as the outside of the tire during repair vulcanization It is made of two sections of inner tubing protected by a stockinette covering. All metal parts, such as caps, are of cold rolled steel, and the fittings are standard Schrader connections and valves for use with steam. The construction of the head of the bag allows drainage of all condensation. Every pound of steam gives results, as the expansion of the bag makes it adjust itself to the exact shape of the inside of the casing. Connection is made to fit all molds so that it can be used with any equipment. It is made in 3½, 4, 4½, 5, 6, 7, and 8-inch sizes.—Perpetual Air Bag Co., 2103 South Michigan avenue, Chicago, Illinois.

"Perpetual" Tire Repair Steam Bag

THE SIVYER STEEL TRUCK WHEEL FOR PNEUMATICS

A cast steel wheel for pneumatic-tired trucks has been developed in a distinctive variation of the disk type. The metal is refined heat-treated steel, and the hubs are cast integrally with the wheels. Four triangular-shaped openings in the web serve to lighten the wheel and improve its appearance. One of these openings is located over the valve slot which permits of using the standard valve stem and the extra clearance allows room for any standard air-line connection when pumping the tire. The valve slot is opened through the outside edge of the wheel, permitting easy mounting or demounting the demountable rim. The rim is channel section, reinforced by cross braces.

Special attention has been paid to eliminate any features of design which would cause strains to be set up during the casting process. The result is an efficient-looking wheel, combining strength with light weight.—The Sivyer Steel Casting Co., Milwaukee, Wisconsin.

A NON-SKID ABRASIVE TIRE TREAD

A new non-skid tire, called the "Bearfoot," is being made in the recently opened factory of the Hobson Rubber Co., 1025 South Hill street, Los Angeles. Instead of using knobs, designs, and corrugations on the surface of the tread, as many manufacturers do in order to lessen the area of rubber on a slippery surface, or to get more or less of a vacuum grip on the road surface, the Hobson concern increases the coefficient of friction by incorporating a large quantity of abrasive material (finely graded sand) in the body of the tread. As the tread wears, the hard particles in it produce a surface not unlike sandpaper, which, it is claimed, securely grips the wettest or oiliest asphalt by presenting innumerable minute angles of tread that fit into the countless tiny depressions in the smooth road surface. The tread is built in layers much like camelback. Bearfoot retreads are also made in the same factory with a standard guarantee to retain non-skid qualities for 5,000 miles. A patent has been applied for on the process by which the abrasive material is distributed in the rubber so as not to cut the latter.

The Rubber Trade in Great Britain

By Our Regular Correspondent

ANENT LOW RUBBER PRICES

Although rubber manufacture generally is not brisk, and some departments are on short time, it cannot be said that the manufacturers show signs of worry and anxiety. This condition seems to appertain more particularly to the directors of rubber plantation companies who regard themselves as the victims of malign providence. Many of them can recall rubber at 12*s.* per pound, and they sadly refer to the good old times when two or three hundred per cent dividends could be paid. Of course, in this matter of shilling-a-pound rubber all producing companies are not in the same position and therefore some directors are more cheerful than others. This cheerfulness is largely limited to the companies which still have rubber to deliver at 2*s.* 6*d.* per pound for months ahead. To the suggestion that this may prove rather hard on the rubber manufacturers when they have to compete with firms buying at present prices the answer is that the manufacturers have had good earnings during the war and are not objects for commiseration. Of course, the manufacturers might reply to the effect that many of the rubber companies have also had their good times in the past.

There is an increasing tendency to reduce the price of rubber goods so as to fall in line with what is going on in so many other branches of trade, though it is only where such reductions are considerable that increased business is likely to result at the moment because everyone seems to be obsessed with the idea that the fall in the prices of goods generally has only begun and they are holding off until it has developed further.

The suggestion has been put forward in certain quarters that rubber plantation shareholders should form a sort of bank with £5,000,000 capital, presumably all paid up, to purchase the stocks of rubber in existence and thus force up the price. However, in view of the criticisms which have been leveled against the proposal, it is unlikely to mature. So far there has been no tendency on the part of buyers of forward rubber at what is now considered a high price to endeavor to get out of their commitments, though we may yet see something of the sort. In the light of what has been going on in certain American circles in regard to Lancashire cotton contracts, there seems room in many directions and in several branches of trade for emphasizing the importance of the sanctity of contracts if trade is to be conducted on a sound basis.

DUNLOP RUBBER CO., LIMITED

With regard to the shares of the Dunlop company, it will be remembered that a reorganization with increase of capital took place not long ago. This was largely the work of a well-known London financier. What has caused so much comment and consternation is that within a week or so of the allotment of the shares quoted at 30*s.* each the market price has fallen to about 17*s.*, representing a paper loss of £10,000,000. Naturally rumors have been flying about as to the cause, about which more will probably be known before this is in print. On December 9 the Dunlop company's new shares issued at 30*s.* and 22*s.* 6*d.* paid were quoted at 8*s.*, while the ordinary shares have dropped from 30 to 15*s.*

Dunlop shares are affected by other factors than the rubber market, as the recent developments and ramifications come into consideration. The shares of the Dunlop Rubber Cotton Mills in Lancashire, part of the Amalgamated Cotton Mills, have fallen a good deal lately, and then there seems to be a little bother about the American Dunlop company. The British Dunlop company has recently been called upon to assume the responsibility of providing the additional finances required to place the American company in a position to complete the construction of its factory and to provide working capital. At the time of writing, the directors of the British company have not acceded to this request for aid, as they feel that the money should be found in America. However, it is understood that £1,000,000 have been remitted and further negotiations are pending.

FINANCIAL NOTES

Although the net profit of the India Rubber, Gutta Percha & Telegraph Works Co., Limited, stood at £73,299, rather more than a year ago, the final dividend has been passed for the time being, owing to the stringency of the cash position. An interim dividend of 2½ per cent has been paid and shareholders had every reason to expect that a final distribution would make 10 per cent for the year as in the five previous years. This withholding of the dividend, of course, means a greatly augmented carry-over, but it will have the effect of making shareholders in similar concerns apprehensive. Palmer Tyres, Limited, which is affiliated with the Silvertown company, though showing a reduction in profits, maintains its dividend of 12½ per cent. W. & A. Bates, Limited, of Leicester, with profits of £42,249, almost the same as a year ago, again pays 10 per cent.

The long deferred report of Vickers', Limited, covering the four years to the end of 1919, was issued on December 21. By amalgamation with other concerns the capital has risen from £7,000,000 to £20,000,000. A former statement promised an interim dividend announcement in the report, but to general surprise there is no mention of a dividend for 1920. In 1919, 11½ per cent was paid.

CATALPO

This is the trade name given to a colloidal form of Cornish china clay, this being the ordinary china clay prepared in a special way instead of the usual method of elutriation or washing by which the admixed particles of mica settle out by gravitation. The first patent was in the name of W. Feldenheimer, now of Catalpo, Limited, of 20 Holborn Viaduct, London, E. C., and a more recent specification, No. 153,343, is in the names of Dr. P. Schidrowitz, W. Feldenheimer and W. W. Plowman. In this case the clay is dried in the deflocculated condition, the dried purified clay being mixed to a paste with water containing 3 per cent by weight of anhydrous sodium carbonate. The water is then evaporated, leaving a clay which is said to possess special properties of accelerating the cure and improving the tensile properties of the rubber in which it is used. China clay has never been popular with British rubber manufacturers, though the "silicate" which came from America during the war period with a high reputation as a zinc oxide substitute was used to a considerable extent. The action of alkali as an accelerator now seems to be generally recognized, as the old use of lime and magnesia has been followed by patents utilizing caustic soda (Twiss) and now sodium carbonate.

OTHER CHEMICALS FOR THE RUBBER TRADE

Before the war there was only a very limited number of chemical firms which specialized in chemicals for rubber manufacture, though there were many more which supplied some particular chemical. Now, however, many new firms have entered the field, though they have but a superficial knowledge of the requirements of the trade. In striving to get business they probably resort to the usual procedure of cutting prices in order to oust the man who is in. When anything goes wrong with the manufactured goods the new dealer is adamant in his opinion that he has nothing to answer for and naturally in his ignorance he cannot make any suggestion of value whereby the harassed manufacturer can get at the root of his trouble. Of course, the particular chemical looked at with suspicion may be entirely guiltless, but the manu-

facturer cannot get out of his mind the fact that with the old source of supply he never had any trouble. Newcomers have not had things all their own way, however, because the conservatism of our rubber manufacturers has become almost proverbial, but all the same a good many changes have been made, and not always with the concurrence of the works or consulting chemist, and the change has not always proved advantageous.

THE DUNLOP PICTURE AGAIN

In the litigation between J. B. Dunlop and the Dunlop Rubber Co., Limited, concerning the company's pictorial advertisements of the former, the House of Lords has dismissed the appeal from the decision of the Irish courts to the effect that Mr. Dunlop be at liberty to issue the writ of summons and serve it on the company in London. This has reference to the use of the advertisement in Ireland.

BRITISH RUBBER TYRE MANUFACTURERS' ASSOCIATION

The fourth annual general meeting of the British Rubber Tyre Manufacturers' Association was held in London in December. F. W. Hinde, who presided, said a good deal on the acute question of imported tires, the value of which, he said, would probably exceed £5,000,000 in the current year. He predicted an even more vigorous export campaign on the part of the American manufacturers, besides the serious competition from France, Italy, and shortly from Germany, owing to the favorable exchanges of these countries. It was resolved that in future all labor questions be left to the India Rubber Manufacturers' Association to deal with. The following were reelected on the general committee for the ensuing year: Lieutenant-Colonel J. Sealy Clarke, F. W. Hinde, E. Healey, Alexander Johnstone, E. J. Mitchell, Reginald Moseley and J. Traxler, Mr. Bond also being elected in place of Mr. Huet, who had resigned. An illuminated address and a service of plate were presented to Mr. Johnstone, chairman from 1916 to 1919.

TRADE NOTES

The Federation of British Industries, an association of manufacturers of all sorts of commodities, keeps well to the fore in Parliament and press in looking after the business interests of its members. The fact that unity is strength in getting desired results is now generally recognized by masters and men alike, and this has come to be the ordinary procedure since the war. Included in the present Grand Council of the Federation as representing the rubber manufacture sub-group, are the following: Sir G. Charles Mandleberg, Hugh C. Coles, F. W. Hinde, Alexander Johnstone, P. H. Lockhart, Stuart A. Russell, C. T. Mabey and W. Bond. Also on the Grand Council are J. A. Fisher and Harold Jones, representing asbestos, and F. Lye, representing machine belting.

A meeting of creditors under the failure of British Rubber Manufacturers, Limited, was held in London on December 2. Founded as a war concern at Acton, near London, it made a profit for one year, but has been in difficulties since 1916. The total indebtedness is £110,149, and as the assets are valued at £45,160 the deficiency is £69,508. The compulsory winding-up order was obtained upon the petition of the Langham Steel Co., which claims to be a creditor for £53,407, for money lent to the company in the last three years.

The Peachey Process Co., Limited, which up to the present has had temporary office accommodations in Gerrard street, has now removed to new offices and showrooms at 83 Pall Mall, London, W. E. The premises are spacious and comprise general and private offices, board room, showrooms, etc., available for the inspection of manufactured products. Mr. Peachey, who has now removed to London, is succeeded at the Manchester College of Technology by A. R. Kaye, who during the later stages of the war was engaged on rubber work at the college. Formerly he was associated with Dr. Schidrowitz' laboratory. Mr. Peachey's lecture work in chemistry outside rubber is to be divided between Dr. J. K. Wood and Messrs. Craven.

The Largest Exhibit of Giant Pneumatic Tires at the London Commercial Motor Vehicle Show Was That of the United States Rubber Co.

THE LONDON RUBBER EXHIBITION

The International Congress which will be held in connection with the Rubber Exhibition at London in June of this year will have as chairman Dr. Joseph Torrey, A. M., Ph. D., who has served so ably in this capacity on previous occasions. Although the rubber industry will be as usual the principal subject of interest, the scope of the congress will include other tropical products and industries and a special feature will be made of papers dealing with cocoa and with vegetable oils.

The vice-chairmen, who are devoting their attention to arrangements for papers concerning the industries of which they have made a special study, include Dr. Philip Schidrowitz, Ph. D., F. C. S., and H. H. Vasconcellos, who will assist Dr. Torrey with the organization of the Rubber Section, Mr. Vasconcellos being specially active in the interests of Brazilian products; Emile Alleaume of the Portuguese Trade Corporation and Hamel Smith, editor of *Tropical Life*, who are looking after the Cocoa Section; E. Richards Bolton, F. I. C., F. C. S., and Emile Baillaud, of the Colonial Institute of Marseilles, who are working to insure the success of the Vegetable Oils Section.

Papers will be read by leading scientists and other experts from all parts of the world. It is believed that the 1921 congress will be even more largely attended than its predecessors by an internationally representative gathering of scientists, producers, manufacturers, merchants and financiers. Among those who have already promised to read papers are:

Edmond Leplae, Director of Agriculture for the Congo. Subjects: The Cultivation of Oil Palms in the Belgian Congo. The Cultivation of Hevea in the Belgian Congo. The Cultivation of Cotton in the Belgian Congo. Auguste Chevalier, Laboratoire d'Argonomie Coloniale, Paris. Subject: Progress de la Culture de l'Hevea en Indochine. Dr. P. J. S. Cramer, Amsterdam. Subject: New Species of Hevea Cultivated in the East. E. W. S. Ventress, A. M. I. M. E. Subject: The Amazon and its Vegetable Oils, etc.

Other speakers who have not yet announced their subjects include Henry P. Stevens, M. A., Ph.D., F. I. C.; Dr. André Dubosc, Laboratoire de Recherches, Bapaume-les-Rouen; Dr. O. de Vries, Director of the Central Rubber Station, Buitenzorg, Java, all connected with the Rubber Section; A. W. Knapp, B. Sc., research chemist to Cadbury

Brothers, in the Cocoa Section; E. Prud'homme, Directeur du Jardin Colonial, Nogent-sur-Marne, and M. T. Dawe, F. L. S.

All persons interested in the congress are cordially invited to volunteer to read papers or to make suggestions as to subjects. All communications concerning the congress (Rubber Section, Cocoa Section, and Vegetable Oils Section), should be addressed to Dr. Joseph Torrey, A. M., Ph. D., Northwestern Rubber Co., Litherland, Liverpool, England.

BRITISH PADS FOR SOLES AND HEELS

Another variation of the attachable rubber heel and sole pad in several sections is of British manufacture and is now marketed under the name "Phillips' Rubbers," the former name being "Phillips' Military Soles and Heels." Thin rubber plates, two for the sole and one for the heel, with raised studs, keep the feet dry, give a smooth, pleasant tread, and do not slip, owing to the corrugations on the surface of the studs. "Phillips' Rubbers" are made in sizes to fit men's, women's, and children's shoes, and the manufacturer asserts they are meeting the approval of the British public.—Phillips' Patents, Limited, 142-146 Old street, London, E. C. 1, England; George A. Slater, Limited, Ontario street East, Montreal, Quebec, Canadian distributer; Frank L. Slazenger, 12 East 43d street, New York City, wholesale distributer.

ENGLISH "PUNCTURE-PROOFED" INNER TUBES

A rubber inner tube, proof against punctures, which is not semi-solid nor "rubbish-filled," but is a pneumatic tube, is the new product of a British company. A thin film of solution, whose ingredients are not divulged, is held by the air pressure to the walls of the tube and in the event of the tube being pierced, a minute portion of this solution is forced into the aperture, effecting an immediate and permanent repair. The makers claim the tube has stood the most drastic tests, both in the factory and in actual use.—Puncture Proofed Tubes, Limited, Avenue Chambers, Bloomsbury, London, W. C. 1.

A GERMAN RUBBER SOLE-PROTECTOR

Protector Kanzler Sole

A rubber sole-protector has recently been placed on the German market, intended to protect the soles of fine shoes from wear and moisture. In shape it follows the sole of the shoe, being cut out in the center, thus giving the pad a sort of horseshoe shape; is corrugated to prevent slipping, and beveled at the edges, so that it is almost invisible when worn. It is attached by means of small nails driven into the sole through holes provided in the protector. A shoe pad of this sort is not so heavy to wear nor so heating to the foot as an all-rubber sole, while affording equal protection. — Kanzler Gummi-Gesellschaft Otto Baumann & Co., 16 Niedenau, Frankfort-on-the-Main, Germany.

TETRALIN

Tetralin and Other Hydronaphthalenes, of Which Five are theoretically possible, have been patented as solvents for rubber, sulphur, liquid or solid hydrocarbons, natural resins, etc. Tetralin is miscible in all proportions with spirits of turpentine, rosin oil, coal tar, mineral oil distillates, trichloroethylene, amyl acetate, etc. Essence of tetralin is a mixture of tetralin and cyclohexanol.—Tetralin Gesellschaft mit beschränkter Haftung, Behrenstrasse 5, Berlin W. 8, Germany. German patent No. 320,807.

THE RUBBER TRADE IN EUROPE

By a Special Correspondent

FRANCE

The demand for American tires has almost completely disappeared owing to an increase in the French production and an improvement in the quality of the product. It is believed that the demand for American tires on the French market will be very slack so long as exchange rates continue as at present, as a French product can be offered at from 20 to 30 per cent below that of the American manufacturers. A slack demand for automobiles has also contributed to the present situation in the tire market. It is stated that practically 30 per cent of the cars actually manufactured in France remain unsold at the present time.

BELGIUM

In 1919, Belgium imported 5,617,484 kilos of crude rubber, valued 37,958,853 francs. During that year exports of crude rubber were 1,569,696 kilos, valued 10,177,110 francs. One kilo equals 2.2 pounds; the value of the franc, which in normal times approximates 5.13 to the dollar, in 1919 fluctuated between 8 and 16, averaging 9 to the dollar. Of rubber manufactures, 1,824,472 kilos of tires, valued 25,251,192 francs, were imported into Belgium and 561,794 kilos, valued 12,382,593 francs, were exported. Of other manufactures of rubber 770,422 kilos, valued 8,390,104 francs, were imported and 44,335 kilos, valued 607,349 francs, were exported. Imports of machine belting, including rubber, leather and similar materials, were 624,604 kilos, valued 10,006,800 francs, and exports were 22,809 kilos, valued 499,321 francs. Textiles impregnated with rubber for making card fillets were imported in the quantity of 85,406 kilos, valued 1,328,780 francs, and 262 kilos, valued 3,000 francs, were exported.

NORWAY

The sample fair of Norwegian products held at Christiania, Norway, in the early autumn, was the first of the kind ever held in the country and very satisfactory results were obtained. The exhibition was held with a view to popularizing Norwegian manufactures at a time when the importation into Norway of numerous articles was prohibited. The group of exhibitors that has had the largest return in business from the fair is that comprising leather and rubber goods.

GERMANY

The Mittelland Gummiwerke Akt., Ges., Hanover, has increased its capital by 300,000 marks, bringing it up to 4,500,000 marks. According to the report, results during the past year were satisfactory.

The Continental Caoutchouc & Gutta Percha Co. some time ago took up the exploitation of the Ruhrkohlengewerkschaft Alter Hellweg. It is understood that 10,000,000 marks have been reserved for this purpose. In this way the company will secure for itself the necessary coal, for it may keep one-third of the coal output for its own consumption.

The death is reported of the founder of the firm of Curt Schellbach rubber goods factory, Seiferitz-Meerane (La.). Curt Schellbach started on a small scale and built up a concern which now has branches in all the chief cities in Germany as well as representation in Turin, Milan and Constantinople. Fr. Herrmann will now direct the business.

The Vereinigte Gothania Werke, Akt.-Ges., Gotha, manufacturing hose, has decided to raise its capital from 4,500,000 to 6,500,000 marks.

The Kabelwerk Reydt, Akt.-Ges., Reydt, declared a dividend of 30 per cent at its recent general meeting. The capital will be raised from 10,000,000 to 24,000,000 marks.

The New York-Hamburger Gummiwaren Compagnie has doubled its capital, which now is 4,002,000 marks.

Farbenfabriken, formerly Frederich Bayer & Co., Leverküsen, has stopped the manufacture of synthetic rubber. The enormous

stocks of crude rubber on the market and the high cost of preparing the synthetic article in connection with the shortage of coal make competition with the natural product impossible for the present.

The Braunschweiger Gummiwarenfabrik Richard Hagemann, Braunschweig, has been dissolved. The owner, Richard Hagemann, has taken over for his business, Brunonia-Gummiwerke Richard Hagemann.

The Treibriemenfabrik Woide G. m. b. H., Breslau, manufacturer of belting, has been dissolved and the owners have begun a new business known as the Breslauer Treibriemenfabrik Woide & Diebison, at Breslau.

The firm of August Knab, wholesale house for rubber bed sheeting and oilcloth, has moved from Nurnberg, where it was founded in 1888, to Bad Reichenhall. The new business has been greatly extended.

The Hamburger Gummi-Vertriebs Gesellschaft m. b. H., Hamburg, has been dissolved.

H. Schwieder Sächs. Gummi-und Gutta-perchawarenfabrik, Dresden, has raised its capital by 3,500,000 marks. This is the Dresden branch of the Akt. Ges. Vereinigte Berlin-Frankfurter Gummiwaren Fabriken, Berlin, which is also the owner of the first concern.

W. Goy & Co., Hannover-Linden, handle the sales for the Mittelland-Gummiwerke A. G., formerly Hannoversche Aktien-Gummiwaren-Fabrik.

NEW FIRMS

Gesellschaft der echten Marks-Prothesen, A. A. Marks m. b. H., has been founded at Frankfort-on-the-Main. The aim of this enterprise is the manufacture of original Marks prothesen or artificial limbs, with genuine Marks feet. The company, which recently patented designs for rubber feet, has also taken over the orthopedic department of the Antiplanwerke Alfred Stiefel. The head of the new concern, which is capitalized at 3,000,000 marks, is Alfred Stiefel.

Firma J. Friedrich Eckrich, Karlsruhe. Wholesale dealer in rubber goods.

Bayerische Gummi-und Asbestindustrie, Hans Maier, Munich.

Ri-Pneu-Nagelsicher Gummiwerke, G. m. b. H., Karlsruhe. Bicycle tire covers.

Prussig Gummi-Industrie Riemann & Co., Königsberg, Preussen.

Kabelwerk Nürnberg Aktiengesellschaft, Nürnberg. Capital, 18,000,000 marks. Directors, Gustav Wunderlich and Max Krüninger.

Fettweis & Freitag, Dusseldorf. Manufacture of rubber goods.

Maerkisch Gummiwaren-Fabrik G. m. b. H., Berlin. Manufacture of rubber goods.

Hannoversche Gummiwerke "Excelsior," Akt. Ges., Hannover-Limmer. To manufacture and trade in sporting goods of all kinds.

Selhausen & Co., Duisburg, wholesalers in rubber heels.

Deutsche Gummiwaren-Vertriebs-Gesellschaft m. b. H., Frankfort-on-the-Main, wholesalers in all kinds of rubber goods.

Weinheimer Gummi-und Gutta-perchawaren-Fabrik, Weisbrod & Seifert, m. b. H., Weinheim. Manufacture and sale of rubber and gutta percha goods.

Duerener Draht-und Kabelindustrie, Dueren. Sale of wires and cables.

Gummi-Handelsgesellschaft, Ferdinand Bauwens, m. b. H., Frankfort-on-the-Main. Wholesalers in tires, repair material, rubber solution, necessities for vulcanizing.

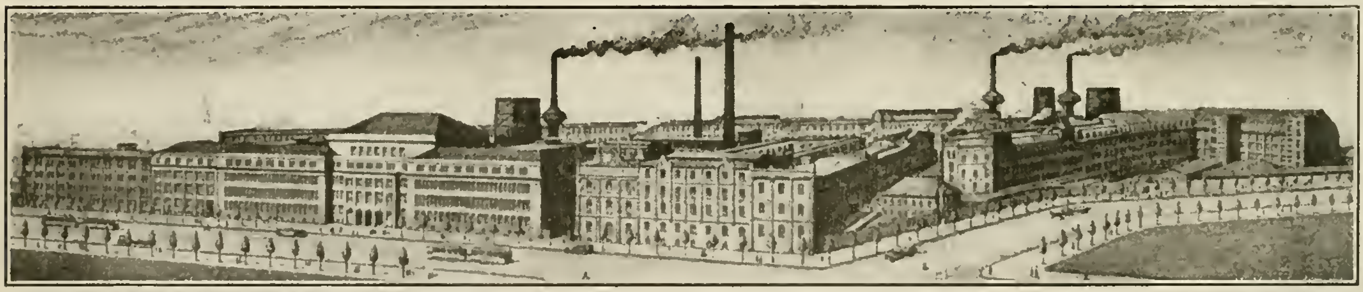
GERMANY'S LARGEST RUBBER WORKS

One of the largest rubber manufacturing companies in the world is the Continental Caoutchouc & Gutta Percha Co., Hanover, Germany, which is shown in the accompanying illustration. Starting in 1872 with 200 men and a very modest capital, it has grown to be the largest concern of its kind in Germany. Its products are varied, embracing almost everything made of rubber except footwear. The attention of the firm is directed chiefly to the manufacture of soft rubber goods, and for the most part for technical purposes, that is, hose, belting, packing, etc., also rubber cloth, balloons, toys, balls and tires for bicycles and automobiles. Its "Continental" pneumatic tires have been famous in Europe for many years.

The Continental Caoutchouc & Gutta Percha Co. is cosmopolitan in its business transactions, doing business all over the world, being, in this particular, the greatest German firm in this special branch.

The late Adolf Prinzhorn, who was well known and admired in the United States and England, was for thirty years managing director of the "Continental," resigning from active service in 1909. However, he continued to give the firm the benefit of his experience as a member of the committee of inspection.

The illustration shows a late picture of the factories, with the new administration building in the center front.



Plant of the Continental Caoutchouc & Gutta Percha Co., Hanover, Germany

VULCANIZATION AND DEPOLYMERIZATION

The improvement of rubber by hot vulcanization is stated by E. Seidle in *Gummi-Zeitung*, 1920, 34, 797-798, to be accompanied by a less marked opposite effect of depolymerization which is concealed by the vulcanizing effect. Rise in temperature increases the rate of vulcanization more than that of depolymerization, consequently vulcanization at higher temperature to the same percentage of combined sulphur relatively increases the beneficial effect.

FOREIGN TARIFFS

SWITZERLAND

A decree issued by the Swiss Federal Department of Public Economy dated November 10, and in force from December 1, 1920, provides that the following goods may not be exported from Switzerland, except under special license issued by that department: india rubber and gutta percha without internal layers of tissue or metal, blocks, balls and negrohead (raw caoutchouc), so-called "patentplatten" not vulcanized; waste of india rubber and gutta percha; rubber tires (inner tubes and covers) for

motor cars and for cycles, with or without internal layers of fabric or metal; threads for elastic tissues.

NEW ZEALAND

According to the British *Board of Trade Journal*, December 16, 1920, X-ray gloves, of lead-rubber covered with leather may be imported into New Zealand duty free with the exception of a "primage" duty of 1 per cent ad valorem which is levied on certain goods on importation, irrespective of whether the goods are otherwise liable to duty or not.

CZECHO-SLOVAKIA

The government of Czecho-Slovakia has introduced a so-called "manipulation" fee, which is a tax payable on all goods exported from Czecho-Slovakia. On india rubber goods this tax amounts to 2 per cent of the invoice price.

RUMANIA

The exportation of india rubber, gutta percha and vegetable gums from Rumania is prohibited by a decision dated November 25, 1920, and published in the "*Monitorul Oficial*" of November 27.

TRINIDAD

According to the new customs tariff for the British colony of Trinidad, which was recently passed by the Legislative Council of that colony, importations of balata, chicle and raw rubber are exempt from duty.

MALTA

A duty of 15 per cent ad valorem is levied on india rubber and its manufactures imported into Malta, according to the Import Duties Revision Ordinance No. 14 of 1920 dated November 19, and, according to the British *Board of Trade Journal*, December 16, 1920.

MEXICO

A presidential decree of November 29, 1920, published in the Mexican *Diario Oficial*, October 25, 1920, fixes the duty on cable, with core of rubber filaments covered with wool or vegetable fiber, for use on airplanes to lessen shock on landing (gross) at .05-peso per kilo (one kilo equals 2.2 pounds; one peso $0.44 normal). Solid rubber tires, fixed to rims or hoops of iron (gross) are dutiable at .50-peso per kilo.

AUSTRALIAN NOTES

Australia imported rubber manufactures to the value of $5,351,373 in 1919, as against $3,812,450 in 1918. Of imports, including india rubber, leather, and manufactures thereof, the United Kingdom contributed $202,063; other British possessions, $2,007,495; the United States, $4,022,544; and Japan, $56,129. Exports of india rubber and its manufactures from Australia in 1918-19 were valued at $1,008,567, as against $457,010 in 1914 15.

SOUTH AUSTRALIA

The overseas import trade in rubber and its manufactures into South Australia for the year 1917-18 was valued at $211,653, as against $281,736 for the calendar year 1913. Similar imports in 1918-19 increased to $642,578. The United States furnished 89 per cent of the rubber belting, the United Kingdom supplying the remaining 11 per cent. Of the total importation of rubber tires, 40 per cent came from the United States, 26 per cent from Canada, 17 per cent from France, 11 per cent from the United Kingdom, the balance from Italy and Japan; all other rubber goods, 69 per cent from the United Kingdom and 28 per cent from the United States.

NEW SOUTH WALES

Imports of india rubber and leather and manufactures thereof into New South Wales are grouped under one head for 1918-19, therefore exact figures of rubber imports are not available, but figures under the combined heading were given at $4,264,065, as against similar importations to the value of $2,582,198 in 1913. The outgoing trade of New South Wales for the fiscal year ending June 30, 1919, included india rubber and its manufactures to the value of $389,997.

AUSTRALIAN TIRES PROTECTED

Australian tire makers enjoy a protective general tariff on tires and tubes of 40 per cent, and as a result Australians have to pay 80 per cent more for tires than Americans pay. In the island continent only 60,000 motor cars are registered, whereas based on England's per capita there should be 200,000. Cheaper tires, it is claimed by motorists in the Antipodes, would bring more cars, and they state that the protection which Australian tire makers have had for twenty years is no longer needed.

NEW ZEALAND TIRE MARKET

In the importation of rubber tires and tubes into New Zealand imports from the United States in the first nine months of 1920 were $2,330,723, from Australia $1,130,809, from Canada $902,624, from the United Kingdom $580,427, France $710,957, Italy $495,833, Japan $4,205, and from Belgium $7,168. The above figures are for the fair market value in the country whence the goods are exported, plus 10 per cent. This means that freight charges, insurance, profits, adverse exchange rates, etc. must be added if the actual cost of the business is to be ascertained, bringing the actual cost to the consumers to $12,500,000 annually. Motor tires, tubes, and covers enter New Zealand duty free from all countries, with the exception of the 1 per cent war tax that is collected on all imports. The adverse exchange rate and the tight-money market will tend to reduce the demand in New Zealand for motor cars for a few months, but there should be a growing demand for motor trucks and tractors for they are greatly needed to handle the business of the country.

THE RUBBER CRISIS IN BRAZIL

The Amazon region, the rubber country of Brazil, is going through one of the worst crises in its history. According to latest reports, not only has production of rubber fallen off by 22,000 tons, but exports for the first ten months of 1920 show a shrinkage of 7,013 tons. Both Europe and America show decreased imports. The price of hard fine Pará has dropped 40 to 50 per cent since January, 1920, and rubber is being shipped at a loss. The situation is so serious that it has been openly said that if the Government failed to aid the suffering states there would be nothing left but to suspend payments.

In an appeal to the Federal Government for support, Amazon rubber interests give the chief causes of this condition as being eastern competition and American speculation working for lower prices. At a session of the Chamber of Deputies, during consideration of the critical situation, three members bitterly denounced the activities of United States rubber interests in the Amazon region. It was charged that a "rubber trust" of the United States was driving down the price of rubber, forcing the native planters out of the field and then purchasing the plantations at very low prices. After stating that the difficulties in the Brazilian rubber industry began in 1914, when the Great War left North American buyers alone in the field, Deputy Salles added.

"Our nationality is threatened by purchase in small pieces. The rubber planter, losing interest, is abandoning the plantations which the Americans are acquiring at infinitesimal prices, becoming lords of our soil."

Telegrams from commercial bodies of the district affected and many local newspapers all make the same charges and condemn the monopolistic activities of the so-called American rubber trust.

Bulgarian imports of rubber, gutta percha and manufactures thereof in 1919 were valued 1,144,727 leva, as against 895,291 in 1912. Normally one lev equals $0.193, but at the end of 1919 it had depreciated to $0.02.

The Rubber Trade in the Far East

By a Special Correspondent

MALAYA

The rubber slump is having a rousing effect on the people who are beginning to think hard about the causes of the situation and means for remedying it. Few are content to leave things at restriction merely. They now realize there are other factors to be dealt with besides speculation and manipulation and the opinion is expressed that there has been a lot of careless spending in the past owing to the comparatively large and easy profits that were reaped up to quite recently. Because of the rapid growth of the industry and the great need for planters, it is claimed that many men were employed at high salaries as planters who really knew very little about the matter. Some learned their business and others did not. Now is the time, it is urged, when rigid economy must be practised, but economy born of efficiency, be it understood.

ECONOMIC CONDITIONS IN STRAITS SETTLEMENTS AND DUTCH EAST INDIES

Trade Commissioner John A. Fowler, in his monthly cable from Singapore giving the current economic conditions in the Straits Settlements and Dutch East Indies, states as of January 12, that the financial situation in both countries has been growing worse. The Chinese have been and are still holding for better prices large stocks of export products. In spite of the fact that export prices of such raw products generally are ruling lower than at the same period last month, exports are decreasing, as neither Europe nor America is actively in the market at present. Consequently, export stocks have been accumulating, particularly of rubber and tin. Among the Chinese the crisis will probably come during the second week in February following the Chinese New Year, which this year falls on February 8, and it is feared that there may be a number of serious failures during this period. It is a long-established custom among Chinese to settle their outstanding accounts on their New Year.

With the above exception there is practically no speculation in anything at the present, and as the western banks have been very cautious it is expected that any failures which may occur will not disastrously involve well-established houses, even though the export market is badly demoralized.

THE DUTCH EAST INDIES

An interesting letter, addressed to the International Association of Rubber Planters, was recently published in a local paper, the theme of which is: "Rubber planters unite to control prices, for if you don't look out, the American will get you."

After sketching the development of rubber culture from the start, when the Americans had not yet appeared upon the scene as planters, and showing how cost price and sale price approached each other until now they almost meet and sometimes even cross, the writer looks around for the buyer and sees that the Americans have the most to say. He draws attention to the fact that when Americans finally took up on a large scale planting in order eventually to make themselves independent of other rubber producers, many laughed. But he considers that Americans should not be laughed at too soon. They should be seriously taken and —watched closely.

His own observation showed him that in spite of the laughter Americans continued to plant and also have their own buying agents in the land of production. These agents buy futures, continually make up import and export statistics for the main offices in America, and the agents of different factories seldom buy at the same time, but if they do they buy at the same price without competition among themselves.

The writer is also of opinion that people concerned do not pay enough attention to the fact that the Goodyear company has offered 24 million gilders (according to others 19 million) for the estates of the Rotterdam Deli Inpij, which planters claim are not worth one-fifth of the above sum. A bona fide planting company, it is said, would suffer eternally from such a bargain, but the American manufacturer with an eye to the future, when he will rule the market, can afford such stunts. If planters keep on treating such matters lightly, the time is not far off when one by one they will be swallowed up by the land-hungry American manufacturer.

Therefore, it is hoped producers will awake before it is too late, unite, regulate the output and successfully combat the American menace.

By the way, shortly after the above letter was published, it was reported that British planters were planning, in cooperation with Dutch producers, to combine in order to control the sale and output of rubber.

REDUCTION OF THE RUBBER OUTPUT

It has been pointed out by Dutch rubber experts that a general reduction in the output of rubber according to a uniform scheme would be neither judicious nor fair to all rubber estates, particularly estates which are just beginning to produce and estates which, through climatic or soil conditions or because of former error, are now backward. It has been proposed to fix a certain maximum reduction per acre and to ask the Government to prohibit free exportation and to introduce an export license system for rubber.

In certain rubber circles it is doubted whether the measure to reduce the output of rubber will succeed.

RUBBER NOTES

It is reported that the Government will open a new gutta percha estate on the East Coast of Sumatra, as continuation of the experiment made in Atjeh.

According to a recent report, the amount of rubber now stocked on the East Coast of Sumatra is estimated at ten thousand tons.

The Anglo-Dutch Plantation Co. proposes to increase its capital by £2,500,000.

Dr. E. R. Hallauer, appointed rubber chemist at the Middle Java Experiment Station, took up his work in November last.

The chief export product of the European estates in the Lampong districts is rubber. There are about 13 estates, of which two are not yet productive. The oldest plantations are about 10 years old. Of the 13 estates, two are English, three German, one Norwegian and the rest Dutch.

At the end of 1919 there were 117 rubber companies operating on the East Coast of Sumatra, of which there were:

Companies	Nationality	No. Estates
39	Dutch	83
25	Dutch East Indies	35
37	English	69
2	American	6
1	French	2
4	Belgian	5
1	German	3
1	Straits	1
1	Danish	1
1	Hawaiian	2
5	Japanese	5
117	Totals	212

Besides these, there were 19 tobacco companies with 31 estates also planted to rubber.

The total area was over 140,000 hectares planted to rubber, of which half was productive.

During the first quarter of 1920, Tapanoeli, Sumatra, exported to foreign countries 188,219 kilos of rubber and 4,446 kilos of wild gutta percha. Exports to Java included 346,414 kilos of plantation rubber.

A report from Medan states that the German explorer, Paul Grätz, is establishing a glass factory on the East Coast of Sumatra, for the purpose of making latex cups. It is understood that plans have reached a far advanced stage and that machinery has already been ordered from Europe.

GUTTA PERCHA

The Government gutta percha plantation at Tjipetir was considerably extended in 1919 and at the end of that year covered an area of 1,309 hectares (one hectare equals 2.47 acres). The crop of leaves was almost as high as in 1918, and amounted to 3,512,000 kilos from which about 74,000 kilos of gutta percha were extracted. This is a better yield than was obtained in 1918, when 67,593 kilos were obtained from a slightly greater amount of leaves. The price was better, too, being 7.50 guilders (one guilder equals $0.40) per kilo, against about 6.68 guilders in 1918.

A wild gutta percha variety, known as "gutta merah," is traded in at Bandjermassin. Prices during 1919 ranged from 350 to 450 guilders per picul (133⅓ pounds), while at Pontianak the pure product brought as much as 500 guilders per picul. The lowest quality obtained 100 guilders per picul. It is said, however, that speculation was the cause of these high prices.

RUBBER GAMBLING IN SINGAPORE

It seems that the laxity of the Singapore Rubber Association in the matter of rules affecting brokers, is unintentionally encouraging a dangerous amount of gambling. It has been pointed out that for the last six months prices here have been from four to ten cents above the parity of London and New York and that the continuation of such a state of affairs will result in destroying the local market. The statement was made that in one case a tender for five tons of rubber passed through the hands of 287 persons before it finally reached a bona fide buyer.

Another allegation is that Singapore standard quality is being thoroughly discredited, because the rubber passes through so many hands in the gambling game that by the time it is ready to be shipped it is no longer worthy the hall-mark standard.

NETHERLANDS GUTTA PERCHA CO. EXPANDS

Netherlands Gutta Percha Co., The Hague, Holland, and Singapore, Straits Settlements, the first manufacturer of rubber goods in East Indies, has prepared plans for a tire manufacturing plant to be added to its factories at Singapore. The new building will be two stories, 80 by 400 feet, and is to cost $300,000. The work of construction will begin as soon as the materials and equipment have been purchased in this country and shipped via San Francisco. Some time ago Ed. Koppeschaar, assistant manager, visited a number of manufacturing plants in this country to ascertain the type of building best suited to the purpose. Besides the factory at Singapore the company has offices and agencies at Batavia, Soerabaya, Shanghai, Calcutta and other important cities in the Far East. Among its manufactures are belting, hose, packing, hard rubber goods and tires.

According to the *Soer. Hbld.*, a local newspaper, the Netherlands Gutta Percha Co., The Hague, will build a factory at Soerabaya for the purpose of making electric cables, and other articles. The factory will probably be in working condition by October, 1921. The Netherlands Gutta Percha Co. has a rubber factory at Singapore and rubber plantations in Java.

CEYLON

The condition brought about by the slump in the rubber market is becoming more and more serious. It is said that some half-dozen rubber estates have already been compelled to close down and pessimists are wondering how many will follow suit. Daily the number of estates that are cutting down European staffs and discharging coolies is growing, and it is feared that there will be trouble on account of the large number of coolies left without employment and means of subsistence. It is reported that about 150,000 coolies will be without work and will either have to be repatriated or given help in Ceylon. The repatriation scheme is not generally approved and it has consequently been decided to appeal to the Government to give the coolies relief work.

The Government has already proposed financial aid for tea and rubber estates with the stipulation that only deserving estates would be helped, worthless ones to be left to their own devices. Of course, the question as to what constitutes a worthless concern has come in for a lot of discussion.

Rubber planters at first had reason to fear that the government was more anxious about the tea estates than about rubber. However, a Central Committee of six members has just been formed which, being thoroughly representative of all tea and rubber, would coordinate such interests, thus obviating the fear of competition for government aid. The Chamber of Commerce, the Estates Agents' Association, the Planters' Association and the Low-country Products' Association are represented.

The new Central Committee will consider the desirability of accepting the financial help offered by government and make a counter proposal if found necessary.

It is now definitely known that the Ceylon Government has offered tea and rubber estates a loan up to a limit of rupees 10,000,000 (one rupee equals $0.324 United States currency), which has been somewhat reluctantly accepted by the Ceylon Chamber of Commerce. A loan board is to be formed which will approve the estates to be aided.

It is reported that the Cicely Rubber Co. has followed the example of the Vallambrosa and has stopped paying dividends for the present. The companies mentioned are two of the oldest and strongest British rubber concerns. The Cicely had paid a dividend of 60 per cent over 1914-15, 120 per cent over 1915-16, 140 per cent over 1916-17 and 75 per cent over the two following years. During the first part of 1919-1920, good profits were made but as the company had at the time decided to extend its planted area considerably, the profits were kept back and all cash is now needed for the upkeep of the non-producing lands.

AFRICAN NOTES

French West Africa includes the districts of Dahomey, French Guinea, the Ivory Coast and Senegal. Exports of rubber from the three last-named districts during the past three years are tabulated below:

	1917		1918		1919	
	Metric Tons	Value	Metric Tons	Value	Metric Tons	Value
French Guinea	733	$707,373	709	$683,730	682	$658,389
Ivory Coast	511	300,152	249	240,406	76	73,620
Senegal	262	252,871	327	315,994	55	52,890

The above table was computed on the normal value of the franc, $0.193.

BRITISH WEST AFRICA

British West Africa includes the Gold Coast, Nigeria and the Cameroons. In 1919 exports of rubber from the Gold Coast totaled 721,588 pounds, valued $163,678, as against 1,391,097 pounds, valued $277,391 in 1918. Rubber exports from Nigeria in 1918 were 157 metric tons, valued $95,700; in 1919 exports of this commodity increased to 398 tons, valued $213,632. The normal value of the English pound sterling $4.866, was used in computing these values.

ALGERIA

Algerian foreign commerce for the first six months of 1919 included imports of 211 metric tons of rubber and gutta percha goods to the value of $893,204. In the corresponding period of 1920, similar imports totaled 837 tons, valued at $3,899,565. Of this total, 792 tons were imported from France.

Recent Patents Relating to Rubber

THE UNITED STATES

GRANTED DECEMBER 7, 1920

No. 1,361,065 Tire with cushioning disks inside. J. M. Johnson, Harrisburg, Pa.
1,361,206 Flexible gas-tubing. C. E. Verbunce, assignor to R. Williamson & Co. both of Chicago, Ill.
1,361,220 Elastic flesh-reducing garment. L. M. Bender, San Francisco, Calif.
1,361,285 Tire valve-cap and pressure indicator. C. T. Nuss, Jamestown, N. D.
1,361,296 Elastic band necktie retainer. L. F. Weir, Spokane, Wash.
1,361,453 Vehicle back cushion with inflatable inside member. H. H. Frey, Chicago, Ill.; Hannah H. Frey, administratrix of H. H. Frey, deceased.
1,361,721 Spring tire filler. W. Hamilton, St. John, New Brunswick, Canada.
1,361,758 Hose coupling. A. E. Ewald, Oakfield, Wis.
1,361,770 Shut-off for rubber tubing. E. O'Connor, New Haven, Conn.

GRANTED DECEMBER 14, 1920

1,361,907 Sole for shoes comprising rubber vulcanized to different degrees of hardness in respect to its tread and arch, the tread being flexible and the arch progressively stiffer rearwardly. A. T. Saunders, Chicopee, Mass., assignor to A. G. Spalding & Bros., Jersey City, N. J.
1,361,926 Rubber shoe with inside pulling-on straps. C. T. and A. K. Thompson, Fitchburg, Mass.
1,362,123 Resilient tire. C. G. Lundstrom, Ames, Ia.
1,362,179 Trousers supporter. M. A. Piper, assignor to Free & Easy Belt Co. both of Marblehead, Mass.
1,362,187 Pneumatic tire with separate inflatable cells. W. H. Richards, Knoxville, Tenn.
1,362,291 Fountain pen. H. D. and P. X. Grossman, Chicago, Ill.
1,362,340 Demountable rim for tires. W. J. P. Moore, New York City.
1,362,430 Demountable rim for tires. C. H. McKendree, Lakeview, Ore.
1,362,433 Split rim for tires. J. M. Meredith, Jr., Norfolk, Va.
1,362,516 Inside tire protector. C. A. and G. E. Stuart, Oregon City, Ore.
1,362,556 Hose supporter. E. Bettinger, Boonville, Ind.

GRANTED DECEMBER 21, 1920

1,362,682 Apparatus for eye treatment. F. E. Dayton, Chicago, Ill.
1,362,731 Tire filler. F. A. Nagel, Cicero, Ill.
1,362,751 Sanitary bed vessel with inflatable cushion. A. G. Snyder, Kansas City, Mo.
1,362,766 Gas mask. J. M. McGargill, Imogene, Ia.
1,362,774 Tire core filler. A. E. Brown, El Paso, Tex.
1,362,804 Inflating coupling for tire valves. H. F. Kraft, Ridgewood, N. J.
1,362,894 Aerial toy parachute actuated by rubber band. T. F. Powell, Retsil, Wash.
1,362,908 Waterproof garment protector. I. M. Weisert, New York City.
1,363,028 Suspenders. J. Weille, Paducah, Ky.
1,363,086 Waterproof life-saving suit with inflatable members. A. Chury, Harrisburg, Ill.
1,363,182 Demountable rim for tires. C. Johnson, assignor to Johnson Rim & Parts Co.—both of Buffalo, N. Y.

GRANTED DECEMBER 28, 1920

1,363,241 Garter. L. S. Florsheim, Chicago, Ill.
1,363,277 Demountable rim for tires. J. C. Schleicher, Mount Vernon, N. Y.
1,363,300 Pneumatic tire. O. S. Yohn, New York City.
1,363,408 Bathing cap. C. K. Ginzburg, assignor to I. B. Kleinert Rubber Co.—both of New York City.
1,363,446 Golf ball practice device. E. J. Vogel, San Francisco, Calif. (See description elsewhere in this issue.)
1,363,498 Segmental rim for tires. A. Davis, Nahant, and C. M. Clark, Boston—both in Mass.; said Davis assignor to said Clark.
1,363,568 Shock-absorbing cushion heel. T. M. Conger, Elyria, O.
1,363,604 Demountable rim for tires. L. H. Krickel, Monroe, La.
1,363,727 Garment shield. V. Guinzburg, assignor to I. B. Kleinert Co.—both of New York City.
1,363,743 Cushion tire. L. J. Meredith, Rupert, Idaho.
1,363,848 Automatic eraser. A. Ponce de Leon, Manila, P. I.
1,363,920 Pneumatic injector for puncture closing compound. V. H. Roehrich, St. Paul, Minn.
1,363,929 Amplifier for stethoscopes. O. Smiley and D. A. Anderson, Indianapolis, Ind.
1,363,951 Spring and cushion tire. R. B. Bostwick, Duquesne, Pa.
1,363,952 Demountable rim for tires. J. T. Cadenhead, Ensley, Ala.
1,363,963 Hose coupling. H. J. Fitzpatrick, Athens, Ga.
1,363,976 Armored pneumatic tire. S. B. Holmes, Seattle, Wash.
1,364,023 Rubber heel. H. L. Beal, Brookline, Mass.

THE DOMINION OF CANADA

GRANTED DECEMBER 7, 1920

206,231 Surgical device with pneumatic cushion. A. H. Fleck, Oklahoma City, Okla., U. S. A.
206,284 Hose coupling. W. H. Palmer, Montreal, Quebec.
206,328 Pneumatic cushion. The Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of A. C. Biggers, Brooklyn, New York, U. S. A.
206,385 Rubber heel. The Hill Rubber Heel Co., assignee of R. I. Hill—both of Elyria, Ohio, U. S. A.
206,386 Inhaling apparatus. D. R. Cooper, Gore, assignor of C. W. Anderson and F. L. Heworth, both of Wellington—both in New Zealand.

GRANTED DECEMBER 14, 1920

206,415 Sanitary milk can cover. M. A. Blosser, Columbia, Ohio, U. S. A.
206,486 Repair patch for rubber footwear. J. Robertson, Jr., Weehawken, New Jersey, U. S. A.

GRANTED DECEMBLR 21, 1920

206,616 Inflatable double-ply bathing suit or life preserver. J. M. Combs, Akron, Ohio, U. S. A.
206,657 Shoe sole. F. A. Nolan, St. Paul, Minn., U. S. A.
206,659 Garter. C. W. Noyes, Newton, Mass., U. S. A., administrator of the estate of R. Gorton, deceased.

GRANTED DECEMBER 28, 1920

206,878 Rubber pad for horseshoes. B. P. Gray, Sutton Coldfield, Warwick, England.
206,925 Elastic hose supporter. E. V. Norris, Buffalo, New York, U. S. A.
207,050 Demountable rim for tires. J. G. Flood and J. A. Scott, assignee of a half-interest—both of Quebec City, Quebec.
207,055 Tire liner. J. H. Grude, Los Angeles, Calif., U. S. A.

THE UNITED KINGDOM

PUBLISHED NOVEMBER 3, 1920

149,315 Fountain pen. J. Mallat, 53 boulevard de Strasbourg, Paris. (Not yet accepted.)
149,321 Spring wheel with rubber disks. Société de Suspensions et Roues Flexibles le Telesco, Paris. (Not yet accepted.)
149,377 Corrugated disks for steel wheels having tire rim welded or riveted on. Dunlop Rubber Co., 14 Regent street, London, and F. J. Keegan, Dunlop Rubber Co., Alma street, Coventry.
149,418 Parachute. G. I. Taylor, 30 Clifton Hill, St. John's Wood, London.
149,424 Disk wheel for tires. S. A. Horstmann and Horstmann Cars, Limited, James street West, Bath, Somerset.
149,466 Directing-signs for aircraft. North British Rubber Co., Castle Mills, and H. Lord, 41 Bruntsfield Gardens—both in Edinburgh.
149,517 Vehicle wheels with rubber tread blocks bearing on pneumatic cushion fitted between side disks. R. S. Wood, 62 Boston street, Manchester.
149,542 Pneumatic tire with detachable tread. C. T. Drigenko, Alwin Hotel, Gloucester road, London.
149,596 Bunion treating device, held in place by elastic bands. F. T. Tanner, 35 Tamworth road, Croydon, Surrey.
149,598 Detachable perforated sheath or cover of rubber, etc., for feeding-bottle. J. A. McAuley, 7 Sanford road, Dublin, and J. J. Kelly, 28 Charleston avenue, Rathmines, County Dublin.
149,599 Suction-cup rubber sole and heel. J. P. Crouch, La Quinta, Rosario de Santa Fe, Argentine.
149,604 Device for securing rubber heel protectors. C. E. G. and A. V. Benbow, 44 Huron road, Balham, London.
149,616 Pneumatic soles for boots, etc. G. E. C. Gerber, 36 rue des Chaussetiers, Clermont-Ferrand, Puy de Dome, France. (Not yet accepted.)

PUBLISHED NOVEMBER 10, 1920

149,853 Removable tread of rubber and canvas for wheel tires. P. P. White, 7 Featherstone Terrace, and A. Brooks, 30 May street—both of Wellington, New Zealand.
149,895 Elastic, velvet-covered heel friction pads. W. J. Robinson, 118 Ardenlee avenue, and D. Kernochan, 103 Ravenhill road—both of Belfast.
149,896 Pessary. A. H. Fleck, 213 Hudson street, Oklahoma, Okla., U. S. A.
149,898 Dust cap for tire valves. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, New York City; assignee of H. P. Kraft, 219 Godwin avenue, Ridgewood, New Jersey—both in U. S. A.
150,013 Electric lamp device for use with captive balloon for marine distress signals. C. Sampson, Terrace House, Camberwell Green, London.
150,030 Hose rack. C. O. Henson, 9 Jersey road, Wolverton, Buckinghamshire.

PUBLISHED NOVEMBER 17, 1920

150,058 Toy foot ball player with kicking leg of rubber, etc., for table foot ball. H. Roberts, 92 Norbury Crescent, Norbury, London.
150,084 Cork-filled interliner for tires. W. Alderson, 24 Ward street, Kimberley, South Africa.
150,142 Fastening waterproof wearing apparel. Anderson's Bristol Rubber Co., and W. H. Anderson, 9 High street, Bristol.
150,202 Dust cap for tire valve. A. Schrader's Son, Inc., 6 Earl street, Westminster; C. T. Shaffer, San Francisco, Calif., U. S. A.
150,219 Ladies' and children's rubber bloomers with ventilating portions at the side. K. Heitler, 605 West 141st street, New York City, U. S. A. (See The India Rubber World, November 1, 1920, page 110. •United States Patent No. 1,353,750.)
150,223 Tread bands of rubber and fabric for wheel tires. L. C. Cummings, 36 Druce street, Brookline, Mass., U. S. A.
150,232 Respirator. C. Rosling and R. H. Davis, 187 Westminster Bridge road, London.
150,255 Rubber or asbestos joint-making and stuffing-box packing. A. Bulbick, 76 The Crescent, Eastleigh, Hampshire.
150,281 Garment supporter with elastic straps. H. S. Marks, 50 York street, Sydney, Australia. (Not yet accepted.)
150,314 Hose union. Titeflex Metal Hose Corporation, Badger avenue, Newark, assignee of W. H. Fulton, Irvington—both in New Jersey, U. S. A. (Not yet accepted.)
150,344 Bath seat with rubber-covered bar. G. H. Mullen, 115 Pinson Place, Queens Borough, New York, U. S. A. (Not yet accepted.)
150,346 Pneumatic tire. Howe Rubber Corporation, Codwise avenue, assignee of J. Schmidt—both of New Brunswick, New Jersey, U. S. A. (Not yet accepted.)
150,441 Tire-inflating valve. T. A. Low, Renfrew, Ontario, Canada.
150,515 Garter. W. H. Stevens, 342 West 57th street, New York City, U. S. A.

Chemical Patents will be found on page 338. Machinery Patents on pages 341, 342.

PUBLISHED NOVEMBER 24, 1920

150,604 Detachable rubber heel. A. Rembado, 31 via XX Settembre, Genoa, Italy.
150,731 Rubber valve for water faucet. J. Maerschalck, 91 rue Lesbroussart, Brussels. (Not yet accepted.)
150,795 Disk wheel for pneumatic tires. Riley, Limited, and H. Rush, City Works, Coventry.
150,838 Link-belt having alternate links of rubber, etc. O. L. Whittle, Victoria House, Wilderspool, Warrington.
150,847 Fountain pen. R. W. Jeffreys, 42 Herongate road, Wanstead, London.
150,890 Disk wheel for pneumatic tires. F. W. Brampton, of Steel Stampings, Limited, Cookley, near Kidderminster.
150,900 Parachute container. C. L. Basham, 8 Fairfield road, Kingston-on-Thames.
150,904 Fountain pen I. S. Heilbrun, 59 Park Place, New York City, U. S. A.
150,946 Slitted rubber protectors for soles and heels. B. A. Thornhill, Single Tree, Newara Eliya, Ceylon.
150,948 Truss with porous rubber pad and elastic straps and belt. G. Skee, 48 Woodbine Terrace, Blyth, Northumberland.
150,986 Elastic webbing. Société Queron et Courbon, 55 boulevard Valbenoite, St. Etienne, Loire, France. (Not yet accepted.)
150,987 Elastic webbing. Société Queron et Courbon, 55 boulevard Valbenoite, St. Etienne, Loire, France. (Not yet accepted.)

PUBLISHED DECEMBER 1, 1920

151,071 Hydraulic packing J. R. Cowell, Central House, Simmonds street, Johannesburg, South Africa.
151,090 Link-belt having links of metal embedded in rubber. I. H. Smith, 15 King street, Baker street, London; R. H. Brand, Cranborne Corner, Ascot; and T. G. Leith, Petmathen House, Oyne, Aberdeenshire.
151,130 Dynamometer with rubber cushion. K. Gauldie, 13 Winston avenue, Broomhill, Glasgow.
151,137 Dental vibratory appliance of rubber. C. W. de Rouet, 39 Panton street, Haymarket, London.
151,202 Rubber pad with spiked metal plate for attachment under sole of children's shoes by straps over toe and around heel, for use in propelling a scooter. G. F. Story, 120 Castelnau, Barnes, London.
151,284 Rubber sole for shoes with edge molded to simulate stitched welting. G. Lefevre (nee S. Garrousse), 5 boulevard Dubois, Dreux, France. (Not yet accepted.)

PUBLISHED DECEMBER 8, 1920

151,333 Double rubber sheet, particularly adapted for insoles, produced by compressing together a layer of spongy rubber and a layer of ordinary rubber, then vulcanizing. M. Kurosawa, 435 Ohaza Kasaigawa, Azuma-Machi, Minamikatsushika-Gun, Tokio.
151,417 Pneumatic tire with separate air-chambers, each fitted with a non-return valve. C. A. Crowther, 75 The Crescent, South Tottenham, London.
151,473 Band tire for perambulators, in which is arranged a retaining-wire with one or more ends passed through radial holes in the tire and rim. W. H. Dunkley, 75 Jamaica Row, Birmingham.
151,482 V-section driving belt for motor vehicles and cycles, dynamos, etc., of metal links connected by outer rows of leather or rubber pads and spaced by links of rawhide, ebonite, vulcanized fiber, etc. L. J. Essenhigh, 3 Woodbine Terrace, Grappenhall road, Warrington.
151,514 Tire with solid rubber tread fitted over an endless rubber band stretched across a channel rim and secured by rings and clamps. H. J. Murphy, 25 Quincy street, Somerville, Massachusetts, U. S. A.
151,529 Reinforced rubber tire. H. Pace, 21 Constantine road, Hampstead, London.
151,568 Elastic corset belt. J. Lindauer, 42 faubourg du Temple, Paris.
151,601 Spring wheel with continuous outer rigid ring and rubber cushions. G. H. Robinson, 14 East 28th street, New York City, U. S. A. (Not yet accepted.)
151,628 Tire composed of two or more rubber bands separated by a band of rubbered fabric in tension. A. van der Stichelen, Patyntje, Porte de Courtrai, Ghent, Belgium. (Not yet accepted.)
151,629 Elastic garment-fastening. A. L. Vilandrer, 160 East 37th street, New York City, U. S. A. (Not yet accepted.)

GERMANY

PATENTS ISSUED, WITH DATES OF ISSUE

330,612 (December 30, 1919.) Method for repairing pneumatic tires. Ernest Latzel, Beuststrasse 7, Dresden.
330,761 (March 16, 1919.) Elastic tire. Alois Blaut, Bahnhofstrasse 11, Torgau.
331,221 (December 5, 1918.) Resilient tire. Julius Wüstenhöfer, Kronprinzenstrasse 56, Dortmund.
331,254 (June 6, 1919.) Atomizer. Johannes Goede, Vogelsang, Ostpreussen.

TRADE MARKS

THE UNITED STATES

SERIAL NUMBERS PUBLISHED DECEMBER 1, 1920*†

No. 134,621 Neuro-Patho—rubber heels. F. W. Willis, Kansas City, Mo.
134,622 Hi-Stepper—rubber heels. F. W. Willis, Kansas City, Mo.
134,706 Catalpo—purified colloidal clay. W. Feldenheimer, London, Eng.

SERIAL NUMBERS PUBLISHED DECEMBER 1, 1920*

111,801 The words Star Fabricord tire casings. The Star Rubber Co., Akron, O.
125,676 The letters O and C separated by the representation of a human eye—rubber horseshoe pads. Vought & Williams, New York City.
131,590 The words Vulcano Gummi within representation of a rectangular stenciled border—vulcanizing strips of rubber and fabric for repairing inner tubes and other rubber articles. Patterson, Gottfried & Hunter, Inc., New York City.
132,189 The words More-Grip above a representation of a seal bearing clasped hands in center and around edge the words Self-Vulcanizing Patch—vulcanizing patches for tires and inner tubes. V. V. Moore, Cordele, Ga.
132,430 The word Artcraft within outline representation of an artist's palette—fountain pens. Edison-Cromer Pen Co., Birmingham, Ala.
133,125 The words Ny-cla—hot- and cold-water bags and bags for ice packs. R. J. Bowell, Elyria, O.
134,125 Representation of a roll of belting bearing round label having thereon a representation of two elks with interlocked antlers and the words Imperial Belting Company, Innerlocked Products—belting, hose and packing of rubber, balata, fabric, etc., and combinations of these materials. Imperial Belting Co., Chicago, Ill.
134,775 Representation of a grotesque figure of a tooth having bodily members and a face, and bearing aloft a dumb-bell accompanied by the words Tooth-Exercise Gum and Trade Mark—chewing gum. D. M. Dickinson, Jr., Detroit, Mich.
136,090 Representation of two bears standing on hind feet and embracing opposite sides of an inflated inner tube enclosing the words Bear Hug—tube patches. Para Products Co., Dallas, Tex.
136,129 The words American Beauty—elastic webbing. The Russell Manufacturing Co., Middletown, Conn.
136,130 The word Monarch above representation of a lion's head—elastic webbing. The Russell Manufacturing Co., Middletown, Conn.
136,131 The word Liberty above representation of the Statue of Liberty—elastic webbing. The Russell Manufacturing Co., Middletown, Conn.
136,132 The word Kangaroo above representation of a kangaroo—elastic webbing. The Russell Manufacturing Co., Middletown, Conn.
136,133 The word Sanseer—elastic webbing. The Russell Manufacturing Co., Middletown, Conn.
136,135 Conventionalized representation of two ribbon scrolls bearing words Blue Ribbon—elastic webbing. The Russell Manufacturing Co., Middletown, Conn.
136,871 The initials C. C. C.—tires, tubes, inner liners, and blow-out patches. C. C. C. Fire Hose Co., Canton, Mass.
137,002 The words Serv-Us—fruit jar rings. Serv-Us Grocery Products Corporation, New York City.
137,365 The word Pyrodent—chewing gum. D. M. Dickinson, Jr., Detroit, Mich.
138,546 The figures 1885 and the words Electrical Wires & Cables against a dark octagonal background—electrical wires and cables. Chicago Insulated Wire & Manufacturing Co., Sycamore, Ill.

SERIAL NUMBERS PUBLISHED DECEMBER 15, 1920*

120,937 The word Fox repeated above the words Red and Gray respectively on each side of the representation of a fox jumping through an inner tube—tires and inner tubes. Southeastern Rubber Works, Macon, Ga.
127,868 Representation of the sun and earth, the sun bearing the word Ray and reflecting it on the earth; the earth encircled by an interliner bearing the words Puncture Proof Interliners; the whole above the words For Pneumatic Tire Casings Protect The Motoring World—pneumatic tires and interliners. Ray Tire & Rubber Co., Chicago, Ill.
129,007 Representation of a coat of arms comprising the word The above a crown between two lions rampant holding a ball bearing the letter E and standing on a scroll bearing the word Excelsior, all above the word Shoe—shoes and boots of leather, rubber, fabric, and combinations of these. The Excelsior Shoe Co., Portsmouth, O.
133,274 The word Malco within a diamond outline—windshield cleaners of the squilgee type. The B. I. Malouf Co., Salt Lake City, Utah.
135,122 The word Slipknot formed of representation of cord—fabric and cord tire casings. Automobile Owners Tire Corporation, Sioux City, Ia.
137,596 The word Globett—vulcanized rubber and fabric belts. United & Globe Rubber Co., Trenton, N. J.

SERIAL NUMBERS PUBLISHED DECEMBER 21, 1920*

125,461 The word Jax—rubber heels. Holtite Manufacturing Co., Baltimore, Md.
128,921 The word Aviator having the letters arranged in a circle with a dash at the bottom between the A and R—golf balls. The Fair, Chicago, Ill.
132,236 Representation of a dust cap for tire valves, having the word Jiffy superimposed thereon—dust caps for tire valves. P. A. Erbes, San Francisco, Calif.
134,924 The word Pacemaker—rubber heels and lifts. Tee Pee Rubber Co., New York City.
136,939 The word Magnum—tire repair outfits. The Dunlop Rubber Co., Limited, London, England.
137,117 The word Exso—inner tires for relining pneumatic tire casings. G. W. Eno Rubber Co., Los Angeles, Calif. (See The India Rubber World, October 1, 1920, page 36.)
137,653 The word Steadfast—tire casings and tubes. The Achilles Rubber & Tire Co., Inc., Binghamton, N. Y.
137,707 The word Seminole underlined by an arrow pointing to the left and preceded by a representation of an Indian's head framed by a tire—tire tubings and casings. The National Sales Co., Chicago, Ill.
138,124 The words Heavy Tourist—pneumatic tires and tubes. The Goodyear Tire & Rubber Co., Akron, O.

SERIAL NUMBERS PUBLISHED DECEMBER 1, 1920*†

124,312 Representation of a dress shield bearing the words Nashco and World's Best and having in center representation of a winged

*Notice of opposition must be filed within thirty days of the date of this publication.

†Add to serial numbers published in our issue of January 1, 1921.

shield picturing a seal on a rock with a lighthouse in the background and on each wing of the shield the words Waterproof and Washable, respectively—dress shields. S. K. Naschek, New York City.
131,654 Representation of a rectangular label bearing a parrot in a ring against a vertically striped background and the words Polly Brand Speaks for Itself—garters and hose supporters. The Russell Manufacturing Co., Middletown, Conn.
131,661 Representation of a kangaroo beneath the word Kangaroo—garters, hose supporters and suspenders. The Russell Manufacturing Co., Middletown, Conn.
137,754 Representation of the checkerboard surface of a package bearing the words Adams Kiss-Me—chewing gum. American Chicle Co., New York City.

TWO KINDS OF TRADE MARKS NOW BEING REGISTERED

Under the rules of the United States Patent Office, trade marks registered under the Act of February 20, 1905, are, in general, fanciful and arbitrary marks, while those registered under the Act of March 19, 1920, Section 1 (b), are non-technical, that is, marks consisting of descriptive or geographical matter or mere surnames. To be registrable under the latter act, trade marks must have been used for not less than one year. Marks registered under this act are being published for the first time when registered, any opposition taking the form of an application for cancellation. The following list includes those of interest to the rubber trade published since the establishment of this procedure:

GRANTED SEPTEMBER 21, 1920

Under Act of February 20, 1905

134,877 A inside ace of spades—hard rubber pipe-bits, cigarette holders, etc. American Hard Rubber Co., Hempstead and New York, N. Y.
134,928 Wedge—erasers. Joseph Dixon Crucible Co., Jersey City, N. J.
134,929 Eclipse—erasers. Joseph Dixon Crucible Co., Jersey City, N. J.
134,942 Violet—elastic webs. Faire Bros. & Co., Limited, Leicester, Eng.
134,954 Goliath—rubber belting, hose and packing. The General Rubber Goods Co., Cleveland, O.
135,006 Allroad—tires and tubes. McClaren Rubber Co., Charlotte, N. C.
135,037 Humidypor—tobacco pouches. Fearson Products Corporation, New York City.
135,042 Council Oak—tires and tubes. R. B. Fiper, Sioux City, Ia.
135,168 Cow Hide, etc.—tires and tubes. C. O. Williams, Wichita, Kans.

Under Act of March 19, 1920, Sec. 1 (b)

135,180 The word Kantkink with the top and bottom legs of the first and last K extended to form horizontal lines above and below the word—belting, hose, packing, and tires. The Goodyear Tire & Rubber Co., Akron, O.

GRANTED SEPTEMBER 28, 1920

Under Act of February 20, 1905

135,270 Heather—rubber heels. The Lorain Rubber Heel Co., Lorain, O.
135,280 Pento Fountain Pen, etc.—fountain pens. W. J. May & Co., Limited, East Twickenham, Eng.
135,326 Sir, etc.—rubber dolls and rattles. S. I. Rothschild, New York City.
135,352 Paramount, etc.—garters, suspenders, etc. U. S. Garter & Suspender Co., Chicago, Ill.

Under Act of March 19, 1920, Sec. 1 (b)

135,368 Gold Medal—footwear of rubber and other materials. Dorothy Dodd Shoe Co., Boston, Mass.
135,370 All-Weather—tires and treads. The Goodyear Tire & Rubber Co., Akron, O.

GRANTED OCTOBER 12, 1920

Under Act of February 20, 1905

135,378 An eagle, etc. elastic cords, braids and tapes. W. J. Adams & Co., Limited, Manchester, England.
135,386 Trojan—rubber sheeting and blankets. Archer Rubber Co., Milford, Mass.
135,387 Royal Archer—rubber sheeting and blankets. Archer Rubber Co., Milford, Mass.
135,402 Lisle Lastic, etc.—elastic braids. The Braided Fabric Co., Providence, R. I.
135,412 Beltex, etc.—dressing for rubber and other kinds of belts, etc. Chicago Belting Co., Chicago, Ill.
135,512 Horse Shoe Re-Cord Tube—inner tubes. Racine Auto Tire Co., Racine, Wis.
135,541 E. Z.—garters. The Thos. P. Taylor Co., Bridgeport, Conn.

RENEWED

18,185 A duck and the word Brand—leather and canvas clothing. Dunlap, Lawton & Hall, Chicago, Ill., assignor to United States Rubber Co. Registered July 15, 1890.
18,402 Climax Rubber Tape—coverings for electric and telephone wires. Boston Rubber Shoe Co., Boston and Malden, Mass. Registered September 2, 1890.

GRANTED OCTOBER 19, 1920

Under Act of February 20, 1905

135,613 Worth Rubber Company around triangle—rubber boots and shoes. Bourn Rubber Co., Providence, R. I.
135,660 Elasticaps—electric splice insulators. The Elasticap Co., Hoboken, N. J.
135,673 Natty Pad—garters. George Frost Co., Boston, Mass.
135,690 Man-Heil—inhalers. Frederick Heilman Co., Johnstown, Pa.
135,792 Admiral—suspenders. The Russell Manufacturing Co., Middletown, Conn.
135,837 Motomat—rubber mats. United States Rubber Co., New Brunswick, N. J., and New York City.
135,838 Feltex felt composition insoles. United States Rubber Co., New Brunswick, N. J., and New York City.
135,839 Representation of a tire with white stripes on side walls—tires. United States Tire Co., New York City.
135,840 Dixie Clay—clay as filler in manufacture of rubber products, etc. R. T. Vanderbilt Co., Inc., New York City.

Under Act of March 19, 1920, Section 1 (b)

135,867 Lee belting, hose, patches, tubing, inner tubes, and tires. Lee Tire & Rubber Co., New York City.
135,871 Miller tires, etc. The Miller Rubber Co., Akron, O.
135,877 Compression—inner tubes. U. S. Compression Inner Tube Co., Tulsa, Okla.
135,879 Figure of little girl wearing garters, reflected back view in mirror children's garters. A. M. Wilson Co., Cherokee, Ia.

RENEWED

18,567 Footholds rubber shoes. Boston Rubber Shoe Co., Boston and Malden, Mass. Registered October 28, 1890.
18,568 Northwest rubber shoes. Boston Rubber Shoe Co., Boston and Malden, Mass. Registered October 28, 1890.
18,569 Trojan—rubber shoes. Boston Rubber Shoe Co., Boston and Malden, Mass. Registered October 28, 1890.
18,599 Laceit—rubber shoes. Boston Rubber Shoe Co., Boston and Malden, Mass. Registered November 4, 1890.
18,671 Storm—rubber shoes. Boston Rubber Shoe Co., Boston and Malden, Mass. Registered December 2, 1890.
18,769 Vernon—rubber shoes. Boston Rubber Shoe Co., Boston and Malden, Mass. Registered December 30, 1890.

GRANTED OCTOBER 26, 1920

Under Act of February 20, 1905

135,881 Reindeer—tire tubes and casings. Achilles Rubber & Tire Co., Binghamton, N. Y.
135,947 Tea Berry—chewing gum. The D. L. Clark Co., Pittsburgh, Pa.
135,996 Treado—composition for repairing rubber goods. J. T. Flaherty, Springfield, Mass.
136,086 Camco—canvas and rubber shoes, rubber soles and heels, etc., Warren MacPherson, Cambridge, Mass.
136,098 Dutiflex—metal-lined, fabric-covered rubber hose. Metal Hose & Tubing Co., Inc., Brooklyn, N. Y.
136,177 Sampson Stoppers—rubber expansible stoppers. The Sampson Appliance Corporation, New York City.

GRANTED NOVEMBER 2, 1920

Under Act of February 20, 1905

136,302 Arrow—garters and supporters. American Textile Products Co., Rochester, N. Y.
136,360 Carmojon—tires and tubes. Carlisle Tire & Rubber Co., Dover, Del., and Carlisle, Pa.
136,405 Dur-a-Bul—blow-out patches. C. L. Durham, Salina, Kans.
136,437 Bear Hug—puncture-curing patches. W. F. Goddard, Moberly, Mo.
136,441 Freshet—hose. The B. F. Goodrich Co., New York City.
136,442 Texstan—machinery packing. The B. F. Goodrich Co., New York City.
136,518 London—leather, fabric, and rubber shoes. London Shoe Co., New York City.
136,560 Acorn—repair and retread vulcanizers. A. E. Nolan, Portland, Ore.
136,594 Country Road—tires and tubes. Racine Rubber Co., Racine, Wis.
136,640 S—rubber heels. The Squeegee Heel Co., Cleveland, O.
136,641 Squeegee—rubber heels. The Squeegee Heel Co., Cleveland, O.
136,673 Tiny Tot—infants' rubber goods and sundries. United Drug Co., Boston, Mass.

GRANTED NOVEMBER 9, 1920

Under Act of February 20, 1905

136,733 Acorn—tires and tubes. Acorn Tire & Rubber Co., Chicago, Ill.
136,738 A inside ace of spades—hard rubber goods. American Hard Rubber Co., New York City.
136,740 Ever-Ready—rubber-set shaving brushes. American Safety Razor Corporation, Brooklyn, N. Y.
136,799 Jiffy Lock—waterproof bathing-suit bags. J. D. Farkas, New York City.
136,821 GP inside diamond—hose and packing. The Gutta Percha & Rubber Manufacturing Co., New York City.
136,843 Kleinert's—sanitary rubber sheets, etc. I. B. Kleinert Rubber Co., New York City.
136,844 Kleinert inside Maltese cross beneath The Best—sanitary rubber sheets, etc. I. B. Kleinert Rubber Co., New York City.
136,889 Parco—tires. The Pan-American Rubber Co., Milwaukee, Wis.
136,908 Milestones—tires and casings. A. Reinsberg, Salt Lake City, Utah.
136,921 Skiddese—anti-skidding tires. P. Sangoff, Worcester, Mass.
136,955 Surety—inner tubes. Surety Tire & Rubber Co., St. Louis, Mo.
136,970 Globestos—brake linings. United & Globe Rubber Co., Trenton, N. J.

Under Act of March 19, 1920, Sec. 1 (b)

137,007 McCreary Tires behind rectangle bearing words Built for Longer Service—tires. H. McCreary, Indiana, Pa.
137,010 O'Bannon Moleskin with L and K of last word joined and bearing the word Quality—waterproofed upholstery fabrics.

GRANTED NOVEMBER 16, 1920

Under Act of February 20, 1905

137,022 Hel Fi—fibrous rubber packing. The Continental Supply Co., St. Louis, Mo.
137,023 Magnum—tires. The Dunlop Rubber Company, Limited, London, Eng.
137,037 Gable—tires. E. B. Killen, London, Eng.
137,048 Rambler—The Ohio Rubber Co., Cincinnati, O.
137,074 Walker's Golden Walkerite—fibrous rubber packing. James Walker & Co., Limited, London, Eng.
137,075 Lipackite fibrous rubber packing. James Walker & Co., Limited, London, Eng.

Under Act of March 19, 1920, Section 1 (b)

137,081 Ceibasilk filling for life-saving garments, etc. Kapo Manufacturing Co., assignor to American Life Saving Garment Co., both of Boston, Mass.

GRANTED NOVEMBER 23, 1920

Under Act of February 20, 1905

137,091 A inside ace of spades—hard rubber rods, sheets and tubes. American Hard Rubber Co., Hempstead and New York City, N. Y.
137,197 Dit rubber boots. George F. Dittmann Boot & Shoe Co., St. Louis, Mo.
137,202 Vac—golf balls. The Dunlop Rubber Company, Limited, Regents Park, London, Eng.
137,206 Picher—storage batteries and parts. The Eagle Picher Lead Co., Cincinnati, O.
137,207 Picher—pig lead, spelter, sheet and slab zinc. The Eagle-Picher Lead Co., Cincinnati, O.
137,209 Picher—paints, pigments, etc. The Eagle-Picher Lead Co., Cincinnati, O.
137,217 1080—rubber and rubber composition erasers. Eberhard Faber, Brooklyn, N. Y.
137,218 Uneedy rubber heels and footwear. T. A. Farrell, Boston, Mass.
137,230 Rollickers—shoes of leather, canvas and rubber. S. Freiburger & Bro. Co., Inc., Fort Wayne, Ind.
137,244 Pony Blimp motor-driven balloons. The Goodyear Tire & Rubber Co., Akron, O.
137,245 Pony Blimp—motor-driven balloons. The Goodyear Tire & Rubber Co., Akron, O.
137,287 Nu-Way dust-caps for pneumatic-tire valves. A. L. Just, Syracuse, N. Y.
137,293 Leathereign raincoats, etc. C. Kenyon Co., Brooklyn, N. Y.
137,294 Leathereign—waterproof fabrics in the piece. C. Kenyon Co., Brooklyn, N. Y.
137,311 Honest Abe—tires, casings and tubes. Lincoln Tire & Rubber Co., Cleveland, Cincinnati, Dayton, Piqua, Toledo, Troy, and Youngstown, O., and Miami, Fla.
137,369 Air Peds—rubber or fiber soles and heels. Pioneer Products, Inc., New York City.
137,429 World tires. World Tire Corporation, Chicago, Ill.
137,483 Dickson's Victory fibrous steam packing. Stewart Dickson & Co., Inc., Boston, Mass.

GRANTED NOVEMBER 30, 1920

Under Act of February 20, 1905

137,531 A inside ace of spades—hard rubber knife handles, etc. American Hard Rubber Co., Hempstead and New York, N. Y.
137,539 Armorcord—inner tubes. Armorcord Rubber Co., Morgantown, W. Va.
137,587 Red Raven Rubber Co. tires and tubes. J. H. Dwork, Newark, N. J.
137,633 Gasmask—rubber sheeting in piece or roll. H. L. Kaufmann, Louisville, Ky.
137,648 McRae's Made Right—inner tubes. McRae Wholesale Hardware Co., Helena, Ark.
137,660 Teddy Pants—rubber baby pants, etc. The Miller Rubber Co., Akron, O.
137,662 Snap Lox—dust caps for pneumatic-tire valves. Newsom Valve Co., St. Louis, Mo.
137,667 Map of Ohio—tires and inner tubes. The Ohio State Rubber Tire Co., Port Clinton, O.
137,682 Prudential—tires and inner tubes. The Prudential Rubber Co., Akron, Ohio.
137,709 Kantkumoff—rubber patches. Stearns Rubber Products Co., Chicago, Ill.
137,731 Naugatop—carriage cloth of fabric and rubber. United States Rubber Co., New Brunswick, N. J., and New York City.
137,732 Raynbar—carriage cloth of fabric and rubber. United States Rubber Co., New Brunswick, N. J., and New York City.
137,733 Supertex—carriage cloth of fabric and rubber. United States Rubber Co., New Brunswick, N. J., and New York City.
137,734 U inside tire—tire casings and tubes. The United Rubber Co., Akron, O.

GRANTED DECEMBER 7, 1920

Under Act of February 20, 1905

137,778 Dorothy Dodd—boots, shoes and slippers of rubber and other materials. Dorothy Dodd Shoe Co., Boston, Mass.
137,889 Rubtex—rubberized cloth and blankets. United States Rubber Co., New Brunswick, N. J., and New York City.

Under Act of March 19, 1920, Section 1 (b)

137,918 O'Bannon Coated Fabrics—waterproof fabrics. O'Bannon Corporation, New York City.

GRANTED DECEMBER 14, 1920

Under Act of February 20, 1905

137,929 Amflectric—insulated wire. American Electrical Works, Phillipsdale, R. I.
137,939 Aero-Fount—fountain pens. Edward O. Baker, Shanghai, China.
137,977 Macgregor—golf balls, etc. The Crawford, McGregor & Canby Co., Dayton, O.
137,993 Edison—fountain pens. Edison Pen Co., Inc., Petersburg, Va.
138,001 White Top—fountain pens. The Evans Dollar Pen Co., Waterloo, Ia.
138,014 Weldo—patches for repairing rubber goods. H. Greenberg, New York City.
138,029 Karlite—belting, hose and packing. Imperial Belting Co., Chicago, Ill.
138,030 Antisulpho—belting, hose and packing. Imperial Belting Co., Chicago, Ill.
138,031 Sahara—belting, hose and packing. Imperial Belting Co., Chicago, Ill.
138,050 Green Cross Reliner—tire reliners. C. M. Lash, Columbus, O.
138,065 Benflex—metal-lined, fabric-covered rubber hose. Metal Hose & Tubing Co., Inc., Brooklyn, N. Y.
138,087 Diap-a-Wash—combined wringer and washboard. The Pierson Co., Rockford, Ill.
138,112 Truflite—hand and tennis balls. The Seamless Rubber Co., Inc., New Haven, Conn.
138,161 Atlantic—tires. The Charles Williams Stores, Inc., Brooklyn, N. Y.

Under Act of March 19, 1920, Section 1 (b)

138,196 Representation of a square plinth in oblique perspective, bearing the words Sherardizing Zinc-Alloyed Metals—zinc alloys. The New Haven Sherardizing Co., Hartford and New Haven, Conn.

RENEWED

17,910 Yucca—chewing gum. Yucca Manufacturing Co., Cleveland, O.; Wm. Wrigley, Jr., Co., assignee. Registered May 13, 1890.
18,673 Diamond—belting, hose, packing, and mechanical rubber goods. New York Belting & Packing Co., New York City. Registered December 2, 1890.

GRANTED DECEMBER 21, 1920

Under Act of February 20, 1905

138,220 Excelsior—belting, hose and machinery packing. Boston Belting Corporation, Boston, Mass.
138,249 Volunteer—rubber sheet packing. The B. F. Goodrich Co., New York City.
138,250 Elbon—hose and packing. The B. F. Goodrich Co., New York City.
138,251 Elevay—elevator belts of fabric and rubber. The B. F. Goodrich Co., New York City.
138,236 Sprifoot—rubber soles and heels. Kleistone Rubber Co., Boston, Mass.
138,277 Kleistone—rubber soles and heels. Kleistone Rubber Co., Boston, Mass.
138,378 Zonta fabric and cord tire casings and inner tubes. Zonta Tire & Rubber Co., Sioux City, Ia.

Under Act of March 19, 1920, Section 1 (b)

138,382 Conklin—fountain pens. The Conklin Pen Manufacturing Co., Toledo, O.
138,400 Tyregard—inner liners. The National Sales Co., Memphis, Tenn.
138,401 Formost—tires, casings and tubes. United Motors Service, Inc., Detroit, Mich.

GRANTED DECEMBER 28, 1920

Under Act of February 20, 1905

138,420 Seal of company—belting, hose and packing. Boston Belting Company, Boston, Mass.
138,447 Fabreeka belting. Fabreeka Belting Company, Boston, Mass.
138,507 Tru-Matic—tires. Tru-Matic Tire & Tube Co., Wilmington, Del., and Wellington, O.
138,517 Staco—boots and shoes of rubber and other materials. Stone-Tarlow Co., Inc., Brockton, Mass.
138,523 S. S. White—dental rubber goods, vulcanizers, etc. The S. S. White Dental Manufacturing Co., Philadelphia, Pa.

Under Act of March 19, 1920, Section 1 (b)

138,542 Franklin—tire casings and tubes. The Franklin Tire & Rubber Co., Kent, O.

THE DOMINION OF CANADA

REGISTERED

27,621 The word Beaver—balata belting. The Beldam Packing & Rubber Co., 29 Gracechurch street, London, E. C. 3.
27,622 The word Panther—leather belting. The Beldam Packing & Rubber Co., 29 Gracechurch street, London, E. C. 3.
27,673 Oval containing the words Du Pont and Fabrikoid fancifully printed—artificial or imitation leather. Du Pont Fabrikoid Co., Wilmington, Del., U. S. A.
27,760 The word Willard—storage batteries. Willard Storage Battery Co., Cleveland, O.
27,784 The word Tag—dental, medical and surgical appliances, thermometers, sphygmomanometers, etc. Charles J. Tagliabue Manufacturing Co., Brooklyn, N. Y.
27,785 The word Tag—measuring, indicating, and registering appliances and thermometers for household and industrial use. Charles J. Tagliabue Manufacturing Co., Brooklyn, N. Y.

THE UNITED KINGDOM

PUBLISHED OCTOBER 20, 1920

405,015 The word Rubbadubdub—inflatable rubber toys. J. G. Franklin & Sons, Limited, 17 Colvestone Crescent, Dalston, London, E. 8.
405,237 Representation of a globe bearing the initials A. O. C., dividing the words Globe Brand—rubber tobacco pouches. A. Oppenheimer & Co., 38 Finsbury Square, London, E. C. 2.
405,455 The word Latite—balata machine belting. W. T. Lambourne trading as The W. T. Lambourne Co., 5 Henrietta street, Covent Garden, London, W. C. 2.
406,356 The word Vanguard—waterproof and rainproof coats. New British Rubber Co., Limited, 399 Lord street, Southport.
B406,502 The word Marco—rubber tires, casings, inner tubes and patches. Brown Brothers, Limited, 20 to 34 Great Eastern street, London, E. C. 2.
B406,856 The words Enco-Flator tire inflating pumps. Fluid Pressure Pumps, Limited, Clifton Street Works, Clifton street, Notting Hill, London, W. 11.

PUBLISHED OCTOBER 27, 1920

403,405 The word Durclastic—suspenders, garters, braces and belts. H. Seal, 3 Redcross street, Leicester.
403,877 Representation of a label bearing picture of a frog sitting on a pond-lily pad among rushes, reaching up one forefoot to a spider suspended from a web above—rubber-soled shoes and galoshes. Kay Brothers, 1 Brazil street, Manchester.
404,369 Representation of a tire bearing the words Preserves Leather and Rubber and enclosing an oval object bearing the word Plio, all above the words Trade Mark—all preserving, waterproofing, blacking, staining, polishing, cleansing and reno-

vating coiopounds and preparations included in Class No. 50 for use on leather or rubber goods. The Viva Co., 112 Moss Lane East, Manchester.

406,489 Representation of a seal bearing the words BALCOT—MADE IN ENGLAND—English-make machine belting and straps included in Class No. 40. The Manchester Balata Belting Co., Limited, 292A, Vauxhall Road, Liverpool

PUBLISHED NOVEMBER 3, 1920

393,249 The word CHICLE between the letter A upright above and inverted below—chewing gum, etc. Adams & Beemans, Limited, 89 Great Eastern street, London, E. C. 2.

402,533 The word SUPERLA—goods manufactured from rubber and gutta percha, not included in classes other than No. 40. Levetus & Co., 194 Bishopsgate, London, E. C. 2.

403,294 The word TETRALIN—solvent for rubber, etc., and all goods included in Class No. 1, excepting enamels. Tetralin Gesellschaft mit Beschränkter Haftung, 5 Behrenstrasse, Berlin W. 8., Germany; address for service in the United Kingdom, care of Dicker & Pollak, 20-23 Holborn, London, E. C. 1.

403,298 The word TETRALIN—all goods included in Class No. 47 except grease-extracting compounds. Tetralin Gesellschaft mit Beschränkter Haftung, 5 Behrenstrasse, Berlin, W. 8., Germany; address for service in the United Kingdom, care of Dicker & Pollak, 20-23 Holborn, London, E. C. 1.

404,207 Representation of a label bearing the figures of a woman and a man in Eastern costume above the word MAHARAJAH—india rubber goods included in Class No. 11. Radium-Gummiwerke Gesellschaft mit Beschränkter Haftung, Gummi-Waren Fabrik, Graven Muhlenweg, Cologne-Dellbrück, Germany; address for service in the United Kingdom, care of Sefton-Jones, O'Dell & Stephens, 285 High Holborn, London, W. C. 1.

PUBLISHED NOVEMBER 10, 1920

406,014 Representation of a seal bearing a monogram—all goods included in Class No 40. The Standard Tire & Rubber Manufacturers, Limited, Alperton Rubber Works, Ealing Road, Wembley, Middlesex.

B407,323 The word ANCHOR—litharge, sulphur, zinc oxide and golden antimony sulphide, all being chemicals used in rubber compounding. The Anchor Chemical Co., Limited, Clayton Lane, Clayton, Manchester.

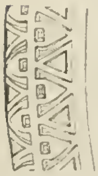
DESIGNS

THE UNITED STATES

NO. 56,723 Tire tread. Patented December 7, 1920. Term 7 years. A. Heskett, Oakland, Calif.

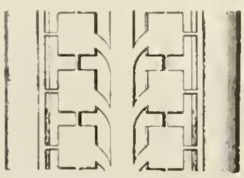
56,726 Rubber heel. Patented December 7, 1920. Term 7 years. E. L. McKimm, Kansas City, Mo.

56,734 Tire tread. Patented December 14, 1920. Term 14 years. E. O. Blekre, Sioux City, Ia.


56,750


56,723


56,766


56,734

56,750 Automobile tire. Patented December 14, 1920. Term 14 years. C. W. McCone, assignor to The Gordon Tire & Rubber Co.—both of Canton, O.

56,766 Tire. Patented December 14, 1920. Term 7 years. H. S. Rector, Chicago, Ill.

56,826 Rubber heel. Patented December 28, 1920. Term 7 years. E. L. McKimm, Kansas City, Mo.

GERMANY

DESIGN PATENTS ISSUED, WITH DATES OF ISSUE

755,749 (September 6, 1920.) Resilient tire. Charles C. Powers, Williams, Ariz., U. S. A., assignee of Casimir von Ossomski, Berlin, W. 9.

756,152 (August 12, 1920.) Pneumatic bicycle tire. Richard Hofmann, Neuseifersdorf near Rosswein i. S.

756,264 (October 4, 1920.) Rubber heel. Hermann Oergel, Ruhbergstrasse 4, Hanover.

756,374 (September 6, 1920.) Extensible rubber heel pad for footwear. Metropol-Gummi G. m. b. H., Dortmund.

756,646 (August 16, 1920.) Non-skid tread. Paul Naumann, Pappendorf near Hainichen.

756,800 (October 2, 1920.) Machine belt. Georg Diesener, Schlesischestrasse 18, Berlin.

757,210 (September 21, 1920.) Attaching rubber heels or soles through elasticity. Oswald Grote and Virgil Höniger, Heinestrasse 32, Düsseldorf.

757,268 (February 7, 1920.) Compressible pneumatic tire with air chambers, particularly for motor vehicles. Gustav Mueller, Berkenwerder.

757,292 (September 27, 1920.) Bossed tire tread. The Standard Tyre & Rubber Manufacturers, Limited, London; representative, assignee H. Neubart, Berlin, S. W. 61.

757,923 (October 27, 1920.) Rubber glove. Otto Dillner, Torgauerstrasse 30, Leipzig-Neusellerhausen.

758,509 (November 3, 1920.) Leg prosthesis with rubber foot. Gesellschaft der echten Marks-Prothesen A. A. Marks m.b.H., Frankfort-on-the-Main.

758,510 (November 3, 1920.) Rubber foot with insertions of webbing. Gesellschaft der echten Marks-Prothesen A. A. Marks m.b.H., Frankfort-on-the-Main.

758,330 (September 27, 1920.) Injection syringe. Carl Jacob Stephan, Eimsbuettler-Chausse 2, Hamburg.

757,449 (October 22, 1920.) Protective rubber cover for telescope lenses, Emil Busch Akt. Ges., Optische Industrie, Rathenow.

757,550 (February 9, 1920.) Tire patch. H. Burklin, Emmendingen.

757,586 (October 9, 1920.) Detachable solid tire. Rudolf Poschenrider, Neustadt a. D.

757,919 (October 25, 1920.) Shoe sole with rubber tread surface. Gustav Albrecht Strunk, Hoeningerweg 288, Köln-Zollstock.

758,046 (September 13, 1920.) Footwear with natural rubber soles attached by means of square wooden pegs. Georg Hommel, Niedersteim near Pulsnitz, i. S.

759,331 (October 25, 1920.) Cudgel consisting of steel rods enclosed in a rubber tube and covered with leather. Vereinigte Feitschenfabriken G. m. b. H., Isny.

759,606 (October 25, 1920.) Clinchers for holding together torn rubber tires. Heinrich Kurzrock, Dippach near Berka, Werra.

759,723 (July 1, 1919.) Resilient tire for automobiles, etc. Josef Jerzykowski, Celtisstrasse 10, Nuernberg.

TRADE MARK PIRACY

No rubber manufacturer need be reminded of the protective and advertising value of the trade mark. It is the lever by which he controls the prestige and good-will that has cost him money and effort to acquire. In certain countries a trade mark becomes the property of the first applicant for its registration, regardless of who makes the article. The only way an American manufacturer can protect himself against trade mark piracy is to register his trade mark in every foreign country in which he is now doing business or expects or hopes to do business in the future.

Not only does the American manufacturer need protection against dishonesty but also against unfortunate coincidences whereby domestic good-will may be turned into ridicule, vulgarity or ill-will in a foreign country where a word or design in an American trade mark may have a different meaning. There are now in existence associations of trade mark specialists whose services may be enlisted to protect the American manufacturer and assure him of the rights, profits and privileges accruing to his properly registered trade mark in any country of the globe. —Mida's Trade Mark Bureau, Chicago, Illinois.

"MIRACLE" BLOW OUT PATCH

The ordinary blow-out patch built of duck is not unpuncturable, but in the "Miracle" blow-out patch a successful effort has been made to make it so. This has been accomplished by inserting between eight-ounce rubberized duck plies a shaped single ply of stiff rawhide, held in place by rubber cement. The outer surfaces of rubber are lightly cured by the vapor process. The patch is intended as an outside temporary tire repair, and is provided with side flaps for lacing in place. It is claimed to outlast the tire in service and comes in five sizes.—Rawhide Products Corporation, 1834 Broadway, New York.

"ARCAR," "VELCAR" AND "FLEXCAR" BELTING

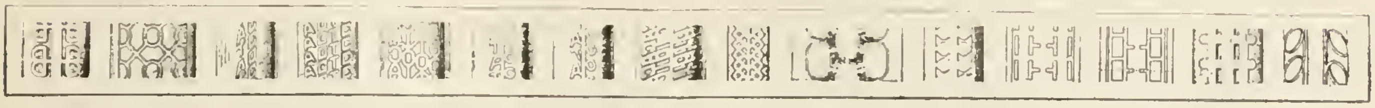
Three brands of rubber belting which have been but a short time on the market are named "ArCar," "VelCar" and "FlexCar," each brand having been designed for a specific purpose. ArCar and VelCar are for intermediate and light service, respectively; FlexCar belting is made in narrow widths, and without sacrificing anything of strength it is sufficiently pliable to run on very small pulleys at unusually high speeds. These belts are manufactured by the makers of the well known "Carspring" rubber belts, under the same standards of high quality of material and workmanship.—New Jersey Car Spring & Rubber Co., Inc., Jersey City, New Jersey.

WHILE THE TOTAL VALUE OF BRITISH MONTHLY IMPORTS STEADILY decreased during 1920, certain classes of imports showed progressive increases. Among these were rubber tires, which, according to returns received by the Foreign Information Department of the Bankers' Trust Co., New York City, were valued at £1,200,000 in the period January 1 to March 31, 1920, and in the period July 1 to September 1, 1920, increased to £1,731,000, a gain of 44.6 per cent.

"CRUDE RUBBER AND COMPOUNDING INGREDIENTS," BY HENRY C. Pearson, is a valuable reference book for every one interested in rubber.

Pneumatic Tire Tread Designs

April, 1920, and June, 1920, to August, 1920



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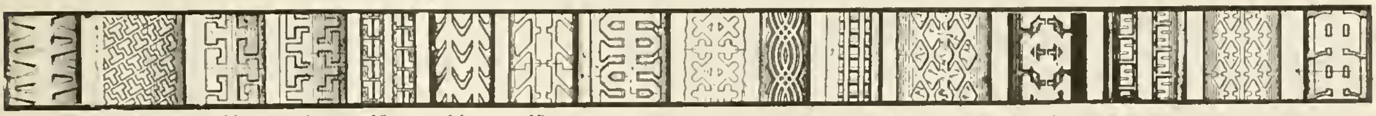

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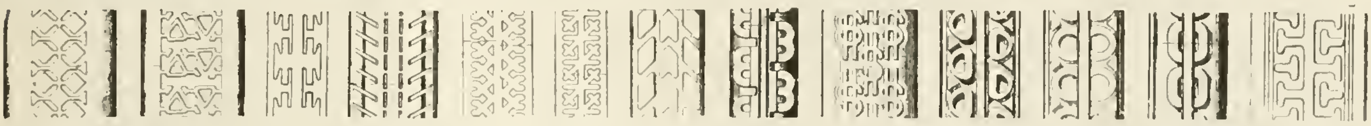

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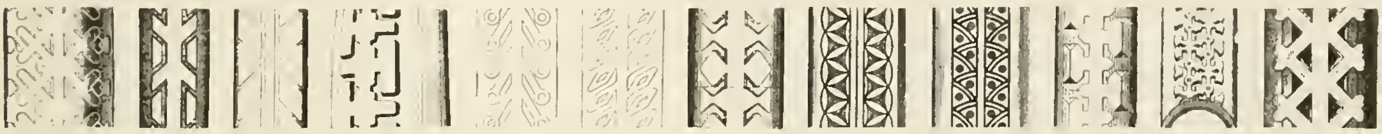


60 61 62 63 64 65 66 67 68 69 70 71

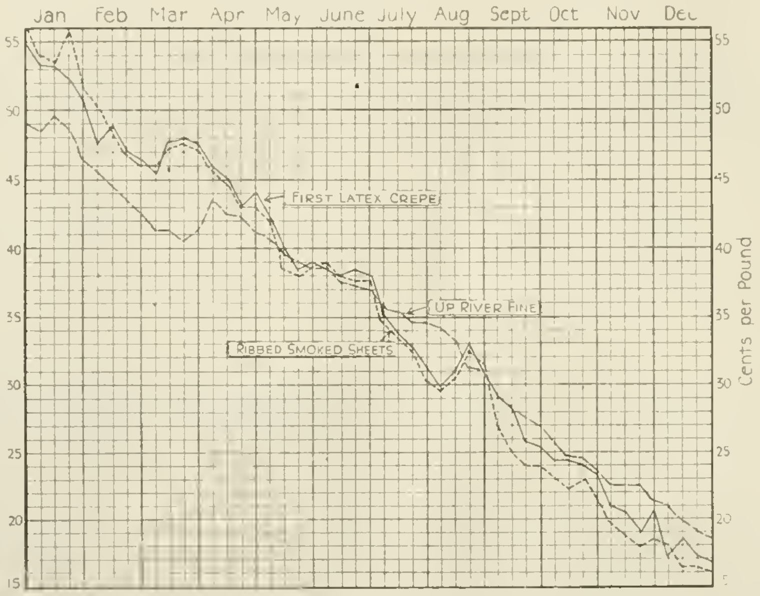
72 73 74 75 76 77 78 79 80

Cut	Patent	Patentee or Assignee and Address.
(1)	54,373	W. P. Braender, Passaic, New Jersey.
(2)	54,412	The Cleveland Rubber Corp. Co., Cleveland, Ohio.
(3)	54,521	E. O. Blekre, Sioux City, Iowa.
(4)	54,522	E. O. Blekre, Sioux City, Iowa.
(5)	54,523	E. O. Blekre, Sioux City, Iowa.
(6)	54,580	E. O. Blekre, Sioux City, Iowa.
(7)	54,581	E. O. Blekre, Sioux City, Iowa.
(8)	54,582	E. O. Blekre, Sioux City, Iowa.
(9)	54,560	T. R. Palmer, Erie, Pennsylvania.
(10)	54,570	O. H. Williams, Columbus, Ohio.
(11)	54,592	W. B. Buckley, Washington, D. C.
(12)	54,624	Zonta Tire & Rubber Co., Sioux City, Iowa.
(13)	54,625	Zonta Tire & Rubber Co., Sioux City, Iowa.
(14)	54,647	The McLean Tire & Rubber Co., East Liverpool, Ohio.
(15)	54,694	F. W. Smith, Rutherford, New Jersey.
(16)	54,408	C. C. Gates, Denver, Colorado.
(17)	54,434	J. Martin, New York City.
(18)	54,496	The Portage Rubber Co., Barberton, Ohio.
(19)	54,534	J. W. Denmead, Akron, Ohio.
(20)	54,536	C. E. Eckrode, Newark, New Jersey.
(21)	54,551	H. Ives, Chippewa Falls, Wisconsin.
(22)	54,555	Empire Rubber & Tire Corp., Trenton, New Jersey.
(23)	54,556	Empire Rubber & Tire Corp., Trenton, New Jersey.
(24)	54,576	Sterling Tire Corp., Rutherford, New Jersey.
(25)	54,583	E. O. Blekre, Sioux City, Iowa.
(26)	54,598	The Portage Rubber Co., Barberton, Ohio.
(27)	54,599	W. H. Clarke, Elyria, Ohio.
(28)	54,608	F. S. Dickinson, New York City.
(29)	54,691	F. A. Seebach, Akron, Ohio.
(30)	54,698	The Rotary Tire & Rubber Co., Zanesville, Ohio.
(31)	54,912	Ten Broeck Tyre Co., Louisville, Kentucky.
(32)	54,919	G. F. Hoffman, Akron, Ohio.
(33)	54,920	G. P. Hoffman, Akron, Ohio.
(34)	54,921	G. P. Hoffman, Akron, Ohio.
(35)	54,955	Parker Tire & Rubber Co., Indianapolis, Ind.
(36)	55,057	Fort Wayne Tire & Rubber Manufacturing Co., Fort Wayne, Indiana.
(37)	55,100	J. Tenney, Jr., Flainfield, New Jersey.
(38)	55,094	H. J. Smith, Bingbamton, New York.
(39)	54,975	C. J. Venn, Chicago, Illinois.
(40)	55,026	W. H. Clarke, Elyria, Ohio.
(41)	55,048	I. V. Humphrey, Highland Park, Pennsylvania.
(42)	55,059	Wear-Well Tire Co., Mahoningtou, Pennsylvania.
(43)	55,080	E. A. Reid, Somerset, New Jersey.
(44)	55,087	A. B. Schleicher, Pasadena, California.
(45)	55,101	E. H. Trump, Barberton, Ohio.
(46)	55,091	F. E. Shannon, Akron, Ohio.
(47)	55,118	W. E. Duersten, New Castle, Fennsylvania.
(48)	55,119	W. E. Duersten, New Castle, Pennsylvania.
(49)	55,141	The Rotary Tire & Rubber Co., Zanesville, Ohio.
(50)	55,144	The Overland Tire & Rubber Co., Omaha, Nebraska.
(51)	55,146	The Ashland Tire & Rubber Co., Ashland, Ohio.
(52)	55,147	The Ashland Tire & Rubber Co., Ashland, Ohio.
(53)	55,216	Howe Rubber Corporation, a Delaware Corporation.
(54)	55,236	G. E. Bennie, Nashville, Tenn.
(55)	55,287	E. L. Lawlor, Youngstown, Ohio.
(56)	55,313	W. C. Owen, Cleveland, Ohio.
(57)	55,314	W. C. Owen, Cleveland, Ohio.
(58)	55,315	W. C. Owen, Cleveland, Ohio.
(59)	55,332	G. N. Schell, Cleveland, Ohio.
(60)	55,122	Standard Four Tire Co., Keokuk, Iowa.
(61)	55,132	Ajax Rubber Co., Inc., New York City.
(62)	55,140	Empire Tire & Rubber Corp., Trenton, N. J.
(63)	55,142	Standard Tire Co., Willoughby, Ohio.
(64)	55,239	The Ashland Tire & Rubber Co., Cleveland, Ohio.
(65)	55,240	The Ashland Tire & Rubber Co., Cleveland, Ohio.
(66)	55,190	Fidelity Tire & Rubber Co., Massillon, Ohio.
(67)	55,301	J. J. Novak, Omaha, Nebraska.
(68)	55,302	J. J Novak, Omaha, Nebraska.
(69)	55,364	The Ashland Tire & Rubber Co., Ashland, Ohio.
(70)	55,378	H. E. Grooms, Columbus, Georgia.
(71)	55,171	J. L. Hanley, Chicago, Illinois.
(72)	55,414	D. F. Crow, Omaha, Nebraska.
(73)	55,420	H. T. Gauss, Chicago, Illinois.
(74)	55,425	W. Kline, Mogadore, Ohio.
(75)	55,411	World Tire Corporation, Chicago, Illinois.
(76)	55,416	J. W. Denmead, Akron, Ohio.
(77)	55,437	F. E. Shannon, Akron, Ohio.
(78)	55,459	Standard Four Tire Co., Keokuk, Iowa.
(79)	55,506	J. & D. Tire Co., Charlotte, North Carolina.
(80)	55,507	W. E. Duersten, New Castle, Pennsylvania.

The New York Crude Rubber Market During 1920

The year 1920 has witnessed the most remarkable decline in crude rubber prices and increase in spot stocks in the history of the industry, these conditions having been brought about by the decreasing demand due to the inevitable readjustment period following a great war, together with the rapidly increasing plantation production.

The year opened at the peak of a rising market with continued demand and prices at the highest point they had shown in some months, plantations commanding higher prices than the best grades of Brazilian, due in large part to the firm handling of the Singapore and London markets. New York stocks were large, but not more than would satisfy the anticipated demand. Excessive stocks in the East had not been dumped upon the market. On January 2 spot prices were first latex crêpe, 55¼ cents; ribbed smoked sheets, 55 cents; upriver fine, 49½-50 cents. After declining slightly in the first week of January, the market remained very steady, holders refusing to concede much to bidders until toward the close, when, on January 26, spot prices reached 52 cents for first latex crêpe, futures 53 cents; ribbed smoked sheets, 52 cents; futures, 53 cents; upriver fine, 47 cents.



Fluctuations of First Latex Crêpe, Ribbed Smoked Sheet, and Upriver Fine Spot Rubber During 1920

During February the market continued steady, declining gradually to the close, spot prices February 25 being: first latex crêpe, 46-47 cents; ribbed smoked sheets, 40½ cents; upriver fine, 42½ cents. First latex crêpe futures were: April-June, 47½ cents; July-December, 49½ cents; ribbed smoked sheet futures were one-half cent less than latex. Manufacturers bought little, but trading among dealers was good. As in London and Singapore the dealing in futures was dull owing to the uncertainty in exchange.

Prices remained firm, with minor fluctuations, and the market quiet throughout March, despite the partial recovery in exchange and very large arrivals, mostly, however, to fill forward orders. There was some trading among dealers, but manufacturers did little buying. On March 25 spot prices were: first latex crêpe, 47½ cents; ribbed smoked sheets, 47 cents; upriver fine, 42-42½ cents. First latex crêpe and ribbed smoked sheet futures were: April-June, 49 cents; July-December, 51 cents.

The April market was dull, with a sharp decline toward the close. Only speculative buying was in evidence, from which manufacturers refrained. Large arrivals continued and prices were affected by the rate of exchange and railroad strikes. Parás were least affected in price, although supported by little trading. First latex crêpe, spot which was 46½ cents on April 1, sold for 42½ cents on April 26; ribbed smoked sheets, spot, dropped from 46 to 42½ cents between the same dates, while upriver fine, spot, remained at 42 cents. First latex crêpe futures were: May-June, 43 cents; July-December, 44 cents; January-June, 1921, 47 cents. Smoked sheet ribbed futures were: May-June, 42½ cents; July-December, 44½ cents; January-June, 1921, 47 cents.

Dullness and decline continued in May, manufacturers buying only in small lots and showing little interest in the market owing to the long series of railroad strikes, car shortages and freight embargoes which hampered industrial operations generally. Rubber manufacturers in the Akron district were forced to curtail their output practically 50 per cent by stopping work on Saturdays and discontinuing night shifts. The only buying activity occurred among dealers securing spot rubber to cover contracts as the market sagged off. The London and Singapore markets ruled firmer and higher than New York, when spot prices on May 24 had dropped to 39 cents for first latex crêpe; ribbed smoked sheets, 38½ cents; upriver fine, 39 cents. First latex crêpe futures were: July-September, 40 cents; October-December, 42½ cents; January-June, 1921, 44-45 cents. Ribbed smoked sheet futures were about the same as latex.

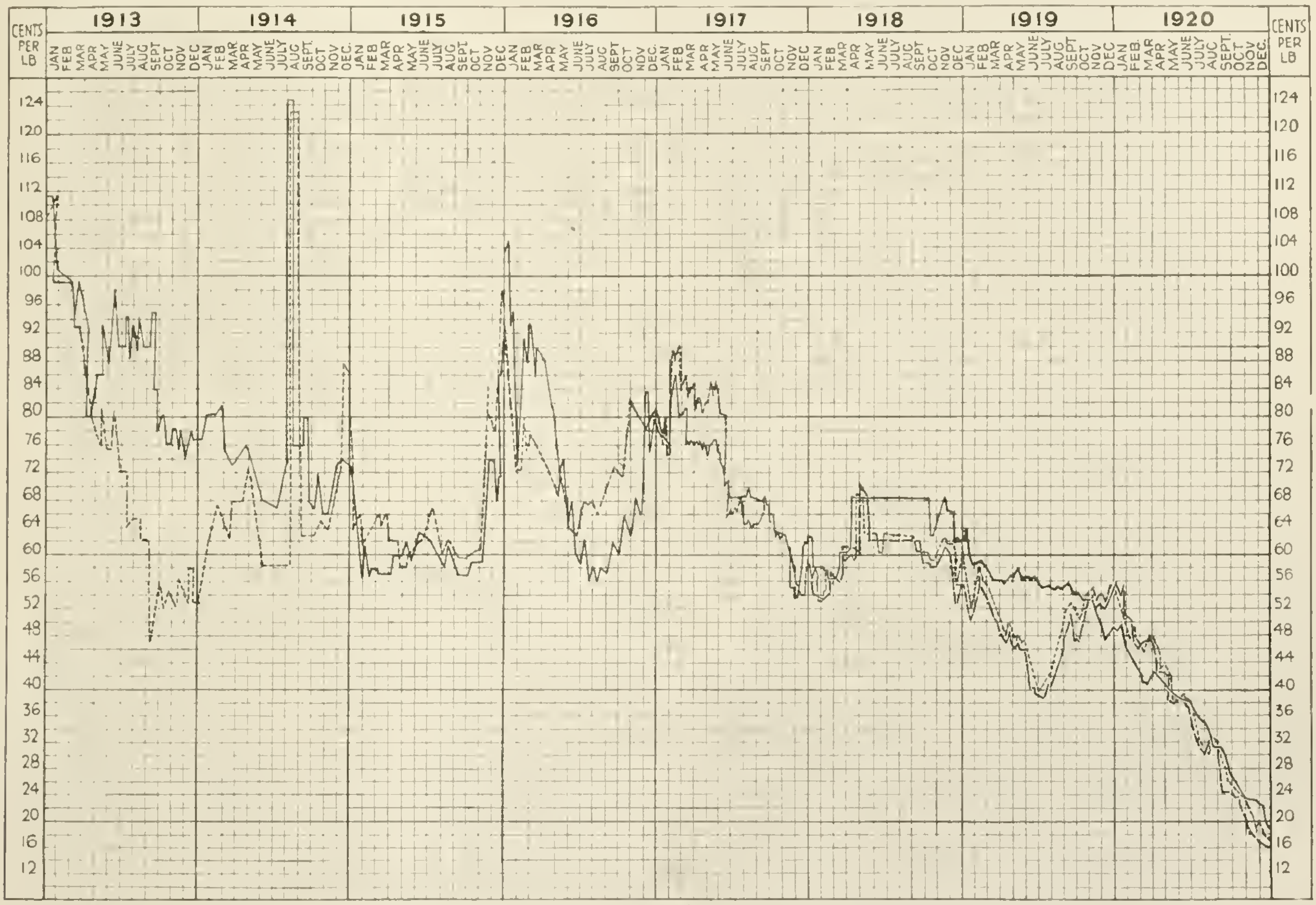
While much speculative activity occurred in June, the regular rubber market continued dull, with few sales and slightly declining prices. Transportation difficulties continued to curtail demand by manufacturers, and the general tightness of money and inability to procure loans prevented dealers from acting upon the low prices in the East and securing stocks in anticipation of future rises. Manufacturers had sufficient stocks under existing conditions. They anticipated lower prices and also held back because of confused forecasts in the tire building trade resulting from the labor troubles of fabric makers and the lessened demand for tires due to the long-continued bad Spring weather. On June 25 spot prices were: first latex crepe, 38 cents; ribbed smoked sheets, 37-38 cents; upriver fine, 37½ cents. First latex crêpe futures were: July-September, 40 cents; October-November, 43½ cents; January-June, 1921, 46 cents Ribbed smoked sheet futures were one-half to one cent lower than latex.

Conditions were generally quiet and prices steady, although tending downward throughout July, and when first latex crêpe, spot, reached 30 cents during the last week of the month a low record was established. For the first time during the year upriver fine, spot, gained a substantial lead of 4½-5 cents over first latex crêpe. The scarcity of both buyers and sellers was an important factor in the support of the market. Dealers were about the only buyers, manufacturers believing the bottom had not been reached, and some becoming September sellers, as futures were all out of proportion to spot quotations. On July 26 spot prices were: first latex crêpe, 32 cents; ribbed smoked sheets, 31½ cents; upriver fine, 34½ cents. First latex crêpe futures were: July-September, 33½ cents; October-December, 37 cents; January-June, 42½ cents. Ribbed smoked sheet futures were: July-September, 33½ cents; October-December, 36¾ cents; January-June, 42 cents.

Quiet conditions prevailed throughout August. Curtailment of tire production was extended, reducing rubber consumption about 8,000 tons monthly. Arrivals for the year had been 36,000 tons greater than for the same period of 1919, and 20,000 tons was reported in New York storage. Depression ruled the first week, with only small lot buying for immediate requirements, sending both first latex crêpe and ribbed smoked sheets, spot, to a new low level of 29½ cents. Later in the month contract covering on the part of short interests resulted in slight spot advances to 31

cents for first latex crêpe on August 26; ribbed smoked sheets, 30-30½ cents; upriver fine, 30-31 cents. First latex crêpe futures were: October-December, 34 cents; January-June, 38 cents. Ribbed smoked sheet futures were about one cent less than latex. The price lead which upriver fine gained over first latex crêpe at the end of July was lost in August, but partially regained in October for the balance of the year.

With practically no factory demand and limited business among dealers, most of whom had withdrawn, fearing greater losses, the September market weakened and spot values dropped to new low records of 24½ cents for first latex crêpe; ribbed smoked sheets, 23½ cents; upriver fine, 25 cents. New York stocks increased to 26,000 tons, including considerable mouldy rubber selling at 21½-23 cents. Arrivals were 2,400 tons less than in September, 1919, and continued less than normal to the end of the year, indicating that buying had been restricted in the producing centers and surplus stocks stored by large holders. On September 27 spot prices were: first latex crêpe, 25½-26 cents; ribbed smoked sheets, 23¾-24¼ cents; upriver fine, 25-26 cents. First latex crêpe futures were: October-December, 26½ to 27½ cents; January-June, 30 to 31 cents. Ribbed smoked sheet futures were: October-December, 25 cents; January-June, 28 to 30 cents.



New York Spot Rubber Prices. Upriver Fine and First Latex Crêpe, 1913-1920. Ribbed Smoked Sheet, 1918-1920.

UNITED STATES CRUDE RUBBER IMPORTS FOR 1920 (BY MONTHS)

1920	Plantations	Paras	African	Centrals	Guayule	Manicoba and Matto Grosso	Balata	Miscellaneous Gum	Waste	Totals 1920	Totals 1919*
January ..tons	17,799	2,620	821	111	.....	.....	65	634	351	22,401	7,235
February	29,681	2,456	558	265	34	....	67	614	309	33,984	17,456
March	28,533	2,463	514	23	114	[illegible]	13	983	1,252	33,898	28,223
April	21,036	1,893	628	29	79	10	22	812	448	24,957	28,146
May	24,443	2,025	662	95	113	.	45	1,059	224	28,666	16,348
June	12,911	1,352	427	27	164	...	7	552	166	15,606	16,319
July	14,695	1,115	34	40	....	.....	8	1,283	312	17,487	17,965
August	12,730	590	13	75	156	.....	67	1,135	300	15,066	11,067
September	10,974	459	99	8	74	[illegible]	44	516	218	12,414	14,036
October	8,759	1,613	27	17	223	..	33	498	425	11,595	28,888
November	5,695	654	39	12	48	....	68	27	608	7,151	15,674
December	9,716	1,151	59	11	32	51	42	....	376	11,438	24,675
Totals, 12 months, 1920	196,972	18,391	3,881	713	1,037	86	481	8,113	4,989	234,663	....
Totals, 12 months, 1919	192,270	27,058	3,340	1,422	1,501	441	......	......	....	....	*226,032

*During 1919, there were actually received 231,510 tons, of which 5,478, not reported until 1920, are not included in figures published for either year.

Compiled by The Rubber Association of America, Inc.

In October, continued depression, with several tire factories closed and very little trading among dealers, brought spot rubber to 23½ cents for first latex crêpe; ribbed smoked sheets, 21 cents; upriver fine, 24 cents. New York stocks increased to 30,000 tons, London stocks to 40,000 tons. On October 26 spot prices were: first latex crêpe, 24 cents; ribbed smoked sheets, 22 cents; upriver fine, 24½ cents. First latex crêpe futures were: November-December, 24 cents; January-June, 27 cents. Ribbed smoked sheet futures were: November-December, 22½ cents; January-June, 26 cents.

Pronounced weakness continued throughout November, with fractional spot declines to 18 cents for first latex crêpe; ribbed smoked sheets, 17 cents; upriver fine, 22 cents. Although buyers were scarce and sellers shy, considerable small lot factory business was done in futures, and some spot stocks were bought and stored. The forced liquidation of several speculative and weak traders would have thrown their commitments on the market with disastrous results but for the generous support of large importers and dealers. On November 24 spot prices were: first latex crêpe, 19 cents; ribbed smoked sheets, 17½ cents; upriver fine, 21 cents. First latex crêpe futures were: January-March, 22½ cents; April-June, 25½ cents. Ribbed smoked sheet futures were: January-March, 21 cents; April-June, 24 cents.

During December the market remained dull and featureless with little buying other than small spot lots, spot prices falling to new low levels of 16¾ cents for first latex crêpe on December 27; ribbed smoked sheets, 16 cents; upriver fine, 18 cents. January-March deliveries for the two plantation sorts reached 17½ and 17 cents, respectively, and in London and Singapore futures declined along with the New York spot and nearby market. Arrivals of good quality mouldy rubber were picked up as bargains by both dealers and manufacturers at 2 to 3 cents below these prices. Parás still lacked demand.

Throughout the year the lower grades of rubber were weak, with the exception of guayule, which was comparatively firm until November. Gutta percha showed strength, also balata, owing to the golf ball demand and the holding of supplies in primary sources.

Every month, as new low price levels were recorded, it was believed in many quarters that the bottom had been reached. Uncertainty will continue to cloud the situation, however, until the production of rubber goods, especially tires, returns to normal and active buying is again resumed by manufacturers. Optimists believe rubber goods production will be in full swing by April 1. Meanwhile the industry as a whole is in strong hands, competent to cope with the unusual conditions.

CEYLON RUBBER IMPORTS AND EXPORTS

IMPORTS

	January 1 to November 29	
	1919	1920
Crude rubber:		
From Straits Settlements .... pounds	2,588,351	2,448,995
India	1,539,029	1,510,519
Burma and other countries	3,436	42,768
Totals .... pounds	4,130,816	4,002,282

EXPORTS

	1919	1920
Crude rubber:		
To United Kingdom	26,271,286	39,825,881
Belgium	29,120	169,550
France	383,400	709,913
Germany	......	661,341
Netherlands	......	26,329
Italy	......	230,720
Norway	......	2,240
Spain	13	......
Australia	......	56
Victoria	98,755	302,516
United States	55,580,238	34,777,176
New South Wales	171,812	447,537
Canada and Newfoundland	863,834	537,610
India	2,649	2,176
Straits Settlements	454	44,800
Japan	267,427	231,810
Totals	83,668,988	77,969,655

Compiled by the Ceylon Chamber of Commerce.

LOWEST AND HIGHEST NEW YORK SPOT RUBBER PRICES, 1913-1920

	January	February	March	April	May	June
1913—First latex	103 @111	96 @103	88 @ 96	76 @ 88	78 @ 84	70 @ 77
Smoked sheets	109 @113	101 @110	97 @102	81 @ 97	81 @ 83	72 @ 83
Upriver fine	102 @110	96 @102	88 @ 96	77 @ 88	82 @ 91	86 @ 89
Upriver coarse	76 @ 84	72 @ 78	63 @ 72	52 @ 66	55 @ 61	54 @ 62
1914—First latex	55 @ 61	58 @ 64	58 @ 65	64 @ 72	57 @ 65	54 @ 57
Smoker sheets	60 @ 64	62 @ 64	62 @ 65	64 @ 69	57 @ 69	57 @ 63
Upriver fine	73 @ 77	73 @ 78	73 @ 74	73 @ 74	69 @ 74	68 @ 69
Upriver coarse	44 @ 47	44 @ 47	43 @ 46	43 @ 47	41 @ 46	38 @ 42
1915—First latex	59 @ 64	57 @ 63	59 @ 60	59 @ 60	59 @ 61	60 @ 63
Smoked sheets	65 @ 66	65 @ 66	65 @ 66	59 @ 65	59 @ 61	61 @ 63
Upriver fine	61 @ 75	57 @ 61	58 @ 60	57 @ 60	59 @ 61	61 @ 63
Upriver coarse	45 @ 58	44 @ 48	45 @ 47	46 @ 48	45 @ 46	45 @ 47
1916..First latex	70 @103	72 @ 90	83 @ 88	74 @ 82	61 @ 74	56 @ 62
Smoker sheets	79 @102	75 @ 95	87 @ 93	78 @ 86½	64 @ 77½	58 @ 65½
Upriver fine	77 @ 99	73 @ 80	74 @ 78	72 @ 74	67 @ 72	62 @ 68
Upriver coarse	60 @ 76	52 @ 60	56 @ 59	55 @ 57	50 @ 54	42 @ 50
1917—First latex	75 @ 80	75 @ 85	82 @ 90	81 @ 83	83 @ 83½	65½ @ 80
Smoked sheets	75 @ 80	75 @ 75½	81 @ 90	81 @ 83	84 @ 84½	65½ @ 80
Upriver fine	75 @ 79	77 @ 79	76½ @ 80	75 @ 76½	75 @ 76	69 @ 74
Upriver coarse	50 @ 53	50 @ 53½	52½ @ 54	51 @ 51½	51½ @ 54	49 @ 53
1918—First latex	53 @ 58	52½ @ 57	55½ @ 60	59½ @ 70	63 @ 68½	60 @ 63
Smoked sheets	54 @ 57½	53 @ 57	55½ @ 60	59½ @ 70	62 @ 68½	62 @ ..
Upriver fine	57 @ 61	56 @ 58	56 @ 60½	60 @ 70	68 @ ..	68 @ ...
Upriver coarse	37 @ 41	35½ @ 37½	33½ @ 34½	34 @ 38½	38 @ 42	40 @ ...
1919—First latex	52 @ 58	56 @ 58	51 @ 56	47 @ 50½	45½ @ 48	40 @ 45
Smoked sheets	51 @ 56	54 @ 57	50 @ 54½	46½ @ 49½	44½ @ 47	39 @ 44
Upriver fine	58½ @ 61	58½ @ 59½	55½ @ 58½	56 @ ...	56 @ 56¼	55½ @ 56¾
Upriver coarse	34 @ 36	34 @ 35	34 @ 35	34 @ ...	34 @ 34¾	32½ @ 34¾
1920—First latex	51 @ 55¼	45¼ @ 51½	46 @ 48¼	42½ @ 46½	38 @ 43¼	37½ @ 39
Smoked sheets	51 @ 55	45 @ 56½	46 @ 48	42½ @ 45	38 @ 43	37¼ @ 39
Upriver fine	45 @ 50	42½ @ 45	41½ @ 43	40½ @ 42	39 @ 41¼	36¾ @ 38½
Upriver coarse	34 @ 37	31½ @ 34	31¼ @ 31¾	30 @ 32	29½ @ 30½	27¼ @ 28¾

	July	August	September	October	November	December
1913—First latex	66 @ 70	66 @ 70	52 @ 64	50 @ 52	52 @ 60	53 @ 55
Smoked sheets	70 @ 73	70 @ 72	60 @ 72	59 @ 61	59 @ 60	60 @ 66
Upriver fine	83 @ 92	83 @ 93	77 @ 88	72 @ 78	73 @ 78	71 @ 74
Upriver coarse	50 @ 56	50 @ 53	48 @ 52	46 @ 49	44 @ 49	44 @ 47
1914—First latex	54 @ 57	60 @105	52 @ 56	54 @ 62	58 @ 65	73 @ 87
Smoker sheets	56 @ 63	56 @ 80	63 @ 80	63 @ 66	65 @ 84	82 @ 93
Upriver fine	68 @ 73	75 @115	64 @ 78	64 @ 66	63 @ 71	70 @ 76
Upriver coarse	38 @ 42	43 @ 89	43 @ 55	43 @ 47	46 @ 53	51 @ 60
1915—First latex	62 @ 63	59 @ 61	57 @ 58	61 @ 63	63 @ 78	76 @ 99
Smoked sheets	62 @ 63	58½ @ 62	58½ @ 59½	59½ @ 62	61½ @ 75	75 @ 79
Upriver fine	59 @ 63	56 @ 59	55 @ 57	55 @ 57	57 @ 76	68 @ 87
Upriver coarse	44 @ 47	42 @ 44	41 @ 43	42 @ 47	44 @ 62	57 @ 72
1916..First latex	52 @ 57	53 @ 56	54 @ 60	56 @ 60	60 @ 69	68 @ 82
Smoker sheets	55 @ 65	56 @ 59½	56 @ 62½	56 @ 65	62½ @ 74½	70½ @ 87
Upriver fine	65 @ 68	65 @ 68	69 @ 74	71 @ 80	79 @ 83	78 @ 81
Upriver coarse	41 @ 42	39 @ 40	41 @ 44	42 @ 46	45 @ 47	47 @ 56
1917—First latex	65½ @ 67	66 @ 67	66½ @ 67½	63½ @ 65½	57 @ 61	54 @ 60
Smoked sheets	65½ @ 67	65 @ 67	65½ @ 67	62 @ 64½	56 @ 62	52 @ 61
Upriver fine	68½ @ 69	68 @ 69	68 @ 69	63½ @ 66½	56 @ 62	54 @ 61
Upriver coarse	48½ @ 49	48 @ 48½	46 @ 48½	43½ @ 46	36 @ 41½	37 @ 41
1918—First latex	63 @ ...	63 @ ..	60½ @ 63	59 @ 60½	41 @ 63	54 @ 63
Smoked sheets	62 @ ..	62 @ ..	59½ @ 62	58 @ 59½	40 @ 61½	52 @ 61½
Upriver fine	68 @	68 @ ..	68 @ ...	63 @ 68	57½ @ 68	61 @ 68
Upriver coarse	40 @	40 @ ...	40 @ ...	35 @ 40	31 @ 40	36 @ 40
1919—First latex	39½ @ 42½	41¾ @ 45½	45½ @ 52½	49½ @ 55	53 @ 54½	51 @ 54¾
Smoked sheets	38½ @ 41½	39¾ @ 44½	44½ @ 51½	48½ @ 54	52 @ 54	51 @ 54½
Upriver fine	55 @ 55½	54 @ 55	54½ @ 56	52 @ 55	49¼ @ 52	47 @ 49
Upriver coarse	32 @ 33	31½ @ 32	32 @ 33½	33 @ 35	34½ @ 35	35 @ ...
1920—First latex	30 @ 35¼	29¾ @ 33½	24½ @ 29	21 @ 26	18½ @ 21	16¾ @ 19½
Smoked sheets	29½ @ 35	29½ @ 33¾	23½ @ 28¼	20 @ 24	17½ @ 19	16 @ 18½
Upriver fine	34½ @ 35½	30 @ 35	26 @ 30	23½ @ 26	20½ @ 23	18 @ 20½
Upriver coarse	22 @ 32	20 @ 27	16½ @ 21	15 @ 16½	14½ @ 15½	14 @ 15

Review of the Crude Rubber Market

NEW YORK

At the close of 1919, the plantation rubber market reacted from the lowest level known in rubber history and developed a firmer tone in the early part of the new year. Spot and near-by rubber moved up from 15½ to 19 cents and futures advanced accordingly. The market was further strengthened at this time by the rise of several points in sterling exchange, resulting in short covering on the part of dealers who were unable to buy in primary markets on account of the exchange situation.

Due to prevailing conditions the weak element were apparently eliminated from the market with the old line interests in control. Sales were only made when they could be covered at a profit. Mouldy ribbed smoked sheet was offered at bargain prices but ribs from selected estates and free from mould were at a premium. There were few sellers of futures owing to the exchange difficulties. First latex crepe was firmly held at comparatively high prices but the offers were not large.

The market continued quiet and dull until the end of the month with very little factory business and almost a total absence of selling pressure. Quotations on the standard grades were firmly held at prices that were from 1½ to 3¾ cents higher than at the first of the month.

The influence of the final settlement of the Goodyear company's affairs is strongly felt in the rubber market as the many importers and dealers who are involved are cautious and loth to trade.

The prices of Pará sorts have not responded to the improvement noted in plantations due to unfavorable exchange, and consequently the demand has been small.

Imports for December, 1920, were 11,020 tons, compared with 24,675 tons last year. Total imports for the twelve months of 1920 were 221,080 tons, compared with 231,510 tons for 1919.

The Council of the Rubber Growers' Association is reported to be in favor of the request made by rubber growers in Malaya to the local authorities for legislation to restrict rubber production by 50 per cent.

Spot and future quotations in standard plantations and Brazilian sorts were as follows:

Plantations. January 3, first latex crêpe, 17 cents; January-March, 17½ cents; April-June, 18½ cents; July-December, 22 cents.

January 24, first latex crêpe, 20 cents; January-March, 21½ to 22 cents; April-June, 23 cents; July-December, 26 cents.

January 3, ribbed smoked sheets, 16 cents; January-March, 16½ cents; April-June, 17½ cents; July-December, 21 cents.

January 24, ribbed smoked sheets, 19¾ cents; January-March, 21 cents; April-June, 21½ cents; July-December, 25 cents.

January 3, No. 1, amber crêpe, 14 cents.

January 24, No. 1, amber crêpe, 17 cents.

January 3, No. 1, rolled brown crêpe, 11½ cents.

January 24, No. 1, rolled brown crêpe, 13 cents.

South American Parás and Caucho. January 3, upriver fine, 18 cents; islands fine, 18 cents; upriver coarse, 14 cents; islands coarse, 14 cents; Cametá coarse, 11 cents; caucho ball, 14 cents.

January 24, upriver fine, 18½ to 19 cents; islands fine, 17½ to 18 cents; upriver coarse, 13 to 14 cents; islands coarse, 11½ cents; Cametá coarse, 11 cents; caucho ball, 12½ to 15 cents.

NEW YORK QUOTATIONS

Following are the New York spot quotations, for one year ago one month ago, and January 24, the current date:

	February 2, 1920	January 3, 1921	January 24, 1921
PLANTATION HEVEA—			
First latex crêpe	$0.52¼ @	$0.16¾ @	$0.20 @
Amber crêpe No. 1	.52 @	.14 @	.17 @
Amber crêpe No. 2	.51 @	.13 @	.16 @
Amber crêpe No. 3	.50 @	.12 @	.15 @
Amber crêpe No. 4	.48 @	.11 @	.13 @
Brown crêpe, thick and thin	.48 @	.10 @	.15 @
Brown crêpe, specky	.46 @	.09 @	.13 @
Brown crêpe, rolled	.42 @	.11 @	.13 @
Smoked sheet, ribbed, std.	.52 @	.16 @	.19¾ @
Smoked sheet, plain, std.	.51 @	.15 @	.18½ @
Unsmoked sheet, standard	.48 @	.14 @	.17½ @
Colombo scrap No. 1	.37 @	.12 @	.15 @
Colombo scrap No. 2	.35 @	.11 @	.14 @
EAST INDIAN—			
Assam crêpe	.46 @.47	@	@
Assam onions	.46 @.48	@	@
Penang black scrap	.38 @	.08 @	*.08 @
PONTIANAK—			
Banjermassin	.13 @	.08 @	.07 @.08
Palembang	@	.08½ @	.09½ @
Pressed block	.27 @	.12½ @	.12 @.13
Sarawak	.11 @	.07½ @	.07 @
SOUTH AMERICAN—			
PARAS—			
Upriver, fine	.47 @	.18 @.18½	.18½ @.19½
Upriver, medium	.39 @	.15 @.16	.15 @.16
Upriver, coarse	.34 @	.14 @	.13 @.14
Upriver, weak, fine	.37 @	.14½ @	*.14 @
Islands, fine	.45 @	.18 @.18½	*.17½ @.18
Islands, medium	.45 @	.15 @	.13 @
Islands, coarse	.22 @	.11½ @	.11 @.11½
Cametá, coarse	.23 @	.12 @	.11 @.11½
Madeira, fine	.47 @	.23 @.24	.21 @.22
Acre Bolivian, fine	.47 @	.18½ @.19	.19 @.22
Peruvian, fine	.47 @	.16 @.17	.17 @.17½
Tapajos, fine	.46 @	.17½ @.18	.17 @.17½
CAUCHO—			
Upper caucho ball	.34 @	.14½ @.15	.14 @.15
Lower caucho ball	.30 @	.10 @	.12½ @
MANICOBAS—			
Ceará negro heads	.35 @	*.12 @	*.12 @
Ceará scrap	.32 @	*.06 @	*.07 @
Manicoba, 30% guarantee	.26 @	*.10 @	.10 @
Mangabeira thin sheet	.35 @	*.15 @	.09 @
CENTRALS—			
Corinto scrap	.33 @	.12 @	.11 @.12
Esmeralda sausage	.33 @	.12 @	.11 @.12
Central scrap	.32 @	.12 @	.11 @.12
Central scrap and strip	.30 @	.10 @	.09 @.10
Central wet sheet	.23 @	.08 @	.04 @.05
Guayule, 20% guarantee	.27 @	*.20 @	*.20 @
Guayule, washed and dried	.37 @	*.30 @	*.28 @
AFRICANS—			
Niger flake, prime	.18 @	.15 @	.17 @
Benguela, extra No. 1, 28%	.27 @	@	@
Benguela, No. 2, 32½%	@	.06½ @	@
Conakry niggers	.40 @	@	@
Congo prime, black upper	.39 @	.14 @	.15 @
Congo, prime, red upper	.37 @	.08 @	.12 @
Kassai, black	.40 @	@	.15 @
red	.36 @	@	@
Massai sheets and strings	.40 @	@	@
Rio Nunez ball	@	@	@
Rio Nunez sheets and strings	.40 @	@	@
GUTTA PERCHA—			
Gutta Siak	.26 @	.16 @.17	.14 @.16
Red Macassar	2.90 @	2.30 @3.00	2.25 @2.60
BALATA—			
Block, Ciudad Bolivar	.56 @	.62 @	.57 @.58
Colombia	.50 @	.40 @	.36 @.37
Panama	.46 @	.30 @.35	.24 @.30
Surinam sheet	.82 @	.69 @	.67 @.68
amber	.84 @	.75 @	.70 @.71

*Nominal.

RECLAIMED RUBBER

There has been less and less activity in the market for reclaimed rubber during the past three months and at last the point has been reached where practically all of the reclaimers have either

closed down their plants completely or are operating them on a basis of ten per cent of capacity. Here and there a manufacturer of rubber goods is requisitioning some reclaimed rubber made and held on contract, but nothing is doing in the way of new orders. In fact, there is no rubber scrap market and reclaimers cannot today determine production cost for that reason.

In spite of the general stagnation in the trade reclaimers, as well as other rubber manufacturers, are confidently hoping for the dawn presently of a day of activity and prosperity.

NEW YORK QUOTATIONS

January 24, 1921

Prices subject to change without notice

STANDARD RECLAIMS			
Floating	*$0.15	@	$0.18
Friction	* .15	@	.18
Mechanical	* .09	@	.11
Shoe	* .12½	@	13½
Tires, auto	* .12	@	.13½
truck	* .09	@	.11
White	* .15	@	.18

*Nominal.

COMPARATIVE HIGH AND LOW NEW YORK SPOT RUBBER PRICES

	January 1921			January 1920			January 1919		
PLANTATIONS:									
First latex crêpe	$0.21¾	@	$0.19	$0.55½	@	$0.53	$0.58	@	$0.52
Smoked sheet ribbed	.20½	@	.18	.55	@	.53	.56	@	.51
PARAS:									
Upriver, fine	.19½	@	.18	.50	@	.49½	.61	@	.58½
Upriver, coarse	.17	@	13	.37	@	.35½	.36	@	.34
Islands, fine	.18	@	.17	.48	@	.46	.54	@	.49
Islands, coarse	.14	@	.11½	.24	@	.22½	.36	@	.22¾
Cametá	.12	@	.10½	.24	@	.23½	.25	@	.23

*Figured to January 26, 1921.

ANTWERP RUBBER MARKET

GRISAR & CO., Antwerp, report [December 31, 1920]:

Throughout the month little change was noted, the market continued weak, with few transactions. At the end of the month the tone became firm at the close. There were no sellers. Spot December, 0*s.* 10¼*d.*; January-March, 0*s.* 10¾*d.*; April-June, 0*s.* 11¾*d.*; January-July, 0*s.* 11*d.* Fine Pará, 1*s.* 1*d.*

Statistics for the week were as follows: Arrivals, 1,832 tons; sales, 630 tons, stocks, 50,244 tons, against 22,283 tons in 1919. No business was done locally. Arrivals, by the "Mayumbe," about 19,790 kilos. Stock on hand this day, about 1,640 tons.

Little interest was shown in the futures market, and prices dropped about 0.35 francs for the first six months. The tendency of the market continued quiet. On the date of this report the futures market was closed.

AMSTERDAM RUBBER MARKET

JOOSTEN & JANSSEN, Amsterdam, report [December 31, 1920]:

The last week of this year has not brought improvement on the rubber market.

Prices showed even a further downward tendency while the turnover remained extremely small, this time, owing to resistance from buyers as well as from sellers.

At the close, a small improvement was perceptible; so that this year still closes with a comparatively good tendency, but rather at the lowest prices, namely:

Hevea crêpe F—.56. Sheets F—53 on the spot
Hevea crepe F.—.57. Sheets F.—.54 January-March.
Hevea crêpe F.—.63. Sheets F.—.59 April-June.

HAMBURG RUBBER MARKET

EFFEKTIV-ROHGUMMIMAKLER-VEREIN, Hamburg, report [December 17, 1920]:

The market tendency was again somewhat weak and sellers were more ready. As expected, the December conditions in London exercised strong pressure. The supply business moved within narrow limits for spot, while there was lively demand for delivery. Reports from the East were conflicting; while some markets were weaker like the European markets, owners remained firm on others. Arrivals were middling. The prices were as follows:

	Marks		
No. 1 first latex crêpe	28	@	31
Ribbed smoked sheets, standard	27	@	29
Smoked sheets, lower grade	25	@	27
Brown crêpe, clean	23	@	26
Brown crêpe, barky	20	@	23
Dark crêpe	18	@	21
Hard fine Para	32	@	35
Caucho ball	24	@	26
Black Congo	21	@	27
South Cameroon	18	@	22
No. 1, flake	16	@	22
No. 1, Surinam balata sheet	107	@	125
Jelutong	15	@	19

SINGAPORE RUBBER MARKET

GUTHRIE & CO., LIMITED, Singapore, report [December 2, 1920]:

The weekly rubber auction held yesterday and today saw an improved demand at prices a shade lower than those paid last week. Standard ribbed smoked sheet sold from 37 to 38 cents, a decline of 1 cent, while a small quantity of standard pale crêpe was sold at 39/39½ cents. Sellers met the market on off-quality sheet for which there was a fair demand at prices ranging from 17 to 35 cents. Off quality crêpe was in good demand. Brown crepes were not in demand and declined a further 2 cents. Dark and barky crêpes advanced 2 cents. The sale closed weak with crêpe 39, sheet 37 cents. Of 910 tons catalogued, 456 tons were sold. The following is the course of values:

	In Singapore per pound[1]			Sterling Equivalent per pound in London		
Sheet, fine ribbed, smoked	37c	@	38c	1/ 0¾	@	1/ 1
Sheet, good ribbed, smoked	17	@	36½	—/ 7	@	1/ 0⅝
Crêpe, fine pale	39	@	39½	1/ 1¾	@	1/ 1⅞
Crêpe, good pale	23	@	38½	—/ 9¼	@	1/ 1⅝
Crêpe, fine brown	20½	@	25	—/ 8½	@	—/ 9⅞
Crêpe, good brown	15	@	20	—/ 7	@	—/ 8⅜
Crêpe, dark	14	@	18½	—/ 6¾	@	—/ 8
Crêpe, bark	10	@	16½	—/ 5⅝	@	—/ 7⅜

[1]Quoted in Straits Settlements currency, $1 = $0.567 United States currency

PLANTATION RUBBER EXPORTS FROM JAVA*

	October 1919	October 1920	Ten Months Ended October 31 1919	Ten Months Ended October 31 1920
To Netherlands ... *kilos*	461,000	655,000	2,025,000	4,107,000
Great Britain	466,000	1,045,000	6,153,000	7,343,000
Germany	......	19,000	......	89,000
France	......	12,000	215,000	23,000
Belgium	......	61,000	......	117,000
Other European destinations	......	25,000	......	25,000
United States of America	2,223,000	625,000	15,633,000	10,786,000
Singapore	520,000	275,000	4,594,000	3,469,000
Japan	2,000	......	183,000	184,000
Australia	......	......	245,000	190,000
Other countries	10,000	......	169,000	......
Totals ... *kilos*	3,682,000	2,717,000	29,217,000	26,333,000
Ports of origin:				
Tandjong Priok ... *kilos*	1,693,000	1,149,000	14,908,000	12,126,000
Samarang	29,000	85,000	460,000	431,000
Soerabaya	1,874,000	1,469,000	12,746,000	13,001,000

*September figures 1919 and 1920 revised.

STRAITS SETTLEMENTS RUBBER EXPORTS

An official cablegram from Singapore states that the exports of rubber from Straits Settlements ports in the month of November amounted to 7,509 tons, as compared with 9,882 tons in October and 13,426 tons in the corresponding month last year. The total export of the current year to the end of November was 118,111 tons as against 131,716 tons in 1919 and 57,537 tons in 1918. Appended are the comparative statistics:

	1918	1919	1920
January ... *tons*	4,302	14,404	13,125
February	2,334	15,661	17,379
March	8,858	20,908	5,931
April	6,584	10,848	9,768
May	13,587	15,845	15,617
June	6,515	5,059	11,663
July	1,978	7,818	10,773
August	1,249	8,933	6,673
September	6,209	10,476	9,791
October	3,260	8,338	9,882
November	2,661	13,426	7,509
Totals ... *tons*	57,537	131,716	118,111

FEDERATED MALAY STATES RUBBER EXPORTS

An official cablegram from Kuala Lumpur states that the exports of rubber from the Federated Malay States in the month of November amounted to 6,650 tons as compared with 8,323 tons in October and 9,848 tons in the corresponding month last year. The total export of the current year to the end of November was 84,692 tons as against 98,053 tons last year and 71,140 tons in 1918. Appended are the comparative statistics:

	1918	1919	1920
January ... *tons*	7,588	7,163	11,119
February	6,820	10,809	9,781
March	7,709	10,679	9,524
April	7,428	7,664	8,375
May	5,851	7,308	7,627
June	5,161	7,094	9,049
July	5,706	8,6[illegible]0	3,085*
August	5,291	10,626	3,554*
September	6,588	9,841	7,605
October	5,901	8,381	8,323
November	7,097	9,848	6,650
Totals ... *tons*	71,140	98,053	84,692

*The figures given above for July and August in the present year differ from those previously issued, and are in accordance with statistics since communicated by mail from Kuala Lumpur.

RUBBER EXPORTS FROM PENANG

		January 1 to December 1 1919	January 1 to December 1 1920
To Great Britain	piculs[1]	208,115	233,612
Europe		....	3,796
United States		122,409	145,123
Totals	piculs	330,524	382,531

[1]One picul equals 133⅓ pounds.

CRUDE RUBBER ARRIVALS AT ATLANTIC AND PACIFIC PORTS AS STATED BY SHIPS' MANIFESTS

PARAS AND CAUCHO AT NEW YORK

	Fine	Medium	Coarse	Caucho	Totals Pounds
December 23. By the S. S. "Frankmere," from Manáos.					
Poel & Kelly	229,317	2,042	59,239	11,395	301,993
Meyer & Brown, Inc	324,800	....	....	....	324,800
December 23. By the S. S. "Frankmere," from Pará.					
Meyer & Brown, Inc	56,000	....	....	....	56,000
General Rubber Co	....	....	....	....	1,274
Various	....	....	....	....	99,372
January 1. By the S. S. "Cuyaba," from Pará.					
Various	....	....	....	....	78,890
January 1. By the S. S. "Hubert," from Pará.					
Poel & Kelly	140,217	....	3,715	22,622	166,554
W. R. Grace & Co	....	....	....	....	15,484
Paul Bertuch	....	....	....	7,109	7,109
January 1. By the S. S. "Hubert," from Manáos.					
Meyer & Brown, Inc	100,800	....	....	....	100,800
January 13. By the S. S. "Sallust," from Manáos.					
Poel & Kelly	....	....	....	....	30,968
General Rubber Co	....	....	....	....	6,468
Various	....	....	....	....	58,212
January 13. By the S. S. "Sallust," from Pará.					
Poel & Kelly	....	....	....	....	3,528
Various	....	....	....	....	9,506

PLANTATIONS

(*Figured 180 pounds to the bale or case*)

	Shipment from:	Shipped to:	Pounds.	Totals.
December 21. By the S. S. "Shingo Maru," at San Francisco.				
Fred Stern & Co	Singapore	San Francisco	56,000	56,000
December 27. By the S. S. "West Cheswald," at New York.				
Aldens' Successors, Inc	Soerabaya	New York	132,480	
East Asiatic Co., Inc	Soerabaya	New York	17,280	
Various	Soerabaya	New York	42,660	
Chas. T. Wilson Co., Inc.	Colombo	New York	49,280	
Poel & Kelly	Colombo	New York	109,692	
Baring Brothers	Colombo	New York	591,360	
Meyer & Brown, Inc	Colombo	New York	302,400	
L. Littlejohn & Co., Inc.	Java	New York	8,960	
Various	Colombo	New York	1,558,076	2,812,188
December 30. By the S. S. "Talthybius," at Seattle.				
F. F. Henderson & Co	Singapore	New York	75,420	75,420
December 31. By the S. S. "Caronia," at New York.				
Various	London	New York	84,240	84,240
January 2. By the S. S. "Saxonia," at New York.				
Various	London	New York	88,200	88,200
January 3. By the S. S. "West Modus," at New York.				
General Rubber Co	Belawan	New York	2,478,780	
Meyer & Brown, Inc	Belawan	New York	268,800	
Fred Stern & Co	Singapore	New York	22,400	
Goldman, Sachs & Co	Singapore	New York	168,000	
L. Littlejohn & Co., Inc.	Colombo	New York	56,125	
Fred Stern & Co	Belawan Deli	New York	242,920	
Baird Rubber & Trading Co	Singapore	New York	156,800	
William H. Stiles & Co	Singapore	New York	22,400	
J. T. Johnstone & Co., Inc	Singapore	New York	160,480	
Various	Singapore	New York	1,178,153	4,654,858
January 3. By the S. S. "Port Bowen," at New York.				
Various	London	New York	340,200	340,200
January 10. By the S. S. "Veendyk," at New York.				
Manhattan Rubber Mfg. Co	Soerabaya	New York	123,713	
Irwin-Harrison & Crosfield, Inc	Soerabaya	New York	23,417	
L. Littlejohn & Co., Inc.	Java	New York	2,081	149,211
January 11. By the S. S. "Tydeus," at New York.				
The Fisk Rubber Co	Singapore	Chicopee Falls	116,480	
L. Littlejohn & Co., Inc.	Singapore	New York	168,000	
Fred Stern & Co	Singapore	New York	22,400	
William H. Stiles & Co	Singapore	New York	2,240	
Baird Rubber & Trading Co	Singapore	New York	33,600	
J. T. Johnstone & Co., Inc	Singapore	New York	71,680	
Meyer & Brown, Inc	Singapore	New York	156,800	571,200
January 12. By the S. S. "Tydeus," at New York.				
L. Littlejohn & Co., Inc.	Singapore	New York	163,800	
Meyer & Brown, Inc	Singapore	New York	193,860	
Rubber Trading Co	Singapore	New York	40,500	
W. T. Sargent & Sons	Singapore	New York	20,160	
Huth & Co	Singapore	New York	90,000	
W. R. Grace & Co	Singapore	New York	100,800	
W. G. Ryckman, Inc	Singapore	New York	1,080	
Mitsui & Co., Limited	Singapore	New York	81,000	
Edward Maurer Co., Inc.	Singapore	New York	142,480	
Alden's Successors, Inc	Singapore	New York	94,840	
Edward Boustead & Co	Singapore	New York	4,320	
The Fisk Rubber Co	Singapore	Chicopee Falls	129,240	
The Goodyear Tire & Rubber Co	Singapore	Akron	588,960	
General Rubber Co	Singapore	New York	680,860	
Various	Singapore	New York	532,640	
J. Aron & Co	Deli	New York	98,640	
Alden's Successors, Inc	Deli	New York	43,200	
East Asiatic Co., Inc	Deli	New York	25,200	
Firestone Tire & Rubber Co	Deli	New York	101,160	
General Rubber Co. of Canada	Deli	New York	145,620	
Various	Deli	New York	536,940	
Various	Penang	New York	189,720	4,005,020
January 13. By the S. S. "Eastern Crown," at New York.				
L. Littlejohn & Co., Inc.	Singapore	New York	201,600	
Fred Stern & Co	Singapore	New York	22,400	
William H. Stiles & Co	Singapore	New York	44,800	
Baird Rubber & Trading Co	Singapore	New York	67,200	
The Fisk Rubber Co	Singapore	Chicopee Falls	33,600	
Meyer & Brown, Inc	Singapore	New York	78,400	448,000
January 14. By the S. S. "Korea Maru," at San Francisco.				
Fred Stern & Co	Singapore	San Francisco	56,000	56,000
January 14. By the S. S. "Eastern Crown," at New York.				
Thos. A. Desmond & Co.	Singapore	New York	156,600	
Chas. T. Wilson Co., Inc.	Singapore	New York	301,860	
Mitsui & Co., Limited	Singapore	New York	43,020	
L. Littlejohn & Co., Inc.	Singapore	New York	197,280	
W. R. Grace & Co	Singapore	New York	108,000	
William H. Stiles & Co	Singapore	New York	54,000	
Rubber Trading Co	Singapore	New York	57,600	
Meyer & Brown, Inc	Singapore	New York	27,000	
Rogers-Pyatt Shellac Co.	Singapore	New York	44,100	
General Rubber Co	Singapore	New York	1,043,100	
W. G. Ryckman, Inc	Singapore	New York	65,520	
F. R. Henderson & Co	Singapore	New York	83,880	
Fred Stern & Co	Singapore	New York	20,160	
Firestone Tire & Rubber Co	Singapore	Akron	96,480	
Various	Singapore	New York	1,042,120	
Various	Penang	New York	71,100	3,411,820
January 15. By the S. S. "Melville Dollar," at New York.				
L. Littlejohn & Co., Inc.	Singapore	New York	526,400	
William H. Stiles & Co	Singapore	New York	48,400	
Meyer & Brown, Inc	Singapore	New York	44,800	
Hood Rubber Co	Singapore	Watertown	124,880	
Rubber Importers & Dealers Co	Singapore	New York	185,431	
Chas. T. Wilson Co., Inc.	Singapore	New York	87,304	
Edward Maurer Co., Inc.	Singapore	New York	179,700	
Baird Rubber & Trading Co	Singapore	New York	257,600	
Various	Penang	New York	366,660	1,821,175
January 17. By the S. S. "Morioka Maru," at New York.				
Thornett & Fehr, Inc	Singapore	New York	291,220	
Mitsui & Co., Limited	Singapore	New York	41,400	
Various	Singapore	New York	19,080	351,700
January 17. By the S. S. "Greenland," at New York.				
Thos. A. Desmood & Co.	Singapore	New York	178,920	
F. R. Henderson & Co	Singapore	New York	132,660	
W. R. Grace & Co	Singapore	New York	108,900	
Meyer & Brown, Inc	Singapore	New York	22,400	
Fred Stern & Co	Singapore	New York	145,600	
Chas. T. Wilson Co., Inc.	Singapore	New York	181,800	
L. Littlejohn & Co., Inc.	Singapore	New York	135,893	
United States Rubber Co.	Singapore	New York	190,260	
J. Aron & Co	Singapore	New York	50,400	
Various	Singapore	New York	1,043,560	
Various	Penang	New York	76,580	
Fred Stern & Co	Batavia	New York	4,480	
Various	Batavia	New York	38,420	2,309,813
January 17. By the S. S. "Kumeric," at Boston.				
Hood Rubber Co	Colombo	Watertown	33,600	33,600
January 18. By the S. S. "Torniura Maru," at New York.				
Baring Brothers	Colombo	New York	113,400	
Meyer & Brown, Inc	Colombo	New York	112,000	225,400
January 19. By the S. S. "Kumeric," at New York				
Meyer & Brown, Inc	Colombo	New York	112,000	112,000

GUTTA PERCHA

January 3. By the S. S. "Ryndam," at New York.				
Austin Baldwin & Co	Rotterdam	New York	300	300

CENTRALS

January 15. By the S. S. "Panama," at New York.				
Neuss, Hesslein & Co	Cristobal	New York	1,050	
Ultramares Corp	Cristobal	New York	2,400	
Various	Cristobal	New York	3,150	6,600

AFRICANS

January 3. By the S. S. "La Perouse," at New York.				
Various	Havre	New York	259,675	259,675
January 17. By the S. S. "Schoodic," at New York.				
Various	W. African	New York	60,950	60,950

JELUTONG

	Shipment from:	Shipped to:	Pounds.	Totals.
January 20. By the S. S. "Rotterdam," at New York.				
Various	Rotterdam	New York	54,395	54,395
January 12. By the S. S. "Tydeus," at New York.				
Various	Singapore	New York	76,800	76,800
January 14. By the S. S. "Eastern Crown," at New York.				
Various	Singapore	New York	121,800	121,800
January 17. By the S. S. "Greenland," at New York.				
Various	Singapore	New York	41,100	41,100

BALATA

	Shipment from:	Shipped to:	Pounds.	Totals.
December 23. By the S. S. "Mayaro," at New York.				
Venezuela Trading Co.	Trinidad	New York	13,440	13,440
December 27. By the S. S. "Colon," at New York.				
G. Amsinck & Co., Inc.	Cristobal	New York	2,880	2,880
January 3. By the S. S. "Aurora," at New York.				
Wm. Schall & Co.	West Indies	New York	2,760	2,760
January 6. By the S. S. "Turrialba," at New York.				
G. Amsinck & Co., Inc.	Cristobal	New York	750	750
January 17. By the S. S. "Maraval," at New York.				
Various	Port of Spain	New York	102,300	102,300
January 17. By the S. S. "Quilpue," at New York.				
G. Amsinck & Co., Inc.	Guayaquil	New York	3,750	3,750

CUSTOM HOUSE STATISTICS

PORT OF NEW YORK

IMPORTS

	November 1919		November 1920	
	Pounds	Value	Pounds	Value
Unmanufactured—*free*:				
Crude rubber:				
From Belgium	46,538	$19,508	....	....
France	276,772	122,814	....	....
Netherlands	732.886	342,065	421,744	$107,974
England	12,806,275	6,479,218	95,034	28,491
Scotland	91,940	29,975	....	....
Honduras	819	169	728	250
Costa Rica	575	275	....	....
Panama	400	85	57	25
Nicaragua	8,857	2,977	....	....
Mexico	17,947	6,644	....	....
Siam	....	....	3,068,460	19,542
Portugal	....	....	29,303	4,184
Brazil	9,568,921	5,044,232	2,822,447	877,013
Colombia	31,422	10,288	4,892	2,828
Ecuador	25,257	8,028	4,335	869
Peru	475,684	160,475	124,065	33,126
Uruguay	137,034	99,456	18,386	17,624
Venezuela	33,242	13,770	40,607	11,368
British India	100,000	29,788	56,000	14,487
British Guiana	2,233	1,988	....	....
Straits Settlements	10,717,020	4,284,441	19,977,531	7,577,201
British East Indies	1,976,186	933,110	4,408,974	1,223,399
Dutch East Indies	5,475,388	2,294,524	1,594,424	1,683,499
Totals	42,525,396	$19,883,830	32,666,987	$11,601,880
Jelutong (Pontianak):				
From Straits Settlements	522,591	$50,072	278,627	$34,063
Dutch East Indies	819,095	59,348	74,405	6,722
Totals	1,341,686	$109,420	353,032	$40.785
Gutta percha:				
From England:				
Straits Settlements	110,554	$25,219	438,051	$117,186
Dutch East Indies	81,896	23,662	89,763	11,266
Philippine Islands	....	....	408	500
Totals	192,450	$48,881	528,222	$128,952
Balata:				
From Colombia	8,352	$3,585	13,099	$5,061
Panama	....	....	3,859	1,409
Venezuela	21,797	12,086	42,895	26,844
Dutch Guiana	67,815	65,904	59,092	37,295
Totals	97,964	$81,575	118,945	$70,609
Reclaimed and scrap rubber	858,287	$90,443	332,485	$21,819
Totals, unmanufactured	45,015,783	$20,214,149	33,999,671	$11,864,045
Manufactures of rubber and gutta percha	....	$59,801	....	$47,557
Chicle ....*dutiable*	213,388	149,976	38,149	16,946
Totals	213,388	$209,777	38,149	$64,503

EXPORTS

	November 1919		November 1920	
	Pounds	Value	Pounds	Value
Manufactured:				
Automobile tires	....	$1,828,484	....	$2,844,703
Inner tubes	....	....	....	429,161
Solid tires	....	....	....	195,404
All other tires	....	94,945	....	68,880
Belting	....	250,518	....	227,622
Hose	....	....	....	263,587
Packing	....	....	....	102,431
Rubber boots ....*pairs*	3,255	9,400	11,001	35,993
Rubber shoes ....*pairs*	780 326	601,870	840,620	890,512
Soles and heels	....	....	....	98,860
Druggists' sundries	....	59,724	....	138,065
Other rubber manufactures	....	352,617	....	603,424
Totals manufactured	....	$3,197,558	....	$5,898,642
Insulated wire	....	429,961	....	932,397
Fountain pens ....*number*	15,893	15,774	30,057	41,128
Suspenders and garters	....	101,183	....	266,401
Chewing gum	....	212,153	....	155,298
Totals	....	$759,071	....	$1,395,224

	November 1919		November 1920	
	Pounds	Value	Pounds	Value
Unmanufactured—*free*:				
Reclaimed and scrap rubber	519,097	$69,556	540,922	$49,880

FOREIGN EXPORTS

	November 1919		November 1920	
	Pounds	Value	Pounds	Value
Crude rubber	28,664	$12,293	304,091	$92,021
Balata	31,040	16,052	61,532	24,665
Rubber manufactures	....	....	....	1,885
Chicle	2,205	349	1,000	175

PORT OF BOSTON

IMPORTS

	November 1919		November 1920	
	Pounds	Value	Founds	Value
Unmanufactured—*free*:				
Crude rubber:				
From Straits Settlements	......	......	4,600	$1,445
British East Indies	......	......	100,800	20,876
Totals	......	......	105,400	$22,321
Rubber manufactures ....*dutiable*	......	$6,786	......	$6,736

EXPORTS

	November 1919		November 1920	
	Pounds	Value	Pounds	Value
Manufactured:				
Automobile tires	......	$77,585	......	$1,766
Inner tubes	......	......	......	187
Other tires	......	90,612	......	......
Belting	......	30,469	......	3,141
Hose	......	......	......	780
Packing	......	......	......	99
Rubber boots ....*number*	10,311	27,694	5,516	18,393
Rubber sboes ....*number*	231,875	152,647	44,444	29,163
Soles and beels	......	......	......	4,762
Druggists' sundries	......	2,808	......	6,637
Other rubber manufacturers	......	90,612	......	16,301
Totals	......	$472.427	......	$81,229
Insulated wire	......	$48,017	......	$22,938
Suspenders and garters	......	22,826	......	8,888
Rubber scrap and reclaimed	23,762	1,226	......	......
Other rubber manufactures	......	156	......	......

OFFICIAL INDIA RUBBER STATISTICS FOR THE UNITED STATES

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	November 1919		November 1920	
	Pounds	Value	Pounds	Value
Unmanufactured—*free*:				
India rubber:				
From France	276,772	$122,814	....	......
Netherlands	732,886	342,065	421,744	$107,974
Portugal	....	....	29,303	4,184
United Kingdom	12,898,215	6,509,193	95,034	28,491
Canada	9,176	3,356	3,094	1,468
Central America	10,821	3,591	785	275
Mexico	17,947	6,644	55,000	11,000
Brazil	9,568,921	5,044,232	2,822,447	877,013
Peru	475,684	160,475	124,065	33,126
Other South Am.	229,188	133,530	68,220	32,689
British E. Indies	24,368,135	9,940,555	24,547,905	8,837,408
Dutch E. Indies	6,980,890	2,864,984	4,718,969	1,734,951
Other countries	235,853	110,287	68,450	19,549
Totals	55,804,488	$25,241,726	32,955,016	$11,688,128
Balata	97,964	$81,575	118,945	$70,609
Guayule	....	....	125,000	25,000
Jelutong (Pontianak)	1,341,686	109,420	353,032	40,785
Gutta percha	192,450	48,881	528,222	128,952
Rubber scrap	1,312,638	123,775	369,355	23,844
Totals, unmanufactured	58,749,226	$25,605,377	34,449,570	$11,977,318
Chicle (dutiable)	617,749	$426,563	447,207	$292,704
Manufactured—*dutiable*:				
India rubber and gutta percha	......	$71,272	....	$65,366

EXPORTS OF DOMESTIC MERCHANDISE

	November 1919		November 1920	
	Pounds	Value	Pounds	Value
Manufactured—				
India rubber:				
Scrap and old	941,616	$92,451	791,364	$50,723
Reclaimed	533,802	89,397	205,165	36,270
Belting[1]	....	518,715 (Belting, Hose, Packing)	....	441,028
Hose[1]	....		....	347,134
Packing[1]	....		....	146,626
Boots[1] ....*pairs*	21,591	63,205	21,345	70,683
Shoes[1] ....*pairs*	1,028,373	774,843	918,900	965,492
Soles and heels[1]	....	....	....	116,057
Tires:				
For automobiles[1]	....	2,438,958	....	....
Casings[1]	....	....	....	3,443,128
Inner tubes[1]	....	....	....	511,219
Solid tires[1]	....	....	....	286,266
All other tires[1]	....	104,692	....	78,520
Druggists' rubber sundries[1]	....	108,169	....	174,304
Suspenders and garters	....	158,269	....	317,952
Other rubber manufactures[1]	....	773,052	....	841,302
Totals, manufactured	....	$5,121,751	....	$7,826,704
Fountain pens ....*number*	28,820	$24,890	33,870	$44,253
Insulated wire and cables[1]	....	535,746	....	1,033,898

EXPORTS OF FOREIGN MERCHANDISE

	November			
	1919		1920	
	Pounds	Value	Pounds	Value
Unmanufactured—				
India rubber	245,255	$96,376	560,198	$139,608
Balata	42,844	22,740	61,532	24,665
Jelutong (Pontianak)	63,414	10,914	....	....
Totals unmanufactured	351,513	$130,030	621,730	$164,273
Manufactured—				
Gutta percha	....	$325	....	$1,885
Totals, manufactured	....	$325	....	$1,885

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES

	November			
	1919		1920	
	Pounds	Value	Pounds	Value
Manufactured—				
To Alaska:				
Belting, hose and packing	....	$2,599	....	$9,137
Boots and shoes..*pairs*	6,059	15,305	2,802	6,765
Other rubber goods..	....	3,056	....	2,710
Totals	....	$20,960	....	$18,612
To Hawaii:				
Belting, hose and packing	....	$20,167	....	$27,613
Automobile tires	....	138,314	....	107,866
Other tires	....	5,423	....	1,390
Other rubber	....	15,895	....	21,593
Totals	....	$179,799	....	$158,462
To Porto Rico:				
Belting, hose and packing	....	$5,408	....	$13,385
Automobile tires	....	47,752	....	166,757
Other tires	....	2,413	....	1,988
Other rubber goods...	....	17,044	....	74,015
Totals	....	$72,617	....	$256,145

To Philippine Islands—treated as foreign commerce.

[1]Details of exports of domestic merchandise by countries during November, 1920, will be published in our next issue.

OFFICIAL INDIA RUBBER STATISTICS FOR THE UNITED STATES

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	October			
	1919		1920	
	Pounds	Value	Pounds	Value
Unmanufactured—*free:*				
India rubber:				
From France	903,765	$277,812	......	......
Netherlands	424,224	202,338	51,546	$24,993
United Kingdom..	8,813,978	4,345,532	143,263	43,655
Canada	66,374	27,179	2,393	1,228
Central America..	23,065	7,654	8,252	2,347
Mexico	8,216	2,417	10,712	1,835
Brazil	2,941,514	1,302,557	2,369,369	576,346
Peru	68,988	19,576	50,629	13,705
Other South Am..	247,132	91,643	44,841	15,738
British East Indies	23,773,158	9,702,603	14,143,006	5,333,778
Dutch East Indies.	5,819,796	2,470,701	3,623,229	1,487,785
Other countries...	636,165	279,639	68,850	17,470
Totals	43,726,375	$18,729,651	20,516,090	$7,518,880
Balata	148,528	$84,588	112,017	$72,916
Guayule	179,639	31,213	270,000	54,000
Jelutong (Pontianak)	2,530,053	381,577	317,222	37,433
Gutta percha	769,115	127,322	524,064	119,001
Rubber scrap	1,235,953	82,903	397,321	18,304
Totals, unmanufactured	48,589,663	$19,437,254	22,136,714	$7,820,534
Chicle (dutiable)	960,482	$652,987	665,368	$453,963
India rubber and gutta percha	......	54,951	......	87,883
India rubber substitutes..	......	......	15,620	3,385

EXPORTS OF DOMESTIC MERCHANDISE

	October			
	1919		1920	
	Pounds	Value	Pounds	Value
Manufactured—				
India rubber:				
Scrap and old	854,635	$73,052	826,556	$63,789
Reclaimed	607,472	105,831	234,872	47,168
Belting[1]	......		......	283,958
Hose[1]	......	400,553	......	399,624
Packing[1]	......		......	182,976
Boots[1] ...*pairs*	29,045	67,203	24,962	82,970
Shoes[1] ...*pairs*	587,953	490,094	666,948	699,174
Soles and heels[1]	......	......	......	86,780
Tires:				
For automobiles[1]	......		......	3,789,819
Casings[1]	......	2,488,299	......	459,490
Inner tubes[1]	......		......	167,332
Solid tires[1]	......		......	
All other tires[1]	......	147,373	......	72,033
Druggists' rubber sundries[1]	......	117,373	......	156,184
Suspenders and garters...	......	202,814	......	316,072
Other rubber manufactures[1]	......	769,396	......	693,110
Totals, manufactured.	......	$4,861,988	......	$7,500,479
Fountain pens.....*number*	34,806	$41,885	56,276	$63,191
Insulated wire and cables.	......	487,444	......	575,041

EXPORTS OF FOREIGN MERCHANDISE

	October			
	1919		1920	
	Pounds	Value	Pounds	Value
Unmanufactured—				
India rubber	637,640	$266,475	1,851,266	$524,603
Gutta percha	2,450	1,432	....	......
Balata	5,300	3,366	41,320	17,219
Jelutong (Pontianak)	......	......	30,000	3,360
Rubber scrap	548	14	4,800	930
Totals, unmanufactured	645,938	$271,287	1,927,386	$546,112
Manufactured—				
Gutta percha and India rubber	......	$19,842	......	$3,228
India rubber substitutes...	......	......	44,250	14,632
Totals, manufactured.	......	$19,842	......	$17,860

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES

	October			
	1919		1920	
	Pounds	Value	Pounds	Value
Manufactured—				
To Alaska:				
Belting, hose and packing	......	$5,344	......	$7,730
Boots and shoes..*pairs*	5,297	11,788	12,082	24,142
Other rubber goods....	......	5,714	......	4,825
Totals	......	$22,846	......	$36,697
To Hawaii:				
Belting, hose and packing	......	$5,324	......	$34,145
Automobile tires	......	29,235	......	147,748
Other tires	......	......	......	5,764
Other rubber	......	5,502	......	26,442
Totals	......	$40,061	......	$214,099
To Porto Rico:				
Belting, hose and packing	......	$7,481	......	$7,747
Automobile tires	......	77,236	......	139,299
Other tires	......	13,130	......	635
Other rubber goods...	......	23,562	......	85,050
Totals	......	$121,409	......	$232,731

To Philippine Islands—treated as foreign commerce.

[1]Details of exports of domestic merchandise by countries during October, 1920, were given on pages 304-305 of our January issue.

RUBBER STATISTICS FOR THE DOMINION OF CANADA

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	October			
	1919		1920	
	Pounds	Value	Pounds	Value
Unmanufactured—*free:*				
Rubber, gutta percha, etc.:				
From United Kingdom	216,478	$98,600	44,064	$15,518
United States	536,077	238,737	614,012	160,898
British East Indies:				
Straits Settlements.	986,643	494,315	946,660	466,262
Dutch East Indies...	114	57	......	......
Totals	1,739,312	$831,709	1,604,736	$642,678
Rubber recovered	333,677	$51,989	229,782	$43,166
Rubber, powdered, and rubber or gutta percha scrap	300,819	28,897	347,004	21,916
Rubber substitutes	209,402	23,728	107,433	12,281
Totals, unmanufactured..	2,583,210	$936,323	2,288,955	$720,041
Partly Manufactured—				
Hard rubber sheets and rods.	2,379	1,980	3,911	2,749
Hard rubber tubes	......	3,598	......	7,732
Rubber thread, not covered..	7,379	10,644	5,280	5,242
Totals, partly manufactured	9,758	$16,222	9,191	$15,723
Manufactured—				
Belting	......	$20,174	......	$16,600
Hose	......	8,268	......	15,184
Packing	......	5,966	......	7,279
Boots and shoes	......	29,499	......	30,105
Clothing, including waterproofed	......	13,700	......	8,653
Gloves	......	962	......	1,560
Hot water bottles	......	3,266	......	2,838
Tires, solid	......	13,904	......	10,349
Tires, pneumatic	......	67,601	......	240,362
Tires, inner tubes	......	3,231	......	28,052
Other manufactures	......	193,318	......	226,288
Totals, manufactured....	......	$359,889	......	$587,270
Totals, rubber imports...	2,592,968	$1,312,434	2,298,146	$1,323,034
Insulated wire and cables:				
Wire and cables covered with cotton, linen, silk, rubber, etc.	......	$14,331	......	$14,936
Copper wire and cables, covered as above	......	11,306	......	43,944
Chicle	245,425	180,935	47,575	23,363

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS

	October			
	1919		1920	
	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
Unmanufactured				
Crude and waste rubber	$46,352	$15,601	$3,856	......
Manufactured				
Belting	3,204	......	8,330	......
Hose	29,730	......	20,458	......
Boots and shoes	167,820	...	93,830	......
Clothing, including water proofed	5,150	440	1,952	$832
Tires	12,667	5,607	2,689	135
Tires, pneumatic	507,847	......	862,067	......
Other manufactures	27,677	23,320	84,111	3,483
Totals, manufactured	$754,095	$29,367	$1,073,437	$4,450
Totals, rubber exports	$800,447	$44,968	$1,077,293	$4,450
Insulated wire and cable:				
Copper wire and cable	......	......	$46,756	......
Chicle	$108,890	......	75,726	......

UNITED KINGDOM RUBBER STATISTICS

IMPORTS

	November			
	1919		1920	
	Pounds	Value	Pounds	Value
Unmanufactured—				
Crude rubber:				
From—				
Straits Settlements	4,270,100	£514,335	6,730,300	£454,284
Federated Malay States	3,353,900	355,463	7,098,000	471,713
British India	327,700	38,049	758,700	48,839
Ceylon and dependencies	2,923,600	314,032	4,574,500	286,140
Other Dutch possessions in Indian Seas	484,600	48,444	1,025,600	65,534
Dutch East Indies (except other Dutch possessions in Indian Seas)	1,784,700	183,465	2,569,600	171,603
Other countries in the East Indies and Pacific not elsewhere specified	52,300	6,192	327,300	22,869
Brazil	724,000	82,517	1,169,300	77,498
Peru	180,900	19,240	19,600	1,223
South and Central America (except Brazil and Peru)	1,100	105	1,900	100
West Africa:				
French West Africa	20,000	2,200	......	......
Gold Coast	52,800	6,036	8,800	151
Other parts of West Africa	54,200	4,485	23,600	1,464
East Africa (including Madagascar)	6,100	740	118,800	6,517
Other countries	160,800	18,246	83,400	6,561
Totals	14,396,800	£1,593,549	24,509,400	£1,614,496
Waste and reclaimed rubber	627,400	19,189	432,700	7,625
Totals, unmanufactured	15,024,200	£1,612,738	24,942,100	£1,622,121
Gutta percha and balata	1,197,000	£194,484	665,000	£132,871
*Rubber substitutes	......	......	1,700	115
Manufactured—				
Boots and shoes...*dozen pairs*	19,074	£40,001	11,314	£31,069
Waterproof clothing	......	3,955	......	424
Insulated wire	......	2,598	......	3,731
Tires and tubes	......	221,791	......	422,281
Other rubber manufactures	......	45,808	......	71,320

EXPORTS

	November			
	1919		1920	
	Pounds	Value	Pounds	Value
Unmanufactured—				
Waste and reclaimed rubber	959,300	£26,535	1,783,800	£49,779
*Rubber substitutes	......	......	108,000	3,809
Totals	......	£26,535	......	£53,588
Manufactured				
Boots and shoes ..*dozen pairs*	11,194	£27,498	21,722	£41,672
Waterproof clothing	......	286,195	......	208,750
Insulated wire	......	95,201	......	200,220
Submarine cables	......	50,399	......	81,609
Tires and tubes	......	416,684	......	481,936
Other rubber manufactures	......	298,334	......	403,989

EXPORTS—COLONIAL AND FOREIGN

	November			
	1919		1920	
	Pounds	Value	Pounds	Value
Unmanufactured				
Crude rubber:				
To Russia	5,600	£420	37,700	£4,215
Sweden, Norway and Denmark	425,000	45,427	293,400	25,120
Germany	521,800	51,191	1,927,300	110,432
Belgium	584,900	61,856	213,600	14,897
France	1,755,900	183,108	649,200	45,215
Spain	69,000	7,932	77,000	6,101
Italy	191,900	16,063	101,800	8,213
Austria Hungary	44,900	4,911	9,000	665
Other European countries	344,600	33,329	407,200	27,893
United States	10,127,500	1,088,897	66,500	7,255
Canada	1,135,600	131,021	350,500	33,196
Other countries	89,000	10,895	112,300	12,865
Totals, rubber	15,295,700	£1,635,050	4,245,500	£296,067
Waste and reclaimed rubber	220,800	£7,856	17,100	£925
Gutta percha and balata	184,700	33,610	25,800	6,715
Manufactured				
Boots and shoes...*dozen pairs*	254	£533	1,582	£7,722
Waterproof clothing	......	305	......	......
Tires and tubes	......	6,016	......	63,011
Insulated wire	.....	......	......	29
Other manufactures	......	6,551	......	4,378
Totals, manufactured	......	£13,405	......	£75,140

*Included in "Other Articles," Class III T., prior to 1920.

THE MARKET FOR COTTON AND OTHER FABRICS

NEW YORK

Unwillingness to sell on the part of holders of American cotton was noticeable early in the month and possibly may explain the upward tendency of prevailing prices. Middling uplands spot sold for 16 cents on January 3, compared with 39.25 cents a year ago. Prices continued to advance and reached 18.25 cents the high level for the month. With minor fluctuations the market sagged off and on January 22, middling uplands was quoted 16.15 cents for spot.

Arizona Cotton. The prices of Arizona cotton are higher than Sakellarides, but there is practically no demand at present for this staple. It is understood that the acreage of Arizona cotton for the coming season will be reduced at least 50 per cent and much shorter cotton planted. No. 2 Pima is quoted 30 to 35 cents although inferior lots have been offered at 30 cents. The quantity price of Salt River Valley cotton is around 40 cents.

Egyptian Cotton. This market has been somewhat easier but has not reacted to the point reached late in December. Features that operate to support values are the strength of sterling exchange and the attempt to hold one-third of the Egyptian crop through a syndicate. Quotations on Sakellarides were 30 to 35 cents according to grade, and 20 to 25 cents for Uppers. Cables from Alexandria indicate that prices will not go much lower.

EXPORTS OF INDIA RUBBER AND CAUCHO FROM MANAOS AND IQUITOS DURING NOVEMBER, 1920

	EUROPE					NEW YORK					
Exporters	Fine	Medium	Coarse	Caucho	Totals	Fine	Medium	Coarse	Caucho	Total	Grand Totals
Stowell & Co. ...*kilos*	224,566	10,974	9,721	179,628	424,889	26,363	323	7,998	......	34,684	459,573
General Rubber Co. of Brazil	50,368	3,024	8,597	11	62,000	146,641	20,077	39,171	40,561	246,450	308,450
Tancredo, Porto & Co.	16,219	6,360	....	....	22,579	27,190	685	10,148	11,655	49,678	72,257
Obliger & Co.	17,577	701	1,834	5,851	25,963	....	....	....	....	....	25,963
Companhia Fluvial	13,304	....	856	3,416	17,576	....	....	....	....	....	17,576
Semper & Co.	10,560	960	1,230	570	13,320	....	....	.....	....	....	13,320
Higson & Fall	5,950	....	2,030	....	7,980	....	....	....	....	....	7,980
J. G. Araujo	....	....	828	654	1,482	....	....	....	....	....	1,482
Totals from Manáos ...*kilos*	338,544	22,019	25,096	190,130	575,789	200,194	21,085	57,317	52,216	330,812	906,601
In transit from Iquitos	5,182	1,914	3,176	1,887	12,159	33,048	21,834	5,328	2,046	62,256	74,415
Totals ...*kilos*	343,726	23,933	28,272	192,017	587,948	233,242	42,919	62,645	54,262	393,068	981,016

Compiled by Stowell & Co., Manáos, Brazil.

SEA ISLAND COTTON. This is practically a dead market although there is some stock carried over and available at 45 cents for extra choice.

RAINCOAT FABRICS. Business has been very good on 64-60 olive drab, but this is about the only cloth that has been moving at all. Raincoat concerns prefer liquidating their stocks before making new commitments on cotton fabrics, although it is the general opinion that prices are low, and advances will be seen very shortly.

DUCKS AND DRILLS. This market has been more active and prospects for improvement in the near future are good. Prices have not materially changed from last month's quotations.

SHEETINGS. The general buying of 40-inch sheetings has improved during the past two weeks. Mills making 40-inch, 2.85-yard sheeting are comfortably fixed with orders for delivery up to May, which is as far as they care to sell. Other light-weight sheetings have also been selling freely. Buying by the rubber trade is still dead.

TIRE FABRICS. Mill quotations are still unavailable as the situation is the same as it has been over the past few months, in which only distressed fabric is being offered. There is, however, a better feeling among tire manufacturers and shipping instructions have been given in some instances on old contracts, but up to the present there have been practically no bona fide inquiries. It is estimated that the stocks of the tire manufacturers will become unbalanced and necessitate purchasing in the near-by months. There is absolutely no interest in tire fabrics at the present time.

TIRE YARNS. The situation among the yarn manufacturers supplying the weaving and knitting trades has improved as well as the demand for print cloths and other staples, so that the mills are now operating in a small way with about an even break, their product having been sold at a loss. The general textile situation looks better.

NEW YORK QUOTATIONS

JANUARY 24, 1921

Prices subject to change without notice

ASBESTOS CLOTH:				
Brake lining, 2½ lbs. sq. yd., brass or copper insertion	*lb.*		@	
2¼ lbs. sq. yd., brass or copper insertion	*lb.*		@	
BURLAPS:				
32—7-ounce	*100 yards*	$4.50	@	
32—8-ounce		4.65	@	
40—7½-ounce		5.00	@	
40—8-ounce		5.15	@	
40—10-ounce		5.50	@	
40—10½-ounce		5.75	@	
45—7½-ounce		5.50	@	
45—8-ounce		5.75	@	
48—10-ounce		9.00	@	
DRILLS:				
38-inch 2.00-yard	*yard*	.22½	@	.23½
40-inch 2.47-yard		.18¼	@	.19
52-inch 1.90-yard		.23	@	.24⅛
52-inch 1.95-yard		.23¼	@	.24¾
60-inch 1.52-yard		.29⅝	@	.30⅛
DUCK:				
CARRIAGE CLOTH:				
38-inch 2.00 yard enameling duck	*yard*	.23½	@	
48-inch 1.74-yard		.27	@	
72-inch 16.66-ounce		.63½	@	
72-inch 17.21-ounce		.66⅛	@	
MECHANICAL:				
Hose	*pound*	.43	@	
Belting		.43	@	
HOLLANDS, 40-INCH:				
Acme	*yard*	.24	@	
Endurance		.28	@	
Penn		.34	@	
OSNABURGS:				
40-inch 2.35-yard	*yard*		@	
40-inch 2.48-yard			@	
37½-inch 2.42-yard			@	
RAINCOAT FABRICS:				
COTTON:				
Bombazine 64 x 60	*yard*	.12½	@	
60 x 48		.11½	@	
Cashmeres, cotton and wool, 36-inch, tan		.80	@	
Twills 64 x 72		.20	@	
64 x 102		.22	@	
Twill, mercerized, 36-inch, blue and black		.29½	@	
tan and olive		.27	@	
Tweed		.40	@	1.00
printed		.22½	@	
Plaids 60 x 48		.12½	@	
56 x 44		.12	@	
Repp		.30	@	.35
Prints 60 x 48		.13	@	
64 x 60		.14	@	
IMPORTED WOOLEN FABRICS SPECIALLY PREPARED FOR RUBBERIZING—PLAIN AND FANCIES:				
63-inch, 3¼ to 7½ ounces	*yard*	.81	@	2.22
36-inch, 2¾ to 5 ounces		.63	@	1.62
IMPORTED PLAID LINING (UNION AND COTTON):				
63-inch, 2 to 4 ounces	*yard*	.71	@	1.57
36-inch, 2 to 4 ounces		.44	@	.84
SHEETINGS, 40-INCH				
48 x 48, 2.35-yard	*yard*		@	
48 x 48, 2.50-yard		.13	@	
48 x 48, 2.85-yard		.11½	@	
64 x 68, 3.15-yard		.13	@	
56 x 60, 3.60-yard		.10¼	@	
48 x 44, 3.75-yard		.09½	@	

SILKS:		
Canton, 38-inch ......yard	.30	@
Schappe, 36-inch	.50	@
STOCKINETTES:		
SINGLE THREAD.		
3½ Peeler, carded ......pound		@
4½ Peeler, carded	.55	@
6½ Peeler, combed	.85	@
DOUBLE THREAD:		
Zero Peeler, carded ......pound	.45	@
3½ Peeler, carded	.52½	@
6½ Peeler, combed		@
TIRE FABRICS:		
BUILDING:		
17¼-ounce Sakellarides, combed ......pound	*2.35	@
17¼-ounce Egyptian, combed	*2.15	@
17¼-ounce Egyptian, carded	*2.05	@
17¼-ounce Peeler, combed	*2.25	@
17¼-ounce Peeler, carded	*1.47	@
CORD:		
15-ounce Egyptian ......pound	*2.40	@
BICYCLE:		
8-ounce American ......pound	*1.50	@
10-ounce American	*1.48	@
CHAFER:		
9¼-ounce Sea Island ......pound		@
9¼-ounce Egyptian, carded	*2.29	@
9¼-ounce Peeler, carded	*1.71	@

*Mill prices of August 1, 1920.

THE EGYPTIAN COTTON CROP FOR 1919-20

Approximately 652,240,017 pounds of Egyptian cotton are available this season, according to a report from Consul Lester Maynard at Alexandria, and which total is made up from a carry-over of 39,421,998 pounds on September 1, 1920, and the estimated new crop of 612,818,019 pounds. In view of the fact that the 1920 yield was 74,346,228 pounds greater than the previous season and the heavy falling off in the demand from the United Kingdom, the principal buyer; due to disturbed economic conditions a further fall in price in addition to the drop of 25 per cent from the figures ruling last winter, is forecasted. Growers fear competition with California and Arizona planters who have had a large crop of high quality, and restriction of credit is also forcing many who were holding back their crops for higher prices to sacrifice them.

According to the Ministry of Agriculture, 1,897,418 acres are planted to cotton in Egypt, thus breaking all records, but of the total acreage only 69.5 per cent has been planted to Sakellarides cotton, as compared with 73 per cent for the two preceding seasons. The estimated yield for the whole of Egypt per acre is 336 pounds.

Salient features of the 1919-1920 season were the remarkable size of the crop, the extraordinary prices paid, and the unprecedented shipments to the United States, where, it is believed, there is still a considerable amount of Egyptian cotton on hand, despite large resales to Liverpool. The American purchases were 256,555 bales, compared with 95,262 for the preceding season. Incidentally Boston assumed first place in the world as a foreign importing port of Egyptian cotton, its imports of the latter almost equalling those of Liverpool and Manchester combined.

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS

NEW YORK

This market has been featured by general dullness with slightly downward tendency in prices noted in lead pigments and lithopone. The trade in general has not experienced much renewed activity since the holiday and inventory season. On all sides there is an apparently well founded feeling of optimism that trade and industry will share a goodly season of prosperity with the coming of Spring.

Aniline Oil. The market was well stocked at the first of the year and in response to a strong demand prices advanced two cents per pound early in the month, holding firm at 23 to 26 cents, and later rising to 26 to 30 cents.

Barytes. The demand has remained moderate the whole month with prices unchanged. Several barytes companies in St. Louis have consolidated into a new absolutely independent organization.

Benzol. The market has been mostly dull with slight tendency to improve. The grades were quoted as follows, 90 per cent at 28 cents and pure at 30 cents per pound.

Blacks. Demand very moderate and prices nominal for several weeks past.

Blanc Fixe. Very quiet, only routine demand.

Blue Lead. Early in the month quotations were 8¼ to 8½ cents, falling promptly in common with the other lead pigments by one cent per pound to 7¼ cent level.

Carbon Bisulphide. The demand has been limited and quotations stood at 8 to 9 cents per pound.

Carbon Tetrachloride. The market was very quiet most of the month, the prices rising the last week from 11 to 12 cents to 12 to 12½ cents under firmer demand.

China Clay. Light importations and very moderate demand for stock.

Dry Colors. The market has been subject to some price cutting to stimulate purchases but higher values are anticipated in the near future.

Hexamethylene Tetramine. Quotations early in the month were $1.40 to $1.60 per pound, declining later to $1.15 to $1.20.

Litharge. The early price was 9¾ to 10 cents with light demand prevailing. The price suffered a decline of one cent per pound, in common with sublimed lead and blue lead. The rubber industry has been taking very little litharge since the first of the year.

Lithopone. Stocks are accumulating with the producers and although the current quotations held for the first half of the month at 7¾ to 8 cents, toward the latter part they were cut to 7 to 7¼ cents, due to action of the producers to curtail their costs of production, partly by reduction of wages to a more reasonable level.

Solvent Naphtha. The demand has been very inactive.

Sublimed Lead. This material has been affected by the same influences and subject to a common price reduction of one cent a pound as the other lead pigments, the latest quotations being 7¼ to 7½ cents a pound.

Sulphur. The market has held throughout the month quite inactive. Commercial flour was quited at $1.60 per hundredweight.

Whiting. The demand has continued routine only.

Zinc Oxide. The factories are producing at full capacity in anticipation of an early spring demand on the part of the manufacturers with the revival of automobile production for the coming season.

NEW YORK QUOTATIONS

January 24, 1921

Prices subject to change without notice

ACCELERATORS, ORGANIC			
Accelerene (f. o. b. English port)	lb.	13s. 6d.	
Accelemal	lb.		@
Aldehyde ammonia crystals	lb.	$1.15	@$1.20
Aniline oil	lb.	.24	@
Excellerex	lb.		@
Hexamethylene tetramine (powdered)	lb.	1.15	@ 1.20
N. C. C.	lb.		@
No. 999	lb.	.17½	@

Paraphenylenediamine ..	lb.	@
Thiocarbanilide	lb.	$0.60 @ $0.65
Velosan	lb.	@
Vul-Ko-Cene	lb.	@
Virol	lb.	.60 @

ACCELERATORS, INORGANIC

Lead, dry red (bbls.)	lb.	.10¼ @
sublimed blue (bbls.)	lb.	.08¼ @
sublimed white (bbls.)	lb.	.08¼ @
white, basic carbonate (bbls.)	lb.	.08 @
Lime, flour	lb.	.02 @ .02½
Superfine, "Cream of Lime"	lb.	.03 @
Litharge, domestic	lb.	.10 @
imported	lb.	@
sublimed	lb.	@
Magnesium, carbonate, light	lb.	.10 @ .12
calcined extra light	lb.	55 @
calcined light	lb.	.25 @ .30
calcined medium light	lb.	.20 @
calcined heavy	lb.	.07 @ .08
calcined commercial (magnesite)	lb.	.05 @
oxide, extra light	lb.	60 @
light technical	lb.	35 @
light, imported	lb.	.55 @
imported	lb.	.55 @
light, commercial	lb.	.22 @

ACIDS

Acetic, 28 per cent	lb.	.10½ @
glacial, 99 per cent	lb.	.22¾ @
Aqua fortis	cwt.	6.40 @
Cresylic (97% straw color) (bbl.)	gal.	.95 @ 1.02
(95% dark) (bbl.)	gal.	.90 @ .97
Muriatic, 20 degrees	lb.	.05 @
Nitric, 36 degrees	cwt.	6.28 @
Sulphuric, 66 degrees	lb.	.02½ @

ALKALIES

Caustic soda, 76 per cent (bbls.)	lb.	.06½ @
Soda ash (bbls.)	lb.	.04 @

COLORS

Black:

Bone, powdered	lb.	.06 @
granulated	lb.	.11 @
Carbon black (sacks, factory)	lb.	.12 @ .20
pressed	lb.	.16 @ .17
Dipped goods	lb.	1.00 @
Drop	lb.	.07½ @ .18
Ivory black	lb.	.18 @ .45
Lampblack	lb.	.16 @ .45
Oil soluble aniline	lb.	.95 @
Rubber black	lb.	.08 @
Rubber makers' black	lb.	.40 @

Blue:

Cobalt	lb.	.25 @ .30
Dipped goods	lb.	1.00 @
Prussian	lb.	.60 @
Ultramarine	lb.	.18 @ .35
Rubber makers' blue	lb.	3.50 @

Brown:

Iron oxide	lb.	@
Sienna, Italian, raw and burnt	lb.	.06 @ .15
Umber, Turkey, raw and burnt	lb.	.05 @ .06½
Vandyke	lb.	.06 @ .10
Maroon oxide	lb.	.13½ @

Green:

Chrome, light	lb.	.40 @ .45
medium	lb.	.45 @ .58
dark	lb.	.50 @ .65¾
commercial	lb.	.10 @ .15
tile	lb.	.10 @ .20
Dipped goods	lb.	1.00 @
Oxide I. R.	lb.	@
Oxide of chromium (casks)	lb.	.90 @
Rubber makers' green	lb.	3.50 @

Red:

Antimony, crimson, sulphuret of (casks)	lb.	.44 @ .45
crimson, "R. M. P."	lb.	.55 @
Antimony, golden sulphuret of (casks)	lb.	$0.26 @ $0.40
golden, "R. M. P."	lb.	.25 @
7-A	lb.	.42 @
vermilion sulphuret	lb.	.65 @
red sulphuret	lb.	.25 @
Arsenic, red sulphide	lb.	.13 @
Dipped goods, red	lb.	1.25 @
purple	lb.	1.25 @
orange	lb.	1.25 @
Indian ..	lb.	.13½ @ .15
Para toner	lb.	1.90 @
Red excelsior	lb.	@
Toluidine toner	lb.	3.25 @ 3.50
Iron oxide, reduced grades	lb.	.02½ @ .11½
pure bright	lb.	.14½ @ .16½
Spanish neutral	lb.	.05½ @ .08
Venetian	lb.	.03½ @ .07
Oil soluble aniline, red	lb.	1.95 @
orange	lb.	1.60 @
Oximony	lb.	.18 @
Vermilion, American	lb.	@
permanent	lb.	.34 @
English quicksilver	lb.	1.05 @
Rubber makers' red	lb.	3.50 @ 4.00
purple	lb.	2.50 @

White:

Albalith	lb.	@
Aluminum bronze, extra brilliant	lb.	@
extra fine	lb.	@
Lithopone, Beckton white	lb.	.07¼ @ .08
Lithopone	lb.	.07 @ .07½
Ponolith (carloads, factory)	lb.	@
Rubber-makers' white	lb.	@
Zinc oxide, American Horse Head brand (factory):		C. L. — L. C. L.
Special	lb.	.10 @ .10½
XX red	lb.	.09½ @ .10
French process, Florence brand (factory):		
White seal	lb.	.13 @ .13¼
Green seal	lb.	.11¾ @ .12¼
Red seal	lb.	.10¾ @ .11¼
White seal, imported	lb.	.14 @
Azo factory:		
ZZZ (lead free)	lb.	.09½ @ .10
ZZ (under 5% leaded)	lb.	.08½ @ .09
Z (8-10% leaded)	lb.	.08⅛ @ .08⅝
Standard AA	lb.	.09 @

Yellow:

Cadmium, sulphide, yellow, light, orange	lb.	@
red	lb.	@
Chrome, light and medium	lb.	.28 @
Dipped goods	lb.	1.25 @
Ochre, domestic	lb.	.02½ @ .05½
imported	lb.	.04 @
Rubber makers' yellow	lb.	.60 @ 2.50
Zinc chromate	lb.	.42 @ .45
Oil soluble aniline	lb.	1.70 @

COMPOUNDING INGREDIENTS

Aluminum flake (carload)	ton	33.00 @ 45.00
hydrate	lb.	@
silicate	ton	@
Ammonium carbonate (powdered)	lb.	.16¼ @
Asbestine (carloads)	ton	17.00 @ 36.00
Barium, carbonate, precipitated	ton	85.00 @
dust	ton	110.00 @
Barytes, pure white (f. o. b. works)	ton	28.00 @ 45.00
off color	ton	20.00 @ 30.00
uniform floated	ton	28.00 @
German "Cream"	ton	@
Basofor	lb.	.05½ @
Blanc fixe (dry, bbls.)	lb.	.05½ @ .06¼
Bone ash	lb.	.10 @
Carrara filler	lb.	.02 @
Chalk, precipitated, extra light	lb.	.04½ @ .05
heavy	lb.	.03½ @ .04
China clay, Dixie	ton	22.00 @
Blue Ridge	ton	22.00 @
domestic	ton	10.00 @ 20.00
imported	ton	30.00 @
Cotton linters, clean mill run, f. o. b. factory	lb.	.02½ @
Fossil flour (powdered)	ton	60.00 @
(bolted)	ton	65.00 @
Diatomite	lb.	@

Glue, high grade	lb.	$0.35 @ $0.45
medium	lb.	.29 @ .34
low grade	lb.	.21 @ .25
Graphite, flake (400-pound bbl.)	lb.	.10 @ .25
amorphous	lb.	.04 @ .08
Ground glass FF. (bbls.)	lb.	.05 @
Infusorial earth (powdered)	ton	60.00 @
(bolted)	ton	65.00 @
Liquid rubber	lb.	.16½ @
Mica, powdered	lb.	.15 @
Pumice stone, powdered (bbl.)	lb.	.05 @
Rotten stone, powdered	lb.	@
Rubber paste	lb.	@
Silica, gold bond	ton	45.00 @
silver bond	ton	[illegible]5.00 @
Soap bark	lb.	.24 @
Soapstone, powdered gray (carload)	ton	12.00 @
Starch, powdered corn	cwt.	2.68 @
Talc, powdered soapstone	ton	18.00 @ 25.00
Terra blanche	ton	@
Tripoli earth, air-floated, cream or rose (factory)	ton	35.00 @
white (factory)	ton	.40 @
Tyre-lith	ton	100.00 @
Whiting, Alba (carloads)	cwt.	.75 @ .90
Columbia	cwt.	@
commercial	ton	25.00 @
Danish	ton	20.00 @
English cliffstone	cwt.	2.00 @
gilders	cwt.	1.45 @ 1.90
Paris, white, American	ton	25.00 @
Quaker	ton	13.00 @
Super	ton	@
Wood pulp, imported	lb.	@
XXX	ton	45.00 @
X	ton	40.00 @
Wood flour, American	ton	40.00 @

MINERAL RUBBER

Elateron (c. l. factory)	ton	@
(l. c. l. factory)	ton	@
Gilsonite	ton	70.00 @
Genasco (c. l. factory)	ton	62.50 @
(l. c. l. factory)	ton	64.50 @
Hard hydrocarbon	ton	42.00 @
Soft hydrocarbon	ton	40.00 @
K-X	ton	@
K. M. R.	ton	@
M. R. X.	ton	@
Pioneer (c. l. factory)	ton	60.00 @
(l. c. l. factory)	ton	65.00 @
Raven M. R.	ton	@
Refined Elaterite	ton	@
318/320 M. P. hydrocarbon (c. l. factory)	ton	50.00 @ 55.00
(l. c. l. factory)	ton	57.50 @
300/310 M. P. hydrocarbon (c. l. factory)	ton	40.00 @
(l. c. l. factory)	ton	45.00 @
States "A" (c. l. factory)	ton	55.00 @
No. 1 (c. l. factory)	ton	45.00 @
Robertson, M. R. pulverized (c. l. factory)	ton	95.00 @
M. R. pulverized (l. c. l. factory)	ton	97.50 @
M. R. (c. l. factory)	ton	72.50 @
M. R. (l. c. l. factory)	ton	75.00 @
Rubrax (factory)	ton	50.00 @ 60.00
Synpro, granulated	ton	87.50 @
Walpole rubber flux (factory)	lb.	@

OILS

Avoilas compound	lb.	.16 @
Castor, No. 1, U. S. P.	lb.	.12 @
No. 3, U. S. P.	lb.	.11 @
Corn	lb.	.10 @
Cotton	lb.	.10 @
Glycerine (98 per cent)	lb.	.23 @
Linseed, raw (carloads)	gal.	.75 @
Linseed compound	gal.	@
Palmoline	lb.	.14 @ .16
Palm niger	lb.	.09 @
Palm "Lagos"	lb.	.11½ @
Palm special	lb.	@
Peanut	lb.	.14 @
Petrolatum	lb.	.10 @
Petrolatum, sticky	lb.	.12 @
Petroleum grease	lb.	$0.07½ @ $0.09
Pine, steam distilled	gal.	1.25 @ 1.45
Rapeseed, refined	lb.	.16 @
blown	lb.	.17 @
Rosin	gal.	.40 @ .75
Synpro	gal.	.48 @ .80
Soya bean	lb.	.10 @
Tar	gal.	.35 @ .39

RESINS AND PITCHES

Balsam, fir	gal.	2.00 @
Cantella gum	lb.	.50 @
Cumar resin, hard	lb.	.12 @ .16
soft	lb.	.09 @ .13
Tar, retort	bbl.	14.50 @ 15.00
kiln	bbl.	14.50 @ 15.00
Pitch, Burgundy	lb.	.06 @
coal tar	lb.	.01½ @
pine tar	lb.	.04 @
ponto	lb.	.14 @
Rosin, K	280 lbs.	9.90 @
strained	280 lbs.	8.95 @
Shellac, fine orange	lb.	1.20 @

SOLVENTS

Acetone (98.99 per cent drums)	lb.	.20 @
methyl (drums)	gal.	@
Benzol (water white, 90%)	gal.	.28 @ .34
Beta-naphthol	lb.	.37 @
Carbon bisulphide (drums)	lb.	@
tetrachloride (drums)	lb.	.12½ @ 14
Naphtha, motor gasoline (steel bbls.)	gal.	.31 @
73 @ 76 degrees (steel bbls.)	gal.	.41 @
70 @ 72 (steel bbls.)	gal.	.39 @
68 @ 70 degrees (steel bbls.)	gal.	.38 @
V. M. & P. (steel bbls.)	gal.	.30 @
solvent	gal.	.30 @
Toluol, pure	gal.	.30 @ .36
Turpentine, spirits	gal.	.75 @
wood	gal.	.73 @
Osmaco reducer	gal.	@
Xylol, pure	gal.	.45 @ .50½
commercial	gal.	.28 @ .34

SUBSTITUTES

Black	lb.	.09 @ .18
White	lb.	.10 @ .20
Brown	lb.	.14 @ .19
Brown factice	lb.	.08 @ .14
White factice	lb.	.09 @ .15
Paragol, soft and medium (carloads)	cwt.	10.81 @
hard	cwt.	10.81 @

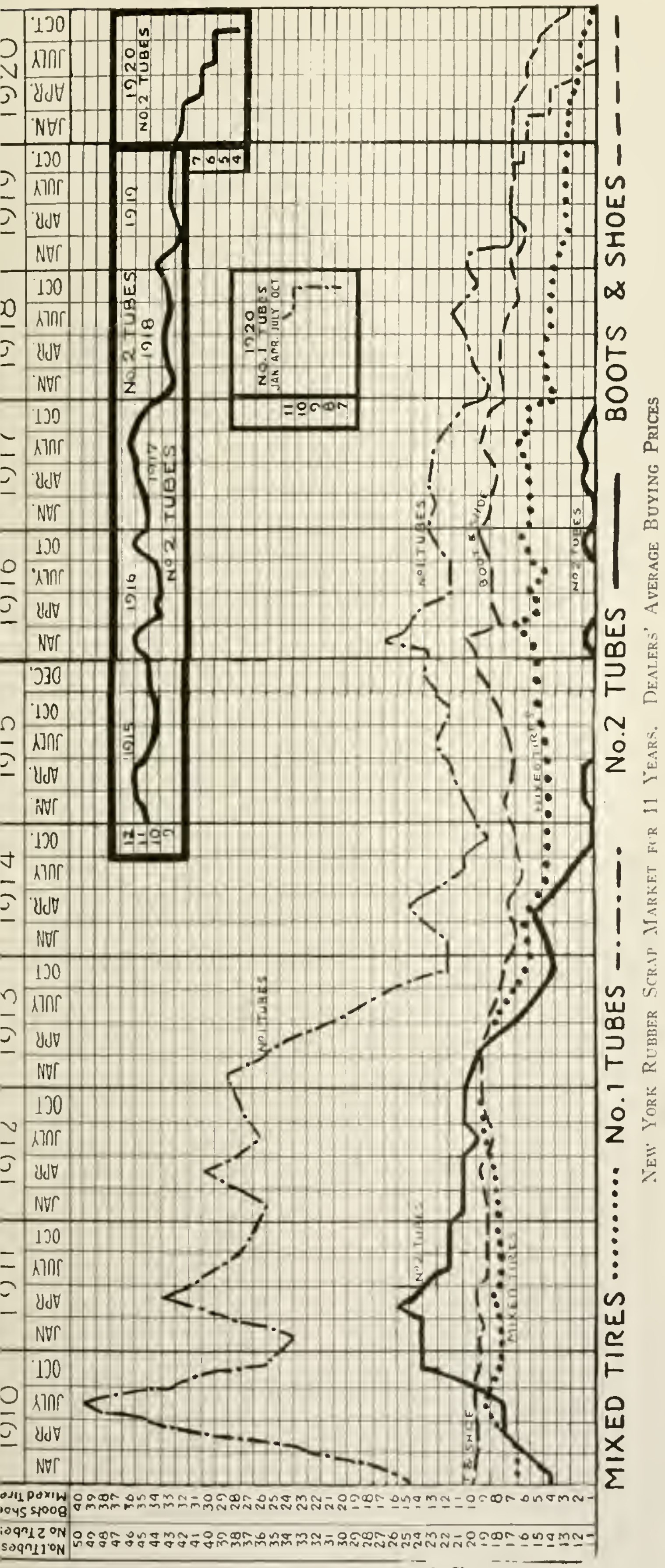
VULCANIZING INGREDIENTS

Lead, black hyposulphite (Black Hypo)	lb.	@
Orange mineral, domestic	lb.	.12½ @
Sulphur chloride (jugs)	lb.	.20 @
(drums)	lb.	.08 @
Sulphur, flour, Brooklyn brand (carloads)	cwt.	2.65 @ 2.90
Brooklyn brand (l. c. l.)	cwt.	2.95 @ 3.45
Bergenport, soft (c. l. factory)	cwt.	2.85 @
superfine (carloads, factory)	cwt.	@

(See also Colors—Antimony.)

WAXES

Wax, beeswax, white	lb.	.67 @
ceresin, white	lb.	.16 @
carnauba	lb.	.22 @
Montan	lb.	.10 @
ozokerite, black	lb.	.65 @
green	lb.	.65 @
paraffine, 115° m. p.	lb.	.12½ @
120° m. p.	lb.	.12¾ @
125° m. p.	lb.	.13½ @
130° m. p.	lb.	.14½ @
Phenanthrene	lb.	.08 @ .10
Sweet wax	lb.	.15 @



Courtesy of The Waste Trade Journal, New York City

THE MARKET FOR RUBBER SCRAP

NEW YORK

If possible, the rubber scrap market is even quieter than a month ago and prices remain nominal and practically unchanged. The firming up of prices for crude rubber has had the effect of awakening renewed hope, which, however, is destined to disappointment. Rubber scrap and reclaimed rubber prices can only recover with the renewal of activity in the industrial field in general. These materials are special and subsidiary and bound to be most active when competitive rubber goods manufacturing is in full swing.

Scrap metals and paper stock appear to be the present salvation of the scrap men. The following prices are all nominal. There is really no market.

QUOTATIONS FOR CARLOAD LOTS DELIVERED

Prices subject to change without notice

January 24, 1921

BOOTS AND SHOES:			
Arctic tops	lb	*$0.075 @	
Boots and shoes	lb	*.05½ @	.05¾
Trimmed arctics	lb.	*.04¾ @	.05¾
Untrimmed arctics	lb.	*.03¾ @	.04¾
HARD RUBBER:			
Battery jars, black compound	lb	*.01 @	.01¼
No. 1, bright fracture	lb.	*.23 @	.24
INNER TUBES:			
No. 1	lb.	*.09½ @	.10½
Compounded	lb.	*.05½ @	.06½
Red	lb.	*.05 @	.06
MECHANICALS:			
Black scrap, mixed, No. 1	lb	*.03½ @	.04
No. 2	lb.	*.02½ @	.02¾
Car springs	lb.	*.03¼ @	.04
Heels	lb.	*.03 @	.03½
Horse-shoe pads	lb.	*.03 @	.03½
Hose, air brake	lb.	*.03½ @	.03¾
fire, cotton lined	lb	*.01½ @	.01¾
garden	lb.	*.01½ @	.01¾
Insulated wire stripping, free from fiber	lb.	*.03½ @	.04
Matting	lb.	*.01¼ @	.01½
Red packing	lb.	*.05½ @	.06
Red scrap, No. 1	lb.	*.09 @	.10
No. 2	lb.	*.06¾ @	.07¼
White scrap, No. 2	lb.	*.08 @	.09
No. 1	lb	*.10 @	.11
TIRES:			
PNEUMATIC—			
Auto peelings	lb.	*.03¾ @	.04¼
Bicycle	lb.	*.02¼ @	.02¾
Standard white auto	lb.	*.02½ @	.03½
Mixed auto	lb	*.01¼ @	.02¼
Stripped, unguaranteed	lb.	*.01 @	.02½
White, G. & G., M. & W., and U. S.	lb.	*.03 @	.03¼
SOLID—			
Carriage	lb.	*.03 @	.03¼
Irony	lb.	@	
Truck	lb.	*.02½ @	.02¾

*Nominal.

THE "HAN-DE-PACH" INNER TUBE REPAIR OUTFIT

A new quick tire-repair outfit called "Han-de-Pach" is now being offered to the trade. It contains gum, cement and a metal rasp for roughening the tube without danger of injury. The "Han-de-Pach" cement is said to contain such portions of solvent and curing ingredients that it can be used with small portable vulcanizers. "Han-de-Pach" stretches with the tube and will not come off, if properly applied. The outfit is neatly and attractively packed and retails at a popular price.—The Palmer Tire Co., Sixth and Van Buren streets, Topeka, Kansas.

INDIA RUBBER WORLD
FOUNDED 1889
CAOUTCHOUC GUTTA-PERCHA

Vol. 63 FEBRUARY 1, 1921 No. 5

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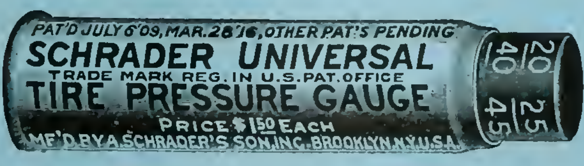

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AS TO CONTRACT CANCELLATION

THAT the worm has simply turned, and that offenders are being paid back in their own coin, is the defense offered in behalf of buyers who have been scored by sellers in the recent epidemic of cancellation orders. Producers, it is claimed, are but reaping as they have sown during the past few years and experiencing the inexorable penalty of taking undue advantage of buyers while the latter had but little recourse but to pay unreasonable prices, put up with all sorts of delays, scaling down of their orders, etc., or go without their goods.

In some quarters the impression prevails that the cancellation wave is simply a drastic corrective of a diseased commercial condition, the effect of which will be salutary to trade. Care will be taken to make contracts to stabilize rather than disturb trade. They will not be so one-sided. If sellers are to safeguard themselves, they must concede the right of buyers to do likewise; burdens must be balanced and responsibilities fairly shared. As commerce flourishes best when it ministers to the welfare of the greatest number, contracts should, if possible, have not merely a dual significance, but also a multiple one, in which regard would be given the interests of all, even though they may be but remotely concerned in such agreement.

RUBBER SHOE SALVAGE

WHEN the tire business of the United States was only $5,000,000 a year and the rubber shoe business was $27,000,000, tire repair was well under way, but rubber shoe repair had not even begun. Today with the tire business hitting the billion mark and the shoe business considerably bigger than ever before, shoe repair is just beginning to be an accomplished fact. The reason for the delay is due neither to apathy of rubber manufacturers nor waste on the part of the public. Worn out rubber shoes for years were the chief source of reclaimed rubber and had an instant and ready market. Scrapped tires, however, were a drug in the scrap market as they were difficult to reclaim. Had the cases been reversed, rubber boots and shoes repaired or remade would long ago have been as common as repaired or remade tires.

The low price of crude rubber, the vast progress in reclaiming tires and tubes, and to a degree the newly awakened thrift of American shoe wearers, all are responsible for the new rubber shoe salvage interest.

LIGHTER CARS AND MORE TIRES

AMERICANS can have lighter automobiles with a far higher gasoline mileage just as soon as they demand them, according to one of the most eminent authorities in the automobile industry, Colonel Jesse G. Vincent, retiring president of the Society of Automotive Engineers. He says that nothing deters manufacturers from producing such road-saving and economical cars but the insistence of Americans that cars shall be able to mount steep hills on high gear and to "pick up" swiftly on level roads. Gladly will the engineers do their part, he said, in revising their designs in order to get the utmost power out of every drop of gasoline; but the public must be reasonable and cooperate with such bodies as the S. A. E. This worthy organization has grown in ten years from 300 to 5,197 members and its activities are world-wide. In a nutshell, the aim of the Society is to make the automobile, and everything that pertains to it, 100 per cent efficient to its owner. Enterprising rubber manufacturers now vie with one another to produce tires that will measure up to the high standards set by the S. A. E.

The retiring president also confirms the claim made by leaders in the rubber industry that the passenger automobile has long ceased to be a luxury, and he cites statistics showing that 90 per cent of all passenger cars are used more or less for business, over two-thirds of the mileage being for that purpose. Equally interesting is the statement of Colonel Vincent that the average owner of a motor car through its use increases his earning

power 57 per cent. To the farmer the motor car has been a decided boon. By replacing men with machines, in most of which rubber must be used, the American farmer produces four times as much food per human unit as the European, and realizes relatively that much more in profits.

RUBBER ROSES IN SIGHT

That the rubber bloom of the future will not be the "excess sulphur" of the present, but a bloom that will rival in beauty the fairest garden product, was foreshadowed recently at a banquet, where side by side with choice cut flowers were dainty bouquets made of rubber that could scarcely be distinguished from their natural models.

Some may ask, "Why, then, are they not marketed?" The answer is, that the market has not yet "arrived." It may be even several years before woman will be educated to adorn her millinery with rubber roses, but when the time comes the far-sighted manufacturers will be found ready to meet the demand. Yet this is but one of many instances of the vision shown by the practical prophets of the rubber industry. There is even reason to believe that through the ceaseless experimenting in the great rubber laboratories many novel and important uses for rubber will soon be found that will go part of the way toward answering the question, "What shall become of the énormous output of the growing plantations in the Far East?"

MAKING MACHINERY DO IT

The favorite contention of the radical agitator is that the sole concern employers have for their workers is to force them, in utter disregard of their health, comfort, future, etc., to produce the maximum output at the minimum cost in order to swell extortionate profits—the agitators always like to picture as excessive even moderate returns on capital. Yet the truth is that the humane, considerate, enlightened employer is far from being a rarity nowadays. Indeed, many of the great captains of industry are keener students of social conditions and are striving more actively and intelligently to promote the welfare of workers than the men who thrive only by fomenting labor unrest. Hard workers themselves, many of them through real merit rising from the lowest rung of the ladder, such industrial leaders well appreciate the view-point of the toilers and they are making a constant, practical effort to lighten the lot of labor. Nor is such effort less earnest because it may not quite coincide with the radical and impractical changes hurriedly urged by the professional trouble-breeder. It is gratifying to note, too, that many of such real leaders of labor, whose counsel is much sought and whose methods are widely emulated, rank as high executives in the rubber industry.

Advanced thinkers discard the old notion that labor is but a mere commodity to be bought in the cheapest market to produce goods to be sold in the dearest. They also challenge the claim that modern machinery has reduced workers and shirkers to one dead level, killed personality, and made each operative but a mere automaton. In refutation, they cite the fact that since the introduction of modern labor-saving machinery the worker earns more and works less, his strength is not overtaxed, his chances of promotion are as good as ever, he has infinitely more sanitary and comfortable working conditions, and has far more time for pleasure or self-improvement. Of especial benefit to him is the practice nowadays, and very generally in the rubber industry, to speed up the labor-saving apparatus rather than the man and thus avert undue strain on the latter. "Sweat the machine, not the operator," is the modern shop slogan.

Industrial managers are finding out also that with shorter shifts for the men and longer shifts for the machines, output can be actually increased, and that workers do react favorably to efficient, drudgery-saving devices.

Their factory clinics tell them, too, that most of the accidents to workers on long shifts occur shortly before quitting time, when caution relaxes with ebbing energy.

BUILDING MEN TO BUILD RUBBER GOODS

A new departure in the rubber industry, that will doubtless be emulated by many other branches of trade, and which has already proved very helpful, is the training of foremen in executive work, assuming responsibility, and developing energy, talent, and possibilities of the men in their departments. At industrial schools in big shop plants as many as fifteen courses of study are pursued, taking in the sources of crude rubber, the problem of labor turnover, the viewpoint of the operative, the question of utmost efficiency, the getting of supplies, time and rate fixing, etc. Foremen are urged to raise not only their own ideals and standards, but to also develop manhood and character, with skill and speed, in those committed to their charge. In other words, they are being educated to build the men who build the tires, belting, shoes, and so on. For foremen in smaller industries an excellent correspondence course is provided.

It was a generous and far-sighted act on the part of Frederic C. Hood to step into the breach and rescue the Boston Belting Co. from the morass of mismanagement into which it had fallen. As a posthumous favor to James Bennett Forsyth, to whom the pioneer American company was dearer than life, it is unexcelled.

It is well for tire users that there are no "speed cops" in factories to check the swiftness of examinations, else how could they, with the present high cost of labor, ever hope to pay for the "over 600 rigid inspections" one tire-making concern says it gives every casing?

Repairing Rubber Footwear[1]

A New and Fast Growing Industry

Early Methods—Metal Plate Repairs—The Chain Matrix—The Fabric Matrix—An English Sole Clamp—Miller's Tennis Sole Press—Repairo Mender—Rubber Shoes Recalled from the Junk Pile—Faults in Footwear—Overseas Boot Repair—Up-to-Date Boot Sole Repair Methods—Processes of Drying, Preparing, Cementing—Mold Making—Sole Stocks and How Applied — Curing — Boot Heel Repair — Mending Uppers — Repairing Tennis Shoes—Tools and Equipment Needed—Vulcanizing Machines in General—The Arthur Apparatus—Rubber Footwear Patching and Curing Forms—Method of Using Half-Soling Forms—The Miller Machine—The M. & E. System—The Brackett Vulcanizer—Cements for Repair Work—Patented Machines for Rubber Footwear Repa r.

EARLY METHODS

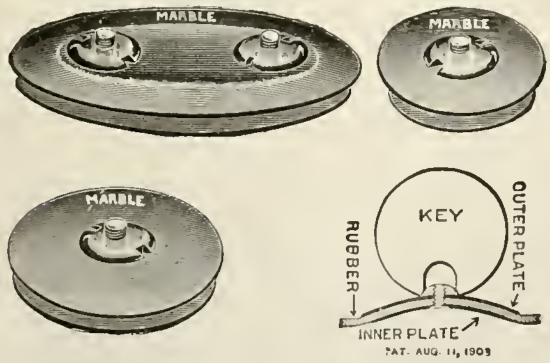
While tire repairing began almost with the birth of the pneumatic tire, the repair of rubber footwear has been, up to a comparatively recent date, of a sporadic nature. The manufacturers have never attempted the repair of rubber footwear. Damaged goods were either sold as "punched" (seconds) or scrapped. Attempts have always been made by thrifty people at home to fix tears in rubber footwear with rubber patches stuck on with rubber cement, but such work has been neither considerable nor lasting.

Occasionally a thrifty cobbler added a can of rubber cement to his kit and crudely affixed pieces of sheet rubber over tears or holes in rubber shoes or sewed soles and patches on rubber boots, but the volume of work was small at best.

METAL PLATE REPAIRS

One of the early rubber boot menders was a double clamp of metal that, while it was not elegant, served to stop leaks in rubber boots. It was called the "Easy Quick" repairer. It consisted of two concave plates arranged to fasten together. One plate was placed within the boot with one or more threaded studs passing through the torn portion. A second plate on the outside, through which the stud passed, was clamped tightly to the first by means of a small nut. The plates were very thin and the mender was easily applied and worked well.

A real attempt at workmanlike repairing came when a noted sporting goods house arranged to resole and overhaul its tennis and other athletic shoes. Following this, expert repairmen in France during the late war took up the problem of mending trench boots and did a lot of it and very well. Not only did the French take hold of the problem, but other Europeans also did some good work in this line.

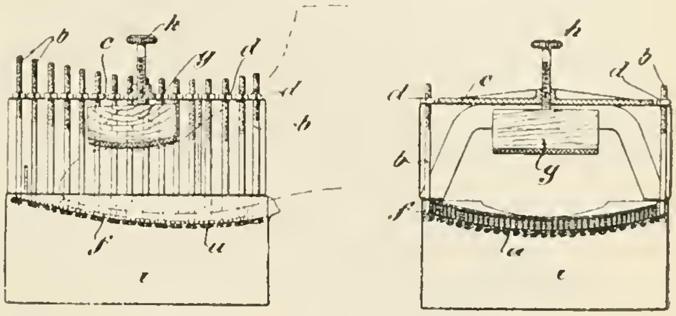


Rubber Boot Mender

A German invention, for example, was this:

THE CHAIN MATRIX

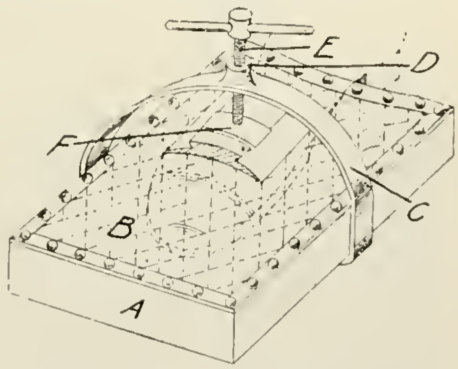
A flexible metal surface composed of a series of fine chains placed side by side, was employed as a matrix for the sole. The apparatus is shown in the illustration, that on the left being a longitudinal section, and that on the right a cross section. In use, the repaired sole on a last is placed under the pressure block *g*, the sole resting on a strip of gauze packing which is placed on the mat of chains. The screws *b*, one for each chain, are then tightened and adjusted, drawing the chains tight against the sole. The chamber *i* is then heated by a gas burner, by electricity or by steam, and the vulcanization effected.



German Sole Clamp—Chain Matrix

THE FABRIC MATRIX

Another German invention, also taken out during the war, is for attaching soles that are vulcanized either by self-vulcanizing solution, or in dry heat after affixing. The press is simply a frame *A*, on which a strong, flexible web *B* is stretched. A curved metal band *C*, threaded at *D*, holds a screw *E*. This screw raises or lowers the press plate *F*.



German Sole Press—Fabric Matrix

ENGLISH SOLE CLAMP

An English invention that is simple and quick in its work is used in applying rubber soles to footwear of all kinds. It was designed primarily for composition soles. It is really an adjustable clamp fitted with welt grips and adjustable thumb-screws. In use, the sole is cemented, put in place, the clamps applied, and the job left until adhesion is complete. Of course a cold cure or a self-vulcanizing cement would be necessary in many cases.

MILLER TENNIS SOLE PRESS

A special American apparatus used in making and repairing tennis shoes is Miller's press. The sole and foxing is molded to the canvas and vulcanized while under pressure.

Referring to the drawing, which shows two views of the device: *A* is a table upon which rests a steam chest *B* provided with steam pipes *C* and *D*. Connected with the table by rods *E*, is a yoke *F* into which are threaded clamping screws *G* and *H*. These screws are raised or lowered by hand wheels *I* and *J*. Resting on the steam chest are molds *K* and *L*, each made in one

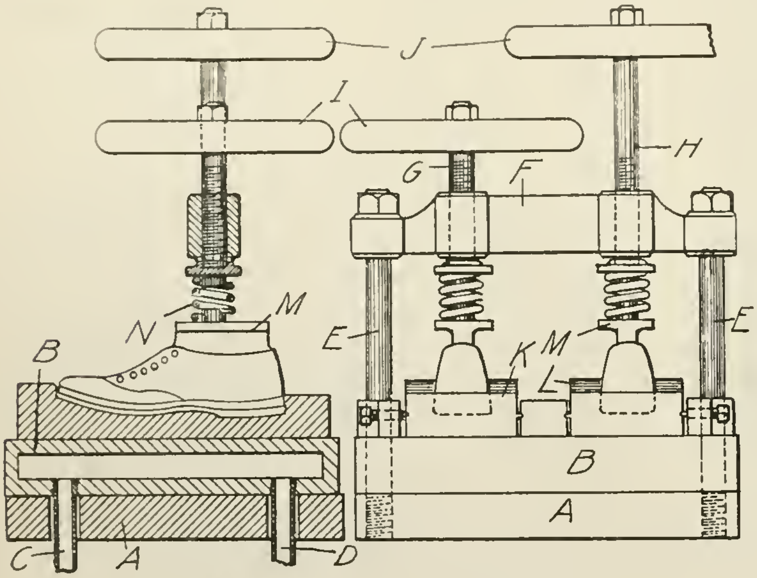
[1] Copyrighted by Henry C. Pearson.

piece and constructed with the exact contour of the sole. *M* is the last over which the shoe is made. Between the last and the pressure screws are the steel springs *N* by means of which a flexible pressure is obtained to compensate for the settling of the last as the plastic rubber sole is forced into shape. The molds are made deep enough to bring the edges of the soles up around the foxing and to force the edges of the sole into the fabric of the upper. For repair work the raised edges on the sole molds are not necessary.

"REPAIRO" MENDER

An alert American supply house has recently put upon the market a patching outfit for rubber shoes and boots called "Repairo." This consists of a prepared rubber patching material and a bottle of self-vulcanizing cement. In using, the surface is roughened, the cement brushed on, the patch applied, and the repair is accomplished.

Most of the foregoing are, of course, designed for individual use and will have a limited market. It is because the great



Miller Tennis Sole Vulcanizer

waste in rubber footwear has caught the attention of the tire repairmen that a new industry has begun to develop rapidly. In numerous well-equipped vulcanizing plants special apparatus has been installed for rubber footwear repairing, keeping the plant profitably busy during the usually dull winter season.

RUBBER SHOES RECALLED FROM THE JUNK PILE

Until quite lately worn rubber boots, arctics and tennis shoes were sold to junkmen for a trifle. Now their owners are sending them by the hundreds to the salvaging shops, from which they come back practically as good as new, and yet at but a fraction of the cost of new. Tire stock, old and new, is largely used in such shops and many customers declare that soles made of such material last even twice as long as the regulation boot soles. Heels, counters, and toes, if worn or cracked, can be mended, and worn places or tears on uppers or legs neatly patched. Repairmen claim that over 25 per cent of the footwear found in the junk piles is well worth repairing. Hence, there has been found in the mountains of old boots and shoes in the yards and storehouses of the reclaimers of old rubber a hitherto undreamed-of source of profit.

FAULTS IN FOOTWEAR

In by far the greater number of cases, rubber boots and shoes are damaged through hard usage, and the blame, of course, attaches to the wearers. In a small degree defective manufacture is the cause of shoe troubles starting. Many people want cheap shoes, and manufacturers try to meet such demand by turning out a low-cost product which they frankly tell buyers cannot be guaranteed. Hence it is that dealers rarely have trouble with first-grade goods but some find it necessary, in order to hold trade, to make a slight proportion of replacements (figured at about ⅓ of 1 per cent) on third-grade goods.

"Repairo" Mending Patch

The trouble that develops often occurs on the uppers, and generally where two or more layers overlap, but the commoner fault is found in the separation of the soles from the uppers about the place in which sits the base of the great toe.

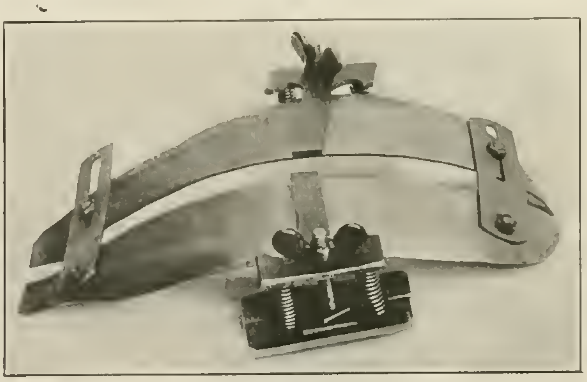
Tennis shoes give way much sooner in the soles than boots. Rough wear on coarse soil explains this largely. A similar type used only at the seashore is more short-lived than those worn on the soft soil and sandless sidewalks of inland places. The soles are literally ground down by frequent contact with the sharp sand on the beaches, and by abrasion on the sandy board and cement walks.

OVERSEAS BOOT REPAIR

The beginning of rubber boot repair in army circles, according to rumor, was this: A short, snappy captain brought his rubber boots to a grouchy shoe repairer and ordered new soles and heels. The repair man objected that he had no boot stock, and was curtly told to build a good thick sole of "tire tread." For a joke on "Shorty" the repair man attached a sole and heel five inches thick cut from a discarded solid tire. The captain, a thoroughbred, never turned a hair when he viewed the boots. Indeed, he was most complimentary, convincing the repairer that if a five-inch sole could be made to stick, a quarter-inch sole would certainly stick better. Furthermore, the repairer was at once put in charge of boot work and scored a great success.

UP-TO-DATE BOOT SOLE REPAIR METHODS

When it is recalled that all the tools and vulcanizers in the repair department were for tire repair, it will be seen that considerable ingenuity was required to effect repairs on boots and arctics. It was not long, however, before metal blocks were cast to fit into tread cavities, the tops of the blocks being sole or heel molds. Although the cure was a bit slow, the effect was good. The leather repairers were also



English Adjustable Metal Sole Clamp

helpful in sewing on cemented patches and soles until proper vulcanizing equipment was finally secured. Heels were cemented and then nailed on.

Along with the design of special machinery came processes for repairing the defects in footwear caused by accident or wear.

PROCESSES OF DRYING, PREPARING AND CEMENTING

The process of repair in a well-equipped rubber repair shop is as follows:

A boot or shoe is first carefully examined to see if a repair can be made successfully. Considerable judgment is required, for a faulty repair drives customers away. Granted that the article is acceptable the first step in the work is thorough drying.

2,000,000 Pounds of Rubber Shoe Junk; 500,000 Pounds Could Be Repaired

When rubber footwear repair becomes a fully established industry vacuum dryers will probably be employed. At present, however, many simple expedients are resorted to. One of the best is a hollow heated form similar to those used in hosiery mills, over which the article is drawn, and which soon expels all moisture. Use is also made of compressed air or a blast from a small electric blower. Drying is very important, for not only will cement refuse to stick to damp rubber or frictioned fabric but blisters form during the cure, from imprisoned moisture, and the repaired section is just so much weakened.

The boot, thoroughly dried, is put upon a "jack," such as leather cobblers use, and the worn parts cut away down to the solid surface of tread, or to the cloth and rubber underlay. All dirt is brushed out with a stiff wire brush. To get a good surface for cement adhesion, the sole part is roughened thoroughly with a rasp or a revolving wire brush. The whole of the part to be patched is then coated with a rubber cement containing sulphur; in other words, a vulcanizing cement. The boot is then put aside until the solvent in the cement has fully evaporated. This is done three times; not that the surface needs so many coats, but to allow some of the cement to penetrate to the rag filler and the friction and thereby give them additional strength.

MOLD MAKING

The next step is the preparation of a mold for the new sole. Stock molds for this purpose are made by mold makers in the rubber centers in any style called for. They are of iron or steel and engraved for any sort of corrugation. Some repairers have turned to a lead mold which they make themselves. The process is very simple. A sheet of lead plate ¼-inch in thickness, slightly wider than the boot to be repaired is taken, and the middle of it marked to show where the corrugations should appear. It is then scored with a cold chisel, or a flat, suitably-engraved steel punch 1½ inches square with a series of criss-cross channels not unlike the tread of a new rubber shoe. The edges are then turned up, either about a wooden form or about the sole of the shoe itself, and a shallow lead mold is the result. The mold is warmed, the surface painted with a thin soft soap solution and when dried it is ready for use.

SOLE STOCKS AND HOW APPLIED

Unvulcanized stock for sole repair is of two distinct sorts: That which may come from the rubber shoe manufacturer and which is already of the proper thickness and, indeed, has the corrugated tread from the soling calender; and tire tread stock. The latter is more available in that every accessory house carries it. If tire tread stock is to be used the *modus operandi* is this:

Two pieces are cut from 1/16-inch tread stock, so as to get a ⅛-inch thickness. If, after being rolled into one solid sheet, air blisters develop, they are punctured by a sharp awl. The doubled sheet is then cemented on one side and thoroughly dried. When this is done, the boot is placed upside down on the jack, the new sole applied and rolled on hard with a hand-roller. Where the edges come, a stitcher is run to help the adhesion in parts which the roller cannot touch. The lead mold is then put upon the sole and tied in place with broad tapes.

CURING

It is now ready for the vulcanizer. This is a chest through which the steam circulates. The boot is put upon the hot-plate and kept there until vulcanized. The steam pressure is from 40 to 60 pounds, according to the grade of rubber used. At 40 pounds pressure the temperature is 288 degrees F., quite sufficient for curing average stock. Finer qualities require higher temperature. The average time for curing is an hour and a half. A frequent tightening up of the clamps during the process aids in evening up low spots.

BOOT HEEL REPAIR

The repairing of the heels of rubber boots is very similar to that of sole repair. If only the heel is to be repaired, it is customary to slip an asbestos or other fabric protector over the foot portion of the hollow last. This prevents the heat from affecting the sole and upper during the cure. The methods described are admirably adapted for the tread section of all sorts of heavy rubber footwear, including fishermen's and lumbermen's overshoes and men's and women's arctics.

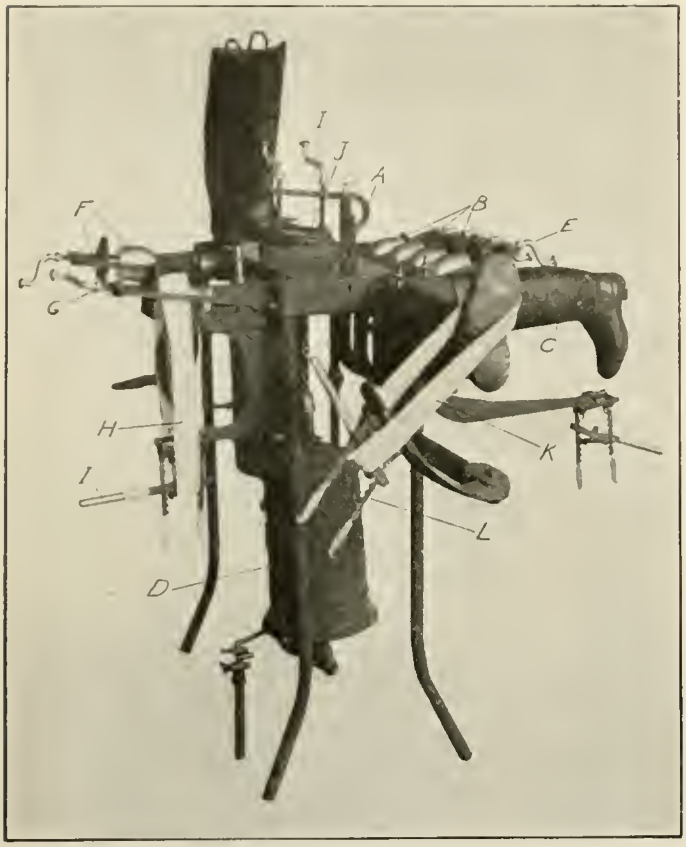
Shoe Repair Unit in Tire Repair Shop

MENDING UPPERS

For mending a tear or a worn spot in the leg or upper of a rubber boot the process is as follows:

The portion of the surface surrounding the tear is rubbed with any abrasive substance that will remove the varnish. The rough-

ened surface is then covered with vulcanizing cement, and a patch cut the proper size, one side of which has been cemented and dried, is applied to the prepared surface. This is rolled down hard. The edges of the patch which should have been skived thin are set with the stitcher. The repaired portion is then put between the platens of a small plate vulcanizer. If the repairer has no plate vulcanizer, small patches may be cured by placing the freshly repaired portion against the hollow steam-heated last



The Arthur Repair Vulcanizer

of the foot vulcanizer, tying with broad tape and fitting the clamps to hold it firmly in place.

REPAIRING TENNIS SHOES

A salesman in the tennis shoe department of a large sporting goods store in a western city, being asked by the writer if repairs could be made on the soles of old shoes, stated that the factory from which the shoes came would readily do any needed mending. "How do the makers fix a big hole in a sole?" he was asked. "Very easily," he replied. "They just get a wad of soft rubber, press it into the hole, and simply solder it in place." But the fact remains that rubber shoe repairing is not yet quite as simple as the work of a tinker.

The best method of repairing tennis shoes is by the cure already described. Experts claim to be able to repair any sort of rubber wear by this process from "Keds" to baptismal pants.

Cloth-surfaced footwear, such as cloth-topped arctics, wading stockings, etc., are quite as easy to repair. The fabric about the worn or torn place, after being well cleaned, is given several thin coats of cement, each being allowed to dry well. The solvent carries the rubber into the fibers of the cloth and prevents water from entering by capillary attraction. A rubber patch is prepared in the usual way and affixed by rolling down and vulcanizing, as in the case of the rubber-surfaced boot leg.

TOOLS AND EQUIPMENT

The tools needed are few in number, that is, for a small plant. They comprise a vulcanizer, zinc-covered work bench, rack or cabinet for raw stock, shoemaker's jack, and covered scrap bins for both vulcanized and unvulcanized scrap. The hand tools are at least two knives; a heavy skiver and a pointed cutting knife, machinist's hammer, covered cement can, cement brushes, naphtha can, roller, stitcher, wire brush, rasp and awl. To this might be added experience in rubber work, patience and ingenuity.

VULCANIZING MACHINES IN GENERAL

Repairs on rubber footwear are cured on or in vulcanizers that are heated by gas, oil or electricity. The gas or oil may heat the vulcanizing plates directly or may be used in forming steam which heats the vulcanizing platens. Electric vulcanizers heat the plates directly. The open steam cure is not easily adaptable to footwear repair, nor is the dry heat cure, that is, the exposure to heated air in a closed chamber.

The time for cure varies widely, very thin patches calling for, say, a 20-minute cure, and thick ones as much as an hour and a half. This further depends upon the type of compound used, the proportion of sulphur, and the degree of heat employed.

Complete vulcanizing equipment will range in price from $100 for an outfit well suited for any small repair shop to $450 for apparatus with which not only every form of rubber footwear repairing can be done, but also many kinds of tire and tube repairing, with the utmost dispatch and efficiency.

THE ARTHUR APPARATUS

Of the various makes of machines for repairing rubber footwear, one of the most complete is the Arthur footwear vulcanizer. This apparatus generates its own steam, is suited for even a large repair shop, and not only can half-soles and full or half-heels of any size rubber boot or shoe be cured with it, but a tire repair man can also use it for mending inner tubes and other rubber goods.

The outfit has a steam table or hot plate 10 by 31 inches for flat vulcanizing work, mounted on cast-iron legs. From the table project eight hollow boot and shoe forms, with a similar number of brackets projecting from the forms and attached to the under side of the latter; eight jacks are fastened to the bottoms of the brackets. Eight canvas belts are supplied to be placed over the footwear being repaired, and which can be tightened by the jacks so as to give adequate pressure on the gum during the curing. Other features are: a water tank with gage attached; a steam gage; a pop valve; a heater with gas or gasoline burner; a follower plate with clamp for short forms, and two follower plates and clamps for long heeling forms; two pairs of foot forms with overhead frame and clamp for half soling, the bottoms of the shoe forms being flattened to fit on steam table, four pairs of sole lasts, and three pairs of heel lasts; two 6-inch C clamps, six sets of foot leads, and six sets of knurled-inside ⅛-inch heel leads. With the outfit is also supplied a quantity of this 1/16-inch lead for covering patching jobs and a moderate amount of supplies for trial jobs. The machine weighs about 700 pounds, has a length of 64 inches, and a width, with brackets extended, of 87 inches.

A smaller outfit, but which nevertheless provides an excellent equipment for shops having only a moderate amount of repair work, is known as the "Baby" footwear vulcanizer. It has about half the capacity of the vulcanizer just described. The same maker also produces a large and a small combined footwear and tire vulcanizing outfit.

RUBBER FOOTWEAR PATCHING AND CURING FORMS

The forms shown in the illustrations and numbered from 1 to 6, inclusive, are all hollow to receive steam used in curing.

1. A short form used for mending the rear part of a heel on light rubbers with hollow heels as well as top lifts. A follower plate and clamp press the end, and a bracket and jack below aid in tightening a canvas band pressing the top surface.

2. Form adapted to the shape of the back of a boot to facilitate patching that section. Pressure is obtained by a canvas band

drawn tight with a bracket and jack operated by hand.

3. Form used for vulcanizing full heels on boots and for vulcanizing pieces on boot legs. Pressure against the end is obtained with a follower plate and a clamp, and a pressure on the top surface with a canvas band drawn taut with a bracket and jack.

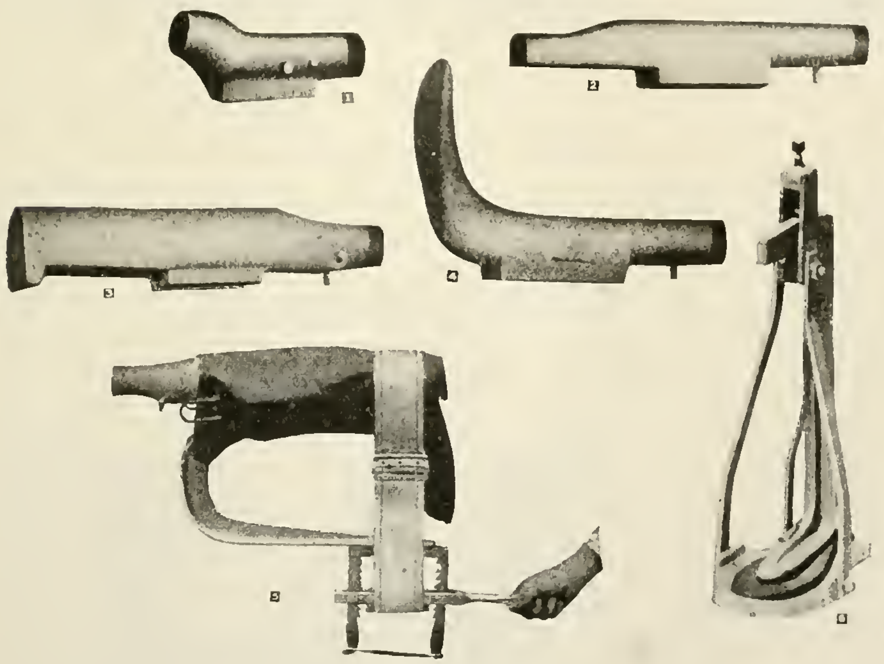
4. Upturned form used for repairing the toe and sides of boots and rubbers; a swinging bracket and jack gripping a canvas band apply pressure wherever desired.

5. Mode of producing pressure on a repair job by means of a bracket, jack and a canvas band.

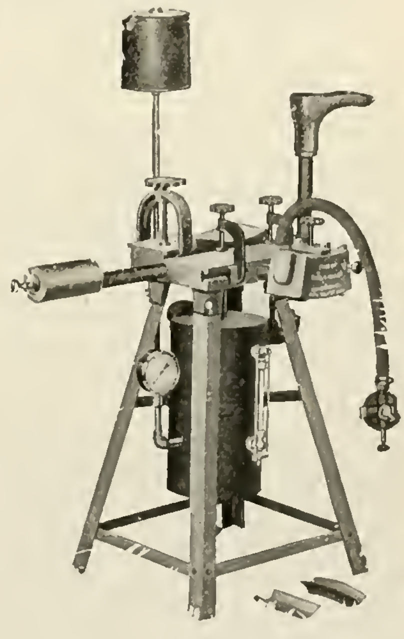
6. Half-soling form to be set on a steam table showing a foot form on which the boot fitted with a bendable lead mold for the sole, is set for curing. The loose clamp is put into the boot, its lower end being made to fit into the slotted guide of the last; the frame supports the foot form, clamp, and the screw above by means of which pressure is applied for vulcanizing the half sole to the boot.

METHOD OF USING HALF-SOLING FORMS

The mode of using the half-soling forms is more fully explained in the following description: The gum tread prepared for the half sole is set in the flexible lead mold, after the latter has been closely shaped and upturned about the old sole. The boot so fitted with the gum and the lead mold is then set on the foot form and the proper size last placed inside the boot. Then the loose clamp is inserted in the boot and its lower end fitted into the slotted guide of the last. The upper end of the clamp fits into a slot in the upper part of the frame, and needed compression for curing is obtained by tightening the screw on top. The repair job is then left on the steam vulcanizing table, the time for curing ranging from 40 minutes to an hour, according to the degree of heat used, the quality of the gum tread, and the thickness of the sole.



Footwear Curing Forms



The Miller Repair Vulcanizer

THE MILLER MACHINE

A very efficient vulcanizing apparatus for the average footwear repair shop is the Miller repair vulcanizer designed for attaching to a steam line. It is equipped with a gas burner to generate its own steam, or with a force-feed gasoline burner for steaming. This outfit, capable of making all the usual repairs on any boot or shoe, consists of a hot-plate or steam table, 30 by 7¼ inches, set on cast-iron legs and having side flanges which grip two wish-bone clamping devices set above the hot-plate and used in the half-soling process. Pressure for curing a sole repair is given the auxiliary clamp, which fits inside the boot or shoe placed on the hot plate, by turning a wheel somewhat like that used on a copying press and which is set in the top of the wish-bone clamp. From one side of the steam table project two inside hollow boot molds, one large and one small, with two revolving arms and extensions, and four sets of double thumb screw pressure clamps with which to tighten tapes on footwear placed on the boot molds. For the half-soling work the outfit also provides seven pairs of suitably indented sole plates in sizes assorted from 3 to 14, with seven pairs of inside sole lasts to work with the sole plates, and three different sizes of heel molds.

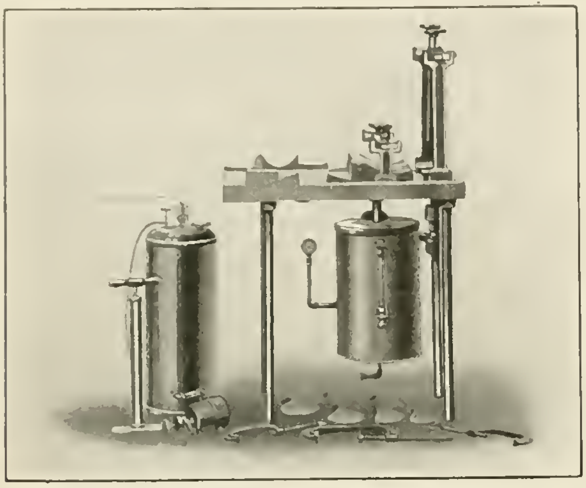
Other Miller apparatus are inside boot vulcanizers to be attached directly to a steam line, the equipment including a revolving arm with extension, double thumb screw pressure clamps, and wall tee fitting for affixing to wall or post. Half-sole and heeling equipment can also be had separately to be used with any hot-plate used by inner tube repair men. This outfit usually includes large clamps, auxiliary sole clamps, heel molds, button sole plates with high side walls, and inside sole lasts to work with the plates and in sizes ranging from 3 to 14.

THE M & E SYSTEM

The M. & E. system is quite simple and very compact. It consists in brief of a steam table upon the top platen of which are built a variety of special molds adapted for all boot and shoe repairs.

The steam table consists of a series of molds on the hot plate, the size of which is 32 by 17 inches. The molds are designed to conform to the different shapes taken by the various angles of a boot or shoe, permitting the repair to be made, no matter where the rip, tear or worn out spot may be. The vulcanizing is done on the outside, as no boot lasts or other inside contrivances are used. It is claimed that this outfit will resole, reheel and put patches on the edges, sides, back of the heel, or instep. In addition, it will repair hot-water bottles, hospital sheets, rubber gloves, tennis shoes, rubber coats, football bladders, inner tubes; in other words, any sort of a rubber article.

The illustration shows the device complete with vulcanizing table mounted on strong legs and the steam boiler in place. The gasoline force-feed burner is ready to be attached to the boiler. The gasoline supply tank is equipped with gage, hand pump and necessary connecting hose. The boiler can be arranged to use gas, or, wherever steam is available, the vulcanizer is sold without the boiler.



THE M. & E. REPAIR VULCANIZER

From 60 to 65 pounds of steam are required for vulcanizing. The average job requires from 15 to 20 minutes. Seven to fourteen jobs can be accommodated on the table at the same time.

THE BRACKETT VULCANIZER

The Brackett machine is designed with a view toward simplicity in all its parts, as in some instances it will be operated by workmen who have not had a great deal of experience in this line of work.

The base of the machine is cast in block, of high-grade iron, with capacious steam chambers. Ample steam connections are provided and conveniently located, as this outfit is made to connect to any steam vulcanizing plant, thus saving the cost of an extra boiler. However, steam heaters can be furnished.

With this method of construction a direct cure on the spot to be repaired is made. No outside cures whatever are used. The means of securing the proper pressure is unique in its simplicity, using any granular substance, preferably rye, for the inside pressure and direct adjustable clamps for the outside pressure. This allows the work to be held rigidly in the proper position to obtain a first class job of vulcanizing.

Four toe clips of special design are furnished with the outfit which handles all sizes of work. Installation is made by placing the machine on a bench and connecting to the steam plant with a steam hose.

The "Baby" Brackett vulcanizer does the same work as the larger type but requires more time. The molds are preheated and the vulcanizing is done on a steam or electricity heated tubeplate.

CEMENTS FOR REPAIR WORK

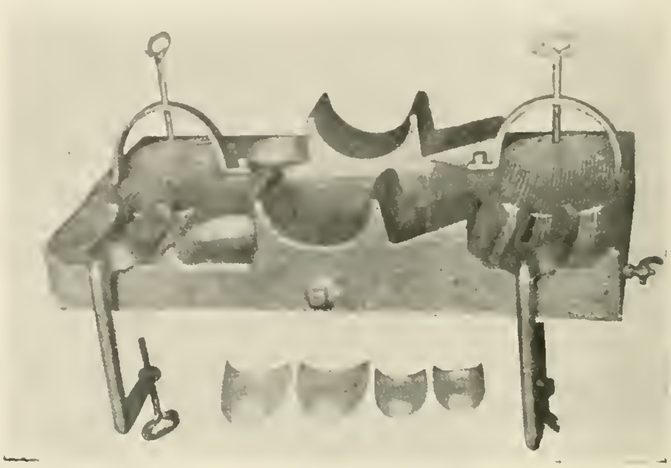
Cements for footwear repair are of various sorts.

First is the well-known rubber cement which leather shoe cobblers use. This is made of rubber dissolved in naphtha and may or may not contain a little resin to make it more adhesive. It is used in part for its adhesive qualities, but also because it renders goods waterproof. The cobbler always depends upon stitching or pegging to hold a sole in place, and not upon this cement.

Second, is the self-vulcanizing cement. This is of compounded rubber containing ingredients that effect a cure without the application of heat. All of the tire accessory men carry it and for surface work it is excellent.

Third, is the cold cure cementing process. In this a cemented surface is lightly brushed over with a solution of chloride of sulphur and bisulphide of carbon. This requires experience and is not altogether pleasant because of the offensive smell.

Fourth, comes the vulcanizing or vulcanizable cements. These consist of compounded rubber dissolved in naphtha, the rubber compound containing from 5 to 8 per cent of sulphur. Cements of this sort vulcanize when heat is applied and become a part of the rubber to which they are attached.



THE BRACKETT VULCANIZER

PATENTED MACHINES FOR RUBBER FOOTWEAR REPAIR

THE UNITED STATES

American patents of importance on rubber footwear repairing apparatus include the following:

No. 1,206,799. Filed March 28, 1916, by Henry E. Bast, Lawler, Iowa. This is an outer cure, quick-acting vulcanizing device with an adjustably rotating lasting jack, which carries a movably adjustable former block sliding on and rotably adjustable on a longitudinally-slotted arm rotably and adjustably mounted on the jack, and a slotted angle plate slidably and rotably adjustable in the slot of the arm. When the former block is pressed against the rubber boot or shoe to be repaired, gasoline is put into a cup-shaped recess in the upper side of the block and

THE BRACKETT VULCANIZER IN USE

ignited to produce the heat required for vulcanizing a patch, heel or sole on rubber footwear.

No. 1,238,648. Filed February 9, 1916, by Charles F. Dilks, Bridgeton, New Jersey. A rubber boot and shoe repairing device utilizing a mold to be heated with steam, an expansible last, a 2-sectional flanged clamp, and a set-screw covering the clamp and for applying pressure to the repair job. One form of the apparatus has the mold arranged to be heated from a steam line, and another provides for a self-contained mold and boiler, the latter to be heated with gas.

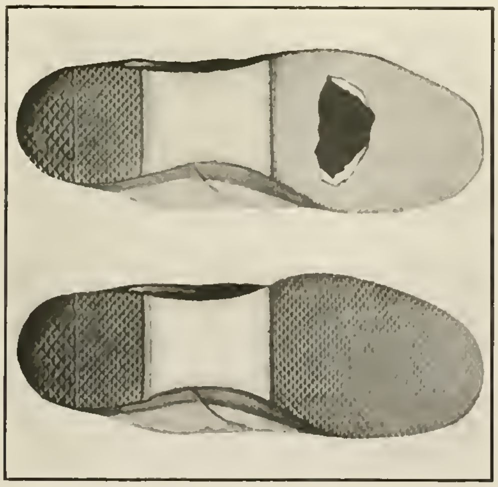
Leather Patch Sewed and Cemented on Rubber Boot

No. 1,293,159. Filed July 25, 1918, by Charles E. Miller, Anderson, Indiana.

A rubber boot and shoe repair vulcanizer consisting of a steam table, heat for which is obtained from an attached container for gasoline or other heating fluid. The steam-table is set upon a stand and from the table projects a tubular last or form, on which a second, angular, tubular form revolves, and which latter can be fastened at various points of adjustment. Pressure upon a repair job is obtained by means of canvas bandaging belts attached to the tubular forms.

No. 1,315,200. Filed May 12, 1919, by James W. Arthur, Akron, Ohio, and assigned to the Williams Foundry & Machine Co., Akron, Ohio.

Plural-part mold for rubber boot and shoe repair attached to steam-heated container, set upon a suitable stand, and having a



Modern Tennis Shoe Repair

tubular rotable work-supporting horn projecting from the side of the steam container, with means for adjusting the horn at desired angles and for applying exterior pressure on repair jobs carried by the horn.

No. 1,358,068. Filed July 6, 1920, by H. D. Ferguson, Dowagiac, Michigan.

In a vulcanizer for boots and shoes, the combination of a mold including a hollow bottom, side and front end walls providing a single steam chamber, a top clamp, an internal lasting support consisting of a casing of flexible material and a filling therefor of granular material such as sand, and a filling of heat conducting material between the walls of the mold and the parts to be vulcanized which are spaced therefrom.

Rubber Boot Repaired with Self-Vulcanizing Patch

THE DOMINION OF CANADA

No. 200,687. Filed December 26, 1919, by Joseph Anctil and Joseph Octave Landry, coinventors, both of Montreal, Canada.

Apparatus to resole rubber boots, utilizing a vulcanizer with a heated surface, a plate bearing an anti-skidding tread mounted on the heating plate, arms secured at one and projecting over the heating plate to which one or more boot forms can be attached, and weights mounted at the free ends of the arms and by means of which pressure can be applied in curing the repair job.

(To be Continued)

HOLLAND'S RUBBER COMMERCE, 1917-1919

A comparison of the values of imports of rubber and gutta percha and rubber manufactures into the Netherlands for the past three years is given in the following table:

Articles	1917	1918	1919
Rubber and gutta percha...........	$7,200	$3,600	$6,181,600
Rubber manufactures	25,600	7,600	5,675,200

Exports of rubber and gutta percha in those three years totalled $56,800 in 1917, $50,400 in 1918, and $3,961,600 in 1919. The great volume of trade in 1919 represented trade conditions in the country itself and conditions in territories which had to draw upon it for supplies during the year. A large proportion of the imports into the Netherlands are goods that pass into the interior of Europe and a large share of its exports are goods manufactured in central Europe and sent abroad by way of the Netherlands. While previous to the war the greater part of this transit trade went through the country without breaking bulk, the greater portion of this trade now represents goods bought by Dutch importers and exporters and is fairly and directly trade of the country. What was once mere transit trade became actual Dutch trade in 1919. Exports of rubber from the Netherlands to the United States in 1919 were valued at $3,135,949. Declared exports from Rotterdam included 3,015,938 pounds of crude rubber, valued $2,622,860.

Rubber and gutta percha manufactures to the value of $218,860 were imported into the port of Dairen, Manchuria, during 1919, to be forwarded by rail to the interior. Similar imports in 1918 were valued at $67,255.

A Glossary of Words and Terms Used in the Rubber Industry—III[1]

By Henry C. Pearson

AFRICAN RUBBER—WILD

African rubbers are not only of great historic value but are still an important market feature. That they have suffered from the abundance and cheapness of plantation rubber and that certain of the lower grades have disappeared from the market was to be expected. Furthermore, the failure so far, of vine planting gives no promise of future *Landolphia* plantation rubber. Whether or not African wild rubber will eventually disappear from the market is something not yet proven. At all events such rubber is still a factor and as a matter of record must be considered in a comprehensive listing of crude rubber sorts.

African Rubber. Wild rubber from Africa including Madagascar, obtained from vines as the *Landolphia, Carpodinus* and *Clitandra;* and from trees as the *Funtumia* and *Ficus Vogelii.* The latex is collected by natives by tapping or cutting down the trees or vines and is coagulated by boiling, air drying and by the use of astringent vegetable juices.

Two broad general divisions are made in East and West Coast Africans. The rubber is marketed in the shape of lumps, slabs, cakes, strips, buttons, paste, flakes, balls, niggers, twists, biscuits, spindles, nipples, nuts, thimbles, cherries, marbles, sheets, blocks, disks.

The above names are given because of the physical appearance of the rubber as it comes from the hands of the natives. The lump type, for example, is rubber that has been coagulated by boiling and is formed into any convenient shape. Spindles and most balls are made up of strips or filaments of rubber that is coagulated on the vine.

In some localities as on the Gold Coast, lumps are cut into strips or buttons by machinery and much of the moisture and foreign matter removed. African rubber thus treated is known in England as Liverpool pressed.

The trade names are usually: (1) the geographical origin or the port of shipment, as Soudan; (2) the physical shape of the rubber, as balls. African rubbers show a decided loss in washing, the shrinkage being from 7 to 50 per cent. The resin content is also large, running from 3 to 30 per cent.

Accra. Landolphia rubber from the Gold Coast. It is shipped in the form of small brown disks, white in cross section, veined with red and earthy. Accra lump is cut into strips and buttons and is graded as prime, seconds, and thirds. The lower grades are flake and paste. The shrinkage is 30 to 45 per cent.

Assinee. Landolphia, Ficus and Funtumia rubber, from the Ivory Coast, Grand Bassam being the port of shipment. It comes in marbles of ½ to 1¼ inches in diameter, is brown in color, cuts yellow, and contains almost no impurities. It is firm and of good quality. It is graded as follows: Assinee-silky, Attoaboa, Lahou, Bayin, half jack. Shrinkage 25 to 35 per cent.

Addah Niggers. Landolphia and Ficus rubber from Togo, and graded No. 1 and No. 2. Comes in small balls, dirty, reddish brown in color. Shrinkage 10 to 35 per cent. Known as Quittah and Lomi.

Adeli Niggers. See Konakry.

Alima. See Congo.

Ambri. Low grade Angola, chiefly in thimbles or nuts. See Benguela.

Angola. See Benguela.

Aruwimi (Mongala, Bumba). Landolphia rubber from the Upper Congo. Comes in large balls, like Equator and Lopori. Is tacky, wet, often fermented and much adulterated. Shrinkage 30 to 35 per cent. See Congo.

Attoaboa. See Assinee.

[1]Continued from The India Rubber World, February 1, 1921, pages 325-7.

Bassam. See Grand Bassam.

Barabaja. See Madagascar.

Bassao. See Gambia.

Batta Balls. See Cameroons.

Bayin. See Assinee.

Batanga Balls. See Cameroons.

Beira. See Mozambique.

Benin. See Old Calabar.

Benguela. Landolphia rubber from Benguela shipped in pressed balls. It is of reddish brown color, contains some vegetable debris, sand and earth, and is of poor quality. Is also graded as sausage and thimbles. Of the latter No. 1 is clean and tough, and No. 2 contains considerable red leaf. Shrinkage 20 to 40 per cent. Also known as Loanda and Angola.

Boulam. See Gambia.

Brown Cure (Brown Slab). Low grade of Madagascar niggers. See Madagascar niggers.

Bumba. See Aruwimi.

Cape Coast. See Gold Coast.

Casamanca (Boulam). See Gambia.

Cameroons. Rubber both from the Landolphia and the Funtumia in balls, biscuits and twists. Shrinkage, 20 to 45 per cent.

Caches. See Gambia.

Congo. A general name for rubber from the Independent Congo State and adjacent territories. The rubber is the product of Landolphias and Funtumia, either alone or in admixture. It comes in the form of buttons, balls, red and black thimbles, and twists. Congo ball, generally known as Kassai, is the best grade. The twists are among the toughest of African rubbers. The better grades are black or deep brown in color and contain but little moisture. The rubber has a woody smell and the lower grades contain bark and moisture. Shrinkages vary widely from 7 to 35 per cent. Some of the well-known grades are Kassai, red and black Kantanga, and Wamba.

Conakry. See Konakry.

Djuma. See Congo.

Donde Balls. See Zanzibar.

Donde Marbles. See Zanzibar.

Equator. African rubber from the Congo, which comes in balls glued to each other, and is much esteemed in quality. The balls are often small and mixed. It is dark, dry and clean, but contains some fermented rubber which smells badly. See Congo.

French Congo. See Congo.

Gristly. See Madagascar.

Gaboon. Landolphia rubber from the French Congo, which comes in short strips or flakes stuck together, but not amalgamated; balls, bulky lumps, which assume the shape of the containers, and flake. Large balls are graded as large O balls, and small ones as small O balls. The strip is black and contains few impurities. The ball is brown, moist and tacky but clean. Cross-section cuts develop pockets full of liquid. The flake is soft, free from dirt and spongy. Other names are Loango, Mayumba and Congo. Shrinkage, 25 to 45 per cent.

Grass Rubber. See Root Rubber.

Gambia. Landolphia rubber from the left bank of the Casamanca River in British Gambia and Portuguese Guinea. It comes in the form of marbles, weighing from one to four pounds, and in balls and niggers. It is made of latex from different species and loses its value by reason of these admixtures. A cross-section shows concentric circles, either red, brown or white, the center being amber in color. There is little débris in it and it is very moist. Shrinkage is 15 to 30 per cent. Gambia from

the left bank of the Casamanca River, shipped from the port of Zighinchor, is called Casamanca and is like ordinary Gambia. Casamanca Boulam is shipped from the port of that name. It comes from the uplands, however, and is like Senegal rubber, deep brown throughout, wet and foul, and contains earth and sand. The shrinkage is 30 to 50 per cent.

Gambie. A, AM, and B. These are of the nigger type. See Gambia.

Grand Bassam.. See Assinee.

Gold Coast. Carpodinus and Clitandra rubber, chiefly in lump from strips and buttons. It also comes in biscuits and niggers, hard and soft. The flake is wet and foul smelling. Shrinkage, 30 to 55 per cent.

Half Jack. See Assinee.

Ibo. See Mozambique.

Ikelemba. See Congo.

Inhambane. See Mozambique.

Isanga. See Congo.

Ivory Coast. See Assinee.

Jakoma. See Congo.

Kassai. See Congo.

Konakry. Landolphia rubber from French Guinea. Comes as Massai and Adeli. Similar to Gambia. Shrinkage, 15 to 44 per cent.

Katanga. See Congo.

Loango. See Gaboon.

Lahou. See Assinee.

Lamu. See German East Africa.

Liberia. Landolphia rubber from the state of that name; comes in small balls, brown or black in color, and is wet and contains vegetable matter and sand. It is graded as lump, hard flake and soft. Shrinkage 20 per cent to 40 per cent.

Lindi Balls. See Zanzibar.

Lamu Balls. See Zanzibar.

Loanda. See Benguela.

Lombiro. Cryptostegia rubber from Madagascar. See Madagascar.

Lopori. See Congo.

Lourenco Marquez. See Mozambique.

Lomi. See Addah Niggers.

Lower Congo. Carpodinus and Clitandra rubber from the Congo and Angola. See Congo.

Luvituku. See Congo.

Lac Leopold. See Congo.

Lagos Silk. Rubber from the Funtumia, sometimes Ficus. Shrinkage 30 to 40 per cent. See Old Calabar.

Lagos Lumps. Biscuits and strips from Landolphia rubber. Shrinkage 40 to 60 per cent. See Old Calabar.

Madagascar. Landolphia, Cryptostegia and Euphorbia rubbers from the island of that name. The general designation is East Coast and West Coast. The rubber is coagulated by salt water and by boiling. The principal port of shipment is Tamatave. It comes in large dark brown or black balls known as niggers, red ball, gristly, black ball, and also in balls of a red brown, as pinky, and in irregular rounded lumps, wet and earthy. Shrinkage 25 to 45 per cent. The grades are as follows: Tamatave or prime pinky Tamatave, which is the best grade; Majunga; East and West Coast; balls, red, black and gristly; brown cure, a low grade of slab; white virgin sheet; unripe balls containing much bark. Madagascar rubber bears the names also of localities as Morondava, Barabaja.

Majunga. See Madagascar.

Mayumba. See Gaboon.

Massai. See Sierra Leone.

Mossamedes. See Benguela.

Mongala. See Aruwimi.

Mozambique. Landolphia rubber from Portuguese East Africa and from Natal shipped in marbles and balls, spindles, sausage, sticks and liver. It is white, orange, and black, contains little moisture but is considerably adulterated with vegetable debris and sand. The best grade is orange ball No. 1, 2 and 3. The spindles are graded as removed and unripe. Ports of shipment are Lourenco Marquez, Inhambane. Beira and Ibo are also used in designation.

Mombassa. See Zanzibar.

"Mgoa." See Zanzibar.

Nunez. See Rio Nunez.

Niger. See Old Calabar.

Nyassa. See Zanzibar.

Orange Ball. See Mozambique.

Old Calabar. Funtumia rubber from Southern Nigeria and the Cameroons shipped in the form of balls stuck together and is called block balls. Known as Benin and Niger, also as silk rubber and Lagos silk rubber.

Quittah. See Addah Niggers.

Root Rubber. Rubber obtained by maceration and beating from the roots of aberrant Landolphias, as Clitandra or Carpodinus. See Congo.

Rio Nunez. Landolphia rubber from French Guinea and adjacent territory. Comes in balls and strings.

Salt Pond. See Gold Coast.

Sankuru. See Congo.

Senegal. See Soudan.

Soudan (Senegal). Landolphia rubber from French Senegal and the Soudan shipped in the form of more or less bulky masses or in flat sheets. Reddish brown in color and contains bits of wood, earth, and some moisture; very inferior. Ports of shipment are Kayes, Bakel and White Cape. Shrinkage 25 to 50 per cent.

Sierra Leone. Landolphia, Funtumia and Ficus rubbers. It comes in niggers, cakes, twists, balls and sheets. It is of a dirty reddish brown color, contains impurities and moisture. Is also known as Manoh. Shrinkage 10 to 40 per cent.

Silk Rubber. Funtumia rubber from Lagos and Southern Nigeria. See Old Calabar.

Tamatave. See Madagascar.

Tava. See Congo.

Tanga. See Zanzibar.

Uelle. See Congo.

Upper Congo. See Congo.

Wamba. See Congo.

White Virgin Sheet or Slab. See Madagascar.

Zanzibar. Landolphia rubber shipped from Zanzibar and Central Africa. It is like Mozambique and contains similar adulterants. Marketed as Nyassa, Lindi balls, Donde marbles, Lamu balls, Mombassa, Tanga, "Mgoa." Shrinkage 30 to 50 per cent.

RUBBER STAMPS IN ARGENTINA

There are several establishments in Buenos Aires whose business is the manufacture or sale of rubber stamps. The rubber stamp gum was all imported previous to the war, but since 1914 a local mechanical rubber goods company has supplied the entire demand at prices lower than those for foreign rubber. The local concern probably will continue to occupy its favorable position in the trade, because of the lesser duties paid for the raw materials and because of lower labor costs. The quality of the domestic product is stated to be perfectly satisfactory.

According to a census of motor cars in Sweden, taken June 1, 1920, there are 8,506 cars and trucks and 9,059 motorcycles in the entire country; of these Stockholm has 2,137 cars and trucks and 1,015 motorcycles. Recent information indicates that the January, 1921, registration will show more than 13,000 cars and trucks in Sweden, due to the heavy importations during 1920.

How Crude Rubber Is Milled and Marketed in Malaya

By Richard Hoadley Tingley

Going south on the railway from Penang through the Federated Malay States, cultivated rubber estates are practically continuous until the junction at Tampin in Negri Sembilan is reached. The line passes through mile after mile of continuous hedge of plantation trees broken at intervals by areas of jungle—some in the process of being cleared—and by tin mining operations. For much of this district the planted area to the west extends to the sea, and to the east to the foothills of the mountains which range, north and south, the entire length of the peninsula. This area is approximately 200 miles long by four or five miles wide and contains a total area of between 600,000 and 700,000 acres. Continuing south to Johor Bahru, a distance of 133 miles, the cultivation is somewhat more scattered as seen from the railway. In the State of Johore, however, practically nothing but rubber is seen as one journeys south to the straits that separate the mainland from the Island of Singapore. It is this section that produces most of the Malayan rubber of commerce.

Rubber raised on the big British estates along this line comes into the market thoroughly washed, cleaned and milled, packed and ready for export to the consuming factory. The operation is all done at the plantation, where every modern facility exists for scientific preparation. Most of this product finds its way to the big tire factories—some of it coming from plantations owned or controlled by them. But even the biggest of the tire and other factories do not produce on their plantations as much rubber as they consume at home, and are constantly in the market at Singapore, Penang and Kuala Lumpur for the product of the big British and other estates that bring their rubber into the market in a finished condition.

The larger portion of the rubber coming from this section is fully milled at the plantation and needs no further treatment before it reaches its factory destination. It is of the other—the smaller portion—that I propose to write, which amounts to many thousands of tons a year.

Henderson Brothers, Limited, Singapore
Factory Entrance

THE UNMILLED RUBBER MARKET OF MALAYA

This rubber is grown on the smaller British, Chinese and native plantations which maintain no milling factories, a large part of whose product, therefore, must be thoroughly treated before it is marketable for export. There are many estates whose annual product is large enough so they might well afford to install their own mill and thus obtain a price higher than can be had for the unmilled product. Lack of working capital has deterred many from doing so, particularly the smaller Chinese and native planters. Others, too, are anxious to get rid of their rubber as soon as made, thus realizing quick cash, and are content to accept a reduction in price in consequence.

At such plantations the coagulated rubber is put through smooth hand-rollers and the resultant is known as unsmoked sheets.

Henderson Brothers, Limited, Singapore
Milling and Conditioning Rubber

Many localities have their own special distinctive unsmoked sheets—each differing from another in certain characteristics. Some are more careful and thorough in the manner of treating the sheets; some use adulterants of one kind or another, the most common being jelutong and sago flour, both of which have a most harmful effect on the rubber. It is thus that the trade has given distinctive names to the sheets coming from this district or that, as Muar, Kuala Kangsa, Djambi, etc. (the latter coming from Sumatra), which identifies them at once as to quality and serves, in a large measure, to fix their relative price in the market. Large quantities of scrap and lump rubber also come into the market at Singapore from the small plantations, which must be milled before it is exportable.

The arrival of large quantities of such rubber at Singapore and Penang in this unusable condition has led to the establishment of milling plants at these ports where the unmilled product is washed, cleaned and made into the crêpes of commerce. In former times much of this rubber was shipped in what is now considered an unexportable condition, in other words, in a partly cured, dirty, barky state—to be milled upon its arrival at its destination in the United States or Europe.

THE HANDICAP OF THE SMALL OPERATOR

The desirability of a milling plant where the rubber offered from the smaller plantations can be converted into an exportable product, is obvious. In the first place, the small operator is barred from buying from the big American estates because they have little for sale—their own requirements consuming most of their output. The large British estates, also, cater to the big American users who always have buyers at hand that take most of their finished product. This constitutes the big market and represents

the larger portion of an annual Malayan output. The chief reliance of these buyers is, of course, the large estates that maintain their own milling plants at the plantation and whose rubber is sold, ready for shipment. The small Chinese and native plantation owner is not debarred, however, from this market by reason of the unmilled condition of his product since the process can be performed, and frequently is performed, by local independent mills at Singapore.

The small Chinese and native producers are scattered throughout the entire western slope of the Peninsula from Johore to the Province of Wellesley and beyond. Many of them are, in reality, but small farmers that cultivate and market all kinds of produce —rubber being but an incident. Chinese merchants or brokers (at times they may be either broker or merchant, as the case demands) travel about continually, picking up a few unsmoked sheets here and there. Assembling these at Singapore or Penang, the principal market is found with the independent brokers or merchants who maintain their own milling plants, where the sheets may be treated and made ready for export. This operation is often subdivided. The Chinese broker who travels about gathering in the sheets sometimes finds his market with another Chinese broker at one of the lesser cities or towns, as Kuala Lumpur or Klang, who, in turn, sends them to the port market.

Henderson Brothers, Limited, Singapore

One of the Drying Rooms

The total volume of business done in unsmoked sheets in this manner is large. There are, however, a multitude of people engaged in their production, assembly and marketing. Supplies of this kind often come into port in very small lots by wagon or bullock cart. Often, however, a sufficient quantity is assembled for a reasonable rail shipment before being moved. Depending on market conditions, this rubber may be sold at once on sample (or even in advance on sample) and taken directly to the mill —or it may have to be warehoused (godowned) pending disposal.

MALAYAN RUBBER MARKET DEAD

At the present time there is practically no market either at Singapore or Penang, in the strict sense of the word—and this condition has obtained for several months. Brokers run in and out of Chinese and British offices trying to get an idea of what prices really are when, in fact, there is practically no market that does not represent speculation. Malayan prices are largely controlled by London and London standards are followed—at least, in theory, though this does not always follow. Business in rubber has fallen into such a disordered state that if London prices are reported up a farthing, the Malayan market, or rather the sellers, instead of raising a penny, generally try for a four or five-cent raise, with the result that nothing happens.

Malaya is always optimistic and believes the United States is holding back on buying in order to bear the market. The dealers cannot dispossess themselves of the notion that America is short of rubber and must soon come into the market, whether or no. A farthing or so in advance in London is therefore construed locally to be the forerunner of a big demand—a big advance in price—and the local dealers want to be the first to discount the rise. For the same reasons, on a declining market, they hold on for dear life—still believing it to be a Yankee trick to unduly depress the market. On a big drop, however, they become panicky and frightened and rush to cover.

For the above reasons the Malayan Peninsula has become almost an impossible market during the past fall and winter and wise buyers can do little but watch out for sharp declines, wait a day or two, and then, often, fair bargains may be obtained. To a buyer who knows the local crowd and their ways and who watches their faces as they flit about among the offices, a trade can sometimes be made several cents under the actual London market. For long periods, however, during the past fall and winter, a most unusual price condition has obtained, making it almost impossible to do business. For long intervals New York has been the lowest market in the world, with London a little higher, then Singapore, Penang, Batavia, in order, with Colombo the highest. Often this relation might change somewhat, but New York and London have been generally lower than at producing centers. At times Penang has led at the top-notch price. The apparent reason for this anomaly is the distrust that haunts the Eastern mind of the sincerity of the American and the firm belief that he will soon come back into the market with a rush.

INDEPENDENT MILLING PLANTS

It is with conditions such as described that the local buyer for a house outside the big combinations has to contend in buying the unmilled product. It is the disorganized condition of the unmilled rubber market that has caused the establishment of independent milling factories at some of the largest trading centers. In the entire Malayan rubber district there are many such plants, large and small. They range in capacity from one ton to 20 or 30 tons a day. Around Singapore there are probably fifteen or twenty; around Penang, perhaps ten or twelve, all Chinese. Some of them, however, are very small.

Henderson Brothers, Limited, Singapore

Native Tamil and Chinese Employes

One large plant employs upwards of 600 men and women, all told, and has a capacity for milling and conditioning about 20 tons of unmilled rubber a day. It is equipped with many milling machines, a portion of which are shown in the accompanying

photographs. Three classes of rubber come to the factory for treatment: (1) rubber to be remilled; (2) rubber to be re-

Henderson Brothers, Limited, Singapore
"Coolie Lines" or Native Quarters

treated, and (3) rubber to be packed for export shipment. Class 1 comes in various forms, such as balls, sheets, crêpe, scrap, lumps, etc. It all contains a certain amount of bark, dirt and other foreign matter.

Class 2 is mostly ribbed smoked sheets, often mouldy or badly treated in the first place. The mouldy sheets are washed and hung in the smokehouse—and the same with the sheets that have been improperly treated.

Class 3 is bought in bulk lots of crêpe or other sheets and is selected according to established standards. When this has been done it is packed for shipment without further treatment.

Class 1 material is received at the store room, selected there, taken to the milling room for recrêping and then hung in the drying room. When dry the sheets are taken to the storehouse, reselected, and finally stored in the house set aside to receive rubber ready for shipment, and there packed. The milling process consists of passing the rubber through two-roll mills while a continuous spray of water is played upon it, thus washing out all dirt and foreign matter.

The typical factory shown in the illustrations is complete in all details with ample "godown" buildings on the premises. It is built for service and utility and is equipped, not only for economic treatment of rubber, but for the comfortable housing of its coolies, as the long row of "coolie lines" will testify. In its construction and installation, too, much good taste has been displayed, as will be seen by the somewhat ornate and elaborate entrance shown in the illustration. It stands out in striking contrast to the unadorned and austere appearance of most United States factories.

The Peachey Vulcanization Process

Our readers are already acquainted with the Peachey process for the vulcanization of rubber through descriptions already published in these columns.[1] Further interesting practical details are found in a recently published paper on this process by S. J. Peachey and A. Skipsey[2] from which the following has been abstracted.

The authors concede that while a vulcanized rubber of excellent quality is yielded by the Goodyear process yet this method possesses certain disadvantages, viz.: (1) It necessitates the continuous use of steam both as a heating agent and as a medium for exerting pressure on the goods under treatment to avoid the development of porosity; (2) it is a comparatively slow process; (3) it restricts the manufacturer in his choice of filling and coloring agents. The manufacturer thus has to depend chiefly on inorganic compounding materials and a limited range of mineral pigments. The majority of coal-tar dyestuffs are destroyed or modified by the action of sulphur at 140 degrees C., hence delicate tints are practically unobtainable with the usual process of vulcanization.

The new process removes these restrictions and renders possible new technical and artistic effects in rubber goods. The discovery of the process resulted from an investigation on the behavior of rubber towards different forms of sulphur. Sulphur is remarkable for the number of allotropic forms which it is capable of assuming. In all three states of aggregation—solid, liquid and gaseous—sulphur appears to be capable of varying its molecular complexity. An attempt was made to compare the action of these different forms of sulphur on rubber. This attempt was interrupted by the discovery that the interaction of sulphur dioxide and hydrogen sulphide produces momentarily a form of sulphur which rapidly combines with rubber at the ordinary temperature, yielding an effective vulcanization. The reaction between the two gases must take place in contact with the rubber or no vulcanization results. The sulphur is active only at the moment of liberation, and it is fair to assume, therefore, that the effect is produced by atomic sulphur.

In applying the new process the rubber is exposed alternately to the action of sulphur dioxide and hydrogen sulphide. The gases readily diffuse into (probably dissolve in) the rubber, and there interacting produce active sulphur which immediately combines with the rubber at the ordinary temperature, yielding a product wholly comparable with that obtained by the Goodyear hot process. Evidence is accumulating to show that the product is actually superior in strength; this may be explained by the fact that the depolymerization of rubber produced by heat is avoided in the new process.

The process appears to be of fundamental importance for the following reasons:

(1) It is a true sulphur vulcanization—as distinct from the sulphur chloride vulcanization produced by Parkes' "cold cure."

(2) It eliminates the use of heat and to a great extent the use of mechanical pressure.

(3) It employs two gases, both of which can be produced on a large scale at a very cheap rate.

(4) It is rapid in action.

(5) It enables the manufacturer to employ organic filling agents which cannot be used in conjunction with the hot process or with the Parkes process (most organic materials are attacked and destroyed by contact with sulphur chloride).

A number of cheap and highly durable materials may be fabricated from various wastes in this manner and employed as floor and wall coverings, for boot and shoe manufacture, and for fancy leather goods and upholstery work. Further, in numerous manufacturing processes unconnected with the rubber industry the process renders possible the use of rubber as a binding agent for fibrous and granular materials as an alternative to the resins,

[1] The India Rubber World, May 1, 1920, page 532.
[2] Journal of the Society of Chemical Industry, Volume XL., No. 1, January 15, 1921, page 5T.

bitumens, gums, and like substances which have hitherto been employed, with the result that the toughness and flexibility of the products are considerably increased.

(6) Coal-tar dyestuffs and even natural dyes like chlorophyll, which, with a few exceptions, are destroyed by the hot cure and also by the sulphur chloride cure, can be introduced into rubber mixings to be cured by the new process with the production of delicately-tinted materials hitherto quite unobtainable.

The process possesses the advantage of extreme simplicity and its translation from the laboratory to the works should prove a simple matter.

The process can be extended to the vulcanization of rubber in solution. If a solution of rubber in benzol or naphtha be saturated wholly or partially with hydrogen sulphide and mixed with a solution of sulphur dioxide in the same solvent, the liquid sets in a few moments to a stiff jelly, and on eliminating the solvent by evaporation a fully vulcanized rubber is obtained. The use of the mixed solutions for producing perfectly vulcanized seams and joints has proved highly successful, and inner tubes repaired by the new process have an excellent life.

Further, by the use of the solution process, reformed leather soles and heels may be attached to boots without the aid of stitching or nailing. In fact, an entire boot may be produced from the reformed leather without stitch or nail being necessary.

PRACTICAL WORKING OF THE PROCESS

Mr. Peachey said that in working the new process the two gases are introduced separately, both being comparatively easily soluble in the solid rubber, especially the sulphur dioxide. The amount of sulphur dioxide absorbed by rubber is surprising. Hydrogen sulphide is more than sufficiently soluble to yield a coefficient of vulcanization up to five, which was higher than required in practice. Adsorption is not relied upon at all, but absorption of the gas followed probably by solution. Generally speaking, excess gases, as far as could be judged by smell, are driven out of the rubber after about one hour's exposure. The practice has been followed throughout of giving the shorter sulphur dioxide treatment first, finishing up with the hydrogen sulphide in excess, so that there was very little possibility of free sulphur dioxide remaining and practically no danger of free acid forming.

To get a fully vulcanized rubber it was only necessary to introduce 2½ per cent of sulphur; therefore the amounts of the two gases required to vulcanize a mixture containing 50 per cent of rubber were surprisingly small, and a negligible amount of water only is produced. The water diffuses out of the rubber quite rapidly. It never exists in the liquid form in the finished product, and the vulcanization need not be followed by any drying operation. Exposure to the air for a few hours causes all necessary elimination of water.

As regards the free sulphur present in antimony sulphide and ultramarine, it is disadvantageous to have free sulphur present in a mixing which is to be vulcanized by the new process. It tends in some way sympathetically to convert the atomic sulphur into molecular sulphur. In all mixings made for the new process ordinary sulphur would not be present, and the use of antimony sulphide would be especially avoided, as that substance could be replaced by much better and brighter colors. In the "dry" treatment the rubber or rubber mixing to be vulcanized is exposed to sulphur dioxide for ten minutes, after which a very short exposure to the air is given to remove the adsorbed gas from the surface. The material is then introduced into another chamber where it is exposed to the hydrogen sulphide for 20 to 30 minutes.

In the case of "solution vulcanization," it is very easy to prepare standard solutions, and in practice a standard solution of sulphur dioxide is prepared by weight. It is convenient to use a solution containing 0.8 per cent of this gas in benzene. Saturate a 10 per cent rubber solution with hydrogen sulphide, and mix four volumes of the hydrogen sulphide solution containing the rubber with one volume of the benzene solution. The actual proportiou of the two gases interacting is theoretical. Small amounts of free sulphur are invariably formed in the rubber. The combination is not quite complete, as apparently a small amount of the atomic sulphur is changed into molecular sulphur, but the amount is small compared with the amount left in the rubber by the "hot" process.

It was a matter of surprise to learn that one experimenter with the new process found acid in his samples; possibly he used the sulphur dioxide in excess. Mr. Peachey, in his own experiments, invariably kept the hydrogen sulphide in excess, and by treating the rubber first with sulphur dioxide and then with hydrogen sulphide the formation of any trace of free acid can be avoided. If, however, faulty working leads to the formation of a trace of free acid the material can be treated with ammonia, just as in the sulphur chloride process.

The question of the treatment of rubber one inch in thickness is rather beyond the present limits of the process. The porosity of a mixing is actually greater when fairly heavily loaded, and the penetration obtained is surprising. Although exact diffusion figures were not available, it might be assumed that both sulphur dioxide and hydrogen sulphide diffuse into rubber at least as rapidly as carbon dioxide, and in the case of sulphur dioxide more rapidly. One would not attempt by the new process to deal with material one inch thick, but would avail oneself of the new method of building up which has become possible as the result of the new solution process.

It is possible now to build up material of any thickness after it has been vulcanized in sheets and to get a solid mass in which the joints will prove of equal strength to that of the material itself. The treatment of thick articles involves new methods of building up, and it is quite desirable that such new methods should be introduced. The leather compounds prepared by this process are 2½ times as durable as new leather.

PRIORITY OF PEACHEY'S PROCESS QUESTIONED

DUBOSC'S CLAIM

The eminent French rubber chemist, André Dubosc, has put forward a claim[1] to have anticipated S. J. Peachey's discovery of cold vulcanization of rubber by gases, by his article entitled "An Hypothesis as to the Process of Vulcanization,"[2] which stated, in part, as follows:

"Sulphur is capable of existing in seven or eight different forms, only one of which, *the colloidal form,* is in evidence in the vulcanization process. What is used technically is ordinary commercial sulphur, which is the polymerized form; evidently there must be a preliminary reaction consisting in the change from ordinary to colloidal or depolymerized sulphur before the union between the rubber hydrocarbon and sulphur can take place.

"When *pure* rubber and sulphur are heated together under ordinary vulcanizing conditions, the quantity of sulphur entering into combination is very small, and the product has an insignificant strength and elasticity.

"When rubber containing resins and proteids is heated with sulphur under the same conditions, sulphur is fixed by the rubber in nominal amounts and the product has the well known properties of vulcanized rubber.

"When resins are heated with sulphur, hydrogen sulphide is produced and with the 'insoluble portion' of crude rubber, consisting of proteids and oxidized rubber, the reaction produces hydrogen sulphide and sulphur dioxide.

"The rôle of resin, the insoluble part of rubber, or a metallic oxide, is simply to give rise to the production of sulphur dioxide, hydrogen sulphide, and metallic sulphides. By this means the octatomic sulphur is transformed into the monatomic form which

[1] The India Rubber Journal, January 22, 1921, page 21.
[2] Le Caoutchouc et la Gutta-Percha, March 15, 1915, page 8601. Translation in The India Rubber Journal, May 1, 1915. Abstracts in The India Rubber World, May 1, 1915, page 428.

enters into the compound as hydrogen sulphide or sulphur dioxide.

"The researches of Graham and others on the osmose of various gases through rubber have shown *that both the gases mentioned above are absorbed in considerable quantities by rubber, which means that they diffuse readily*. The reaction between sulphur dioxide and hydrogen sulphide is—

$$2H_2S + SO_2 = 2H_2O + 3S$$

the products being water and monatomic or colloidal sulphur. All of this sulphur which was present as sulphur dioxide or hydrogen sulphide diffused through the mass of rubber has been transformed into colloidal sulphur capable of uniting with the rubber and saturating the double bonds of the caoutchouc molecule."

PEACHEY'S REPLY

"By what chain of reasoning Dubosc considers himself entitled to father the new cold process of vulcanization as a consequence of the publication by him of a hypothetical explanation of the old hot process is by no means clear, and the writer would welcome further enlightenment.

"Dubosc states that only one form of sulphur is in evidence in the vulcanization process in the ordinary hot sulphur cure, namely, the colloidal form, and that the first step in the process is the breaking down of ordinary, or polymerized, sulphur into colloidal, or depolymerized, sulphur.

"This statement is contradicted by the very axioms of colloidal chemistry, which affirms that colloidal bodies possess a high degree of polymerization, and that the more complex the molecule, the more pronounced is the colloidal character.

"Dubosc overlooks the fact that the temperature at which vulcanization is effected in the hot process (140 degrees C.) lies well above the melting point of sulphur (114 degrees C.), and that molten sulphur (which at 140 degrees C. consists of an equilibrium mixture of two well-recognized forms of the element) can alone be concerned in the change. It should be noted that the present writer claims that vulcanization is effected by means of atomic sulphur produced momentarily by the interaction of hydrogen sulphide and sulphur dioxide at the ordinary temperature. To convince physical chemists that atomic sulphur is identical with colloidal sulphur will indeed prove a difficult task.

"Dubosc further states that when pure rubber and sulphur are heated together to the vulcanizing temperature, the amount of sulphur entering into combination with the rubber is very small, and that the product does not possess the characteristics of vulcanized rubber. This statement is not based on facts. Pure rubber has never been prepared, but rubber which has been subjected to the most drastic method of purification available will still vulcanize, even up to the ebonite stage, when heated with sulphur. It is purely a matter of the amount of sulphur and the duration of the heating.

"The statement, 'When resins are heated with sulphur hydrogen sulphide is produced,' calls for one comment only, viz., that the natural resins are not hydrocarbons but are oxy-compounds usually of an acid character. The further statement that the heating of the 'insoluble portion' of rubber with sulphur leads to the formation of both hydrogen sulphide and sulphur dioxide would require that oxidation and reduction of sulphur should proceed simultaneously in a single reaction, which is in the highest degree improbable.

"As regards the suggestion that sulphur dioxide plays a part in the hot vulcanization process and that the requisite amount is derived from the interaction of the sulphur with a metallic oxide in the presence of air, it is sufficient to mention that a solution of rubber in xylene, free from and out of contact with air, and containing no metallic oxide whatever, can be effectively vulcanized by heating with sulphur to a temperature of 135 to 140 degrees C. for several hours. The writer would ask M. Dubosc to suggest the source of the sulphur dioxide in this particular experiment.

THE CASE OF PURE EBONITE

"How can Dubosc's hypothesis be made to fit the case of the production of pure ebonite, made by heating together 100 parts of plantation crêpe and 50 parts of sulphur between platens of a press at 140 degrees C. sufficiently long to yield a product containing 32 per cent of sulphur? If Dubosc's theory were correct and the sulphur combining with the rubber were produced by the interaction of hydrogen sulphide and sulphur dioxide, then for every 100 gr. of rubber converted into ebonite, about 20,000 cc. of the former gas and 11,000 cc. of the latter would require to be generated by the interaction of the sulphur with the resins and the occluded air in order to effect the complete vulcanization. Does M. Dubosc suggest that plantation crêpe contains sufficient quantities of resins and occluded air to yield the amounts of the two gases calculated on the basis of his hypothesis?"

Consumption of Automobile Tires in 1920

Rubber company statisticians in Akron estimate that the 9,295,252 motor vehicles registered in the United States in 1920 require about 32,000,000 tires annually to replace those worn out at the rate of 3½ tires per vehicle. This estimate admits a small allowance for solids used on trucks.

Tire consumption thus averages about 2,700,000 each month, exclusive of tires needed for new equipment.

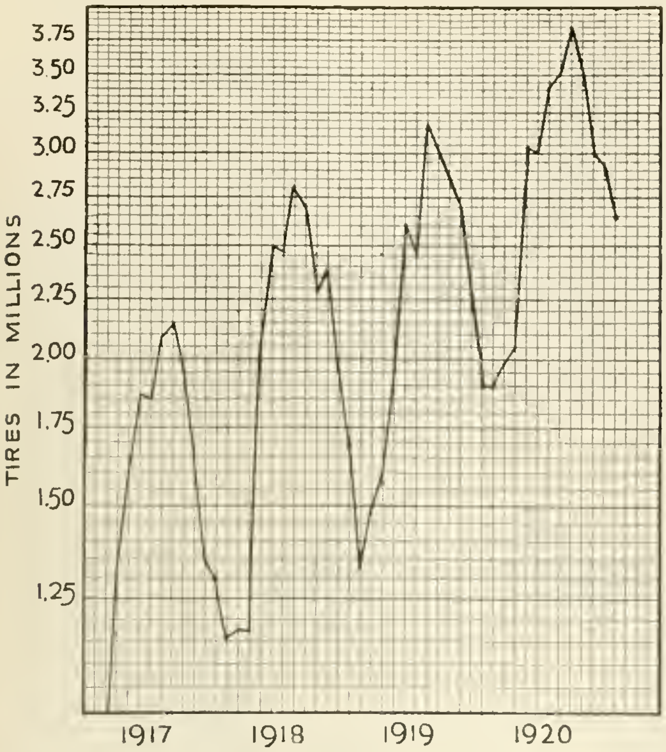
Estimates of tire consumption have not as yet, so far as known, been based on tire mileage and gasoline consumption. Such a basis, however, offers an opportunity to estimate probable rather

Table I

Monthly Consumption of Gasoline and Tires

	1917		1918		1919		1920	
	Gasoline, Gallons	Tires	Gasoline, Gallons	Tires	Gasoline, Gallons	Tires	Gasoline, Gallons	Tires
January	....	875,000	143,967,669	1,155,000	169,256,877	1,355,000	238,204,518	1,905,000
February	....	885,000	147,204,377	1,175,000	185,900,192	1,490,000	248,395,214	1,990,000
March	....	1,325,000	219,462,185	1,755,000	204,004,317	1,610,000	256,020,539	2,055,000
April	....	1,600,000	265,151,411	2,120,000	243,440,615	1,950,000	297,001,120	2,375,000
May	....	1,880,000	311,524,603	2,500,000	328,277,648	2,625,000	378,912,672	3,030,000
June	....	1,850,000	303,255,608	2,460,000	305,960,438	2,450,000	427,242,862	3,420,000
July	259,630,336	2,090,000	352,589,555	2,820,000	397,591,158	3,180,000	434,868,997	3,525,000
August	268,478,623	2,150,000	337,659,668	2,700,000	376,484,274	3,010,000	479,741,391	3,840,000
September	245,475,851	1,960,000	284,435,982	2,275,000	366,625,742	2,835,000	450,888,670	3,510,000
October	207,049,371	1,660,000	298,186,557	2,385,000	338,429,709	2,700,000	384,802,246	3,080,000
November	166,703,910	1,350,000	245,269,244	1,960,000	284,620,049	2,275,000	366,831,265	2,935,000
December	163,183,611	1,300,000	210,116,502	1,680,000	238,245,230	1,900,000	300,000,000*	2,400,000
Totals	2,694,704,251	18,925,000	3,074,791,178	24,985,000	3,437,960,726	27,380,000	4,262,909,494	34,065,000

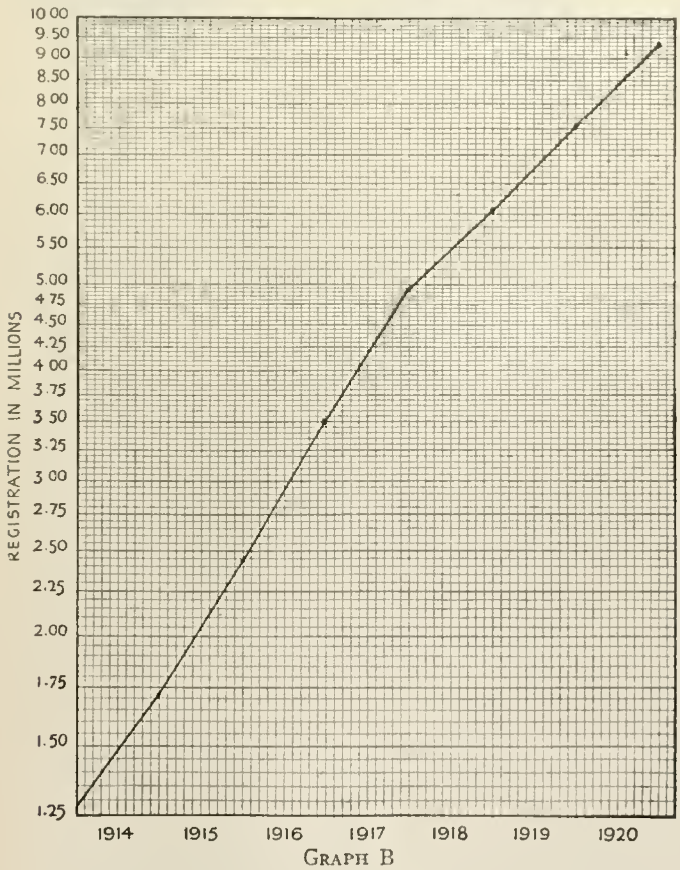
*Estimated



Graph A
Tires Consumed Monthly In Millions

than average monthly totals of the number of tires consumed.

In the figures given by the United States Bureau of Mines the domestic monthly consumption of gasoline is given in gallons.



Graph B
United States Motor Vehicle Registration 1913-1920 Inclusive

Since these figures include gasoline consumed for all uses a reduction is necessary to determine that used by passenger cars only. The allowance to cover all other uses has been taken at 20 per cent.

The ratio between tires and gasoline consumed is based on reported official cost data[1] modified by the statement of the American Automobile Chamber of Commerce that 70 per cent of the cars registered are classifiable as small and 30 per cent as large. The average number of miles per gallon of all cars is thus taken at 17 miles. The average usefulness of a pneumatic tire is taken at 5500 miles. The ratio of worn out tires to gallons of gasoline is thus found to be one to 100. In other words, one per cent of the gallons of gasoline consumed represents the number of tires consumed; thus every 100,000 gallons of gasoline represents 1000 tires.

In Table I the monthly domestic consumption of gasoline is given as far as available and the estimated corresponding numbers of tires consumed. It is interesting to note that the method adopted results in a total annual consumption of 34,065,000 tires. This practically agrees with the generally accepted trade view and is not greatly in excess of the figure of Akron experts quoted above.

Tires consumed monthly from 1917 to 1920, inclusive, are charted in graph A. The similarity in seasonal distribution indicated is notable, as well as the rapid growth which parallels the annual increase in vehicle registrations.

Table II records the official registration of motor cars in the United States for the period from 1913 to 1920, and the figures are charted in Graph B.

Table II

Registration of Motor Vehicles

Year	Cars
1913	1,254,971
1914	1,711,339
1915	2,445,664
1916	3,512,996
1917	4,983,340
1918	6,146,617
1919	7,565,446
1920	9,295,252

JAPAN'S RUBBER TRADE—1918-1919

Imports of crude rubber into Kobe in 1913 totalled 1,439,000 pounds, valued $859,000; in 1918 rubber imports increased to 9,616,000 pounds, valued $4,110,000, and in 1919, 15,804,000 pounds were imported, valued at $5,866,000. Exports from Kobe in 1918 included 2,944,000 pounds of tires, valued $2,019,000, and other rubber manufactures to the value of $366,000; in 1919 tire exports were 4,211,000 pounds, valued $3,089,000, and exports of other rubber manufactures increased to $682,000. Exports of insulated wire totalled 2,225,000 pounds, valued $909,000 in 1919, as against 1,892,000 pounds, valued $701,000 in 1918, and 31,000 pounds, valued $9,000, in 1913.

Insulated wire was also exported from Osaka, in the quantity of 4,706,000 pounds, valued $1,188,000, in 1919, as against 2,967,000 pounds, valued $958,000, in 1918, and 136,000 pounds, valued $28,000, in 1913. Imports from the United States into Osaka in 1919 included 30,000 pounds of soft rubber, valued $20,000, as against 32,000 pounds, valued $32,000, in 1918. Declared exports from Japan to the United States in 1919 included 2,402,694 pounds of crude rubber, valued $1,094,085, and 1,036,802 pounds of sheet rubber, valued $442,790.

Imports of rubber goods through the port of Trondhejm, Norway, during 1919, were 23 metric tons, as against 25 metric tons in 1913.

[1]Operating Cost Record of 65 Motor Vehicles in the Los Angeles Water Department, Engineering Record, June 3, 1916, pages 728-732.

Artificial Lighting in the Rubber Industry—III[1]

The Fundamental Principles of Illumination (Psychophysical)

By E. Leavenworth Elliott

WHAT IS PSYCHOPHYSICS?

IN THE LAST ISSUE we discussed the nature and action of light as a form of energy. The subject was one of physics and mechanics, having to do only with matters external to the human body. We come now to the consideration of what takes place within the body through the action of light.

The performance of the mind constitutes the subject of psychology, and the performance of the body the subject of physiology. The subject which deals with the relation between the action of the mind and the action of the body is called psychophysics. Seeing is the mental result of light acting upon the visual organs, and hence belongs to the science of psychophysics.

The subject of illumination is something like the manufacture of rubber. You have certain substances which you subject to various mechanical processes, all of which are carried out in accordance with the rules established by experience, and then the product of these mechanical manipulations is subjected to a mysterious process which you call "vulcanization," which changes the whole mass of materials into a new body having very different properties from the combination you started with. No matter how good your materials, and how perfectly the mechanical operations have been performed, unless the vulcanization takes place properly the final result is a failure. What happens during this process? Nobody knows. To be sure, you have names for all that you can find out about it; you talk of "polymerization," and "rearrangement of atoms in the molecule," but what do you *know* about atoms and molecules? So, we know how to manipulate heat, electricity, and various materials to produce light, and we can direct and modify the light to make it serve our purposes of seeing. But it is what takes place after the light enters the eye that produces the results we are after; the process of seeing is the all-important thing, and this is a far greater mystery than vulcanization. However, you know the conditions required for good vulcanizing without knowing what actually takes place, and we can likewise learn much about the conditions for good seeing without understanding fully just how the eye does it. But the better we understand the construction and working of the eye the better able we shall be to provide the conditions requisite to its efficient operation.

THE EYE AS AN OPTICAL INSTRUMENT

The idea generally conveyed when the eye is mentioned includes all the organs of vision, of which the eye proper, or eyeball, is only a part. Let us examine this visual mechanism in detail. Anatomists tell us that it consists of three main organs: the eye-ball, the optic portions of the brain, and the nerve-cable connecting these.

It is customary to describe the eye (eye-ball) as a small camera, and this comparison is good as far as it goes; but the eye is much more than a camera—it is a whole photographic laboratory. However, the similarity between the visual and photographic processes as a whole is so remarkably complete that it furnishes one of the best methods of explaining vision.

To begin with, the eye is a double mechanism, and hence is a stereoscopic camera. This binocular vision (seeing the same thing with two eyes) is of great assistance in enabling us to judge the relative distances of objects, just as the stereoscope brings out distance in the views seen through it. As an optical apparatus, the eye is exactly similar to the camera. The illustration Fig. 1 represents a section through the eye. The familiar term eye-ball is exact; the eye is a ball, or sphere, bulging slightly in the front. This ball fits a socket in the skull, in which it is free to move to a certain extent in any direction. Six muscles attached to the outer surface and around the front of the ball hold it in place and also turn it in its socket; it is thus like a camera mounted on its tripod with a ball-and-socket joint. The outside casing of the ball is a tough, fibrous substance, called the *sclerotic S*. On the front this coating is transparent and horn-like, and is called the *cornea C*. The cornea bulges out in the form of a portion of a smaller sphere, and forms part of the compound lens with which the eye is fitted, the other elements of the combination being the *crystalline lens*

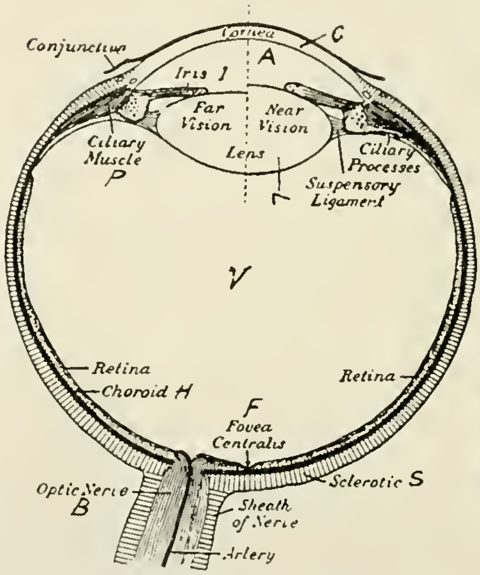


Fig. 1. A Diagram of the Eye

Fig. 2. Image on the Retina—Full Size

L which is a double convex lens of a solid, transparent substance, and the transparent liquid called the *aqueous humor A*, filling the space between the lens and cornea. Between these two there is also a membrane having a circular opening, called the *iris I*, which forms the diaphragm or "stop" of the lens. The iris is the central round spot which gives the characteristic color to the eyes, and the circular opening is called the "pupil."

The aperture in the iris is capable of opening and closing through a range of about four times the minimum, which it does automatically, and for exactly the same purposes as the size of stop is varied in the camera; that is, it opens in dim light to admit more light, and it closes slightly when the lens is focussed on near objects, which increases the sharpness of the image. It is commonly supposed that the dazzling effect of going from a dark room into a very light room is due to the excessive amount of light that enters the eye through the full opening in the iris, and that this dazzling effect disappears when the iris has had time to contract. This is only a part, and the smaller part, of the explanation; the principal cause of this effect will be explained later.

The sclerotic, or outer casing, is lined with a thin, dense, dark-colored membrane called the *choroid H*, which excludes all light from the interior except what passes through the lens and iris. This serves the same purpose in the eye as the black paint inside the camera.

The lens is "mounted" in a ring of muscles, called the *ciliary processes P*, which focus the image by contracting or relaxing,

[1]Continued from The India Rubber World, February 1, 1921, pages 329-332.

thereby causing the lens, which is elastic, to become more or less convex, and thus varying its focal length. In this respect the eye differs from the camera in which the focussing is done by moving the lens back and forth.

The inner surface of the eye, extending from the muscular lens-mounting over the rear portion, is covered with a layer of tissue consisting largely of nerve fibers, and is called the *retina R.* A bundle of nerves—very like a large cable containing hundreds of telephone wires—enters the eye-ball at the rear, and slightly to one side *B.* These nerves spread out in all directions over the inner surface, which is also well supplied with blood vessels. The portion of the retina directly back of the lens, upon which the image formed by the lens is received, is fitted with the special devices that are directly acted upon by light. These are of two kinds: small rods which project from the surface, like the nap on velvet, and shorter cone-shaped projections, pointing outward. The central part of this sensitive surface is covered with cones only and the outer portion with rods only, the two being interspersed in the median portion. These rods and cones are the terminals of nerves. In the very center of this sensitive surface there is a small spot, slightly depressed, and of yellow color, called the *fovea F,* which is more highly sensitive than the other parts of the surface, and upon which the eye automatically throws the image of what we want to see with particular sharpness.

This sensitive portion of the retina is the counterpart of the sensitive coating of the plate or film in photography. The cones alone give the sensations we call colors; while the rods alone produce vision in very dim light, but give only sensations of varying shades of gray. Who would have looked for so intricate an explanation of the old saying that "in the night all cats are gray"! A little space where the nerve-cable enters the eye is wholly insensitive to light, and forms the *blind spot.* Just what action the light produces upon the rods and cones of the retina which causes them to send nerve currents to the brain is not known—another similarity to photography, the action of light upon the silver salts in the film not being positively known. It had been observed that, left in darkness or dim light, the rods become purple at the ends, and that this purple rapidly fades out on exposure to bright light. This indicates chemical action, but further than this there is no definite knowledge.

All of the effects of light which make up the sensation of seeing are transmitted through the nerve-cable, or *optic nerve,* to their special center—like a telephone "central"—in the brain. The brain, like the eye, is a double apparatus, consisting of duplicate right and left portions. It is a rather curious fact that the optic nerves cross, the nerve from the right eye going to the left lobe of the brain, and vice versa. If the optic nerve is incapacitated, vision of course is prevented. Wood alcohol, taken into the system either by drinking or by sufficient inhalation, has the peculiar property of permanently paralyzing the optic nerve, and so producing blindness—which renders it rather objectional for beverage purposes.

The interior cavity of the eye back of the lens is filled with a transparent substance of buttery consistency called the *vitreous humor V,* which serves to keep the casings distended and the form full and true.

The skin of the face is slit and folded under in front of the eye-sockets, forming the eyelids, which serve as the shutter for the camera. It is important to remember, however, that the eyelids are not opaque, like the shutter in the photographic camera, but decidedly translucent, as may be readily seen by closing them in the light and observing the very sensible impression of light still produced upon the mind.

GENERAL CONDITIONS FOR GOOD VISION

Having made ourselves familiar with the general construction of our seeing apparatus, we may now inquire into the conditions necessary for obtaining the best results from its use. To this end we can still follow the analogy of the photographic camera and process to advantage. What are the conditions requisite to a good photograph? What are the causes of defects in photos? Since photography is now so generally understood it will be permissible to follow this lead in our efforts to explain the general principles of lighting.

To get a good picture you must first of all have a good lens. By no possibility can the finished photo be any better than the image thrown on the plate: poor plates, or poor developer, or wrong exposure may make it worse. The character of the image is determined solely by the lens. The lens of the eye is frequently defective—after middle life, nearly aways so. The cornea often becomes distorted in shape, taking an elliptical instead of a true spherical form, which prevents focussing sharply on horizontal and vertical lines at the same time. This is called astigmatism, and is corrected by the use of glasses having a cylindrical surface. After middle age the lenses generally lose their elasticity to such an extent that they cannot be focussed on near objects, thus becoming far-sighted. This is corrected by using glasses having a slight magnifying power, i. e., having slightly convex surfaces. Sometimes the lens has too great a curvature, producing near-sightedness, which is corrected with concave, or reducing, glasses. Not infrequently the two eyes have different focal lengths, or different-shaped corneas, and must be matched optically by the use of different glasses for the two eyes. All defects due to deformation of the lenses of the eye can be corrected by the use of glasses; the crystalline lens may even be removed, and its action performed by an exterior glass lens, as is done in cases of cataract.

PICTURE ON THE RETINA IS WHAT WE ACTUALLY SEE

As the image on the plate determines the character of the photo, so the image on the retina determines the character of the visual impression. In fact, the retinal image is the only thing that we actually *see;* all of our *perception* of things by means of vision is the result of experience. We know that the objects we see are in their places because we have learned to connect our visual impressions with other sensations, particularly of muscular movement and touch. Anything that changes the image on the retina from its usual form will mislead the mind as to the reality, as in the case of the mirage. A dog, seeing the image of itself in a mirror, believes it sees another dog; a man who had never before seen a mirror would make the same mistake. We can also see things with the eyes shut—the familiar "after images."

In speaking of the eye as a camera we naturally overestimate its size. In this respect the eye should be compared to the microscope camera. The whole apparatus is only an inch in diameter, and the actual size of the image and the extent of the field is shown in Fig. 2. The diminutive circle in the center shows the part of the image falling on the fovea, which is seen sharply. The conscious effort which we make to look sharply at an object is expended in turning the eyes so as to bring the images of the object on the foveas—called fixation—and in bringing the lenses to the curvature necessary to produce a sharp or focussed image.

The impression we have of seeing about us within a wide field is due to the fact that the eye-ball is naturally in constant motion, of which we are as little conscious as of winking, and the different views are blended in the mind by memory. So habitual is this motion of the eye-ball that it can be overcome only by a severe conscious effort, which soon becomes irksome, and then painful, like holding the arm outstretched. Try looking sharply and steadily at a single word on this page, and you will soon appreciate this fact. In this constant roving the eye instinctively tends to bring the most prominent, i. e., the brightest point, into focus on the fovea—a fact which will receive attention later in connection with glare. Our little micrographic camera is thus a panoramic camera—the kind that swings on its tripod

while the picture is being taken, only the eye turns in all directions instead of merely swinging around.

WHAT HAPPENS WHEN WE SEE

The formation of the picture on the retina is a simple matter of the mechanics of light; but the process of *seeing* this picture, that is, of realizing it in consciousness, is intricate beyond comprehension. Consider that there are two pictures taken from slightly different positions and consequently different in perspective; that the pictures are bottom side up and reversed right and left; that they are of microscopic fineness; that they have all variations of color as well as of light and shade; that they are constantly changing with instantaneous swiftness, and that objects in them are frequently in motion: all of this complex, the visual apparatus in the brain transforms into the single, congruous impression of objects having their actual relative sizes, shapes, motions and positions in space. Furthermore, this transformation does not take place where the picture is produced, but the image is first converted into nerve currents—whatever they may be—and transmitted to the brain through cables of nerve-fibers. If we follow the analogy of photography to the whole visual apparatus, we must imagine a tiny camera an inch long, with the sensitive plate connected by a telegraphic cable directly to a moving picture projector, which gives a life-size picture in colors of whatever the camera "shoots." Science has some distance to go yet before it can equal this "stunt"!

But to return to the retinal image as the determining factor in vision. We have seen that mechanical defects in the lens of the eye can be remedied by the use of glasses; but there is one imperfection in the lens of the eye which is inherent and impossible of correction by artificial means. The nature of this defect is easy enough to understand. If you look at an object through a simple magnifying glass you will notice a play of rainbow colors about the sharp edges and lines of the object. This results from the fact that a simple convex lens cannot bring the different colors to a focus on the same surface; if the yellow is in focus, the red focus will be back of the surface, and the blue focus in front. This is called *chromatic aberration*. By combining lenses of different kinds of glass it is possible to overcome this difficulty almost entirely. Such a compound lens is said to be *achromatic*. The lens of the eye is *not* achromatic. The retinal image is therefore subject to chromatic aberration. A perfectly sharp image is formed only when objects are seen by light of one color, or monochromatic light. The more nearly light approaches this quality the sharper the retinal image of objects seen by it.

SHARPNESS OF VISION DEPENDS UPON COLOR OF LIGHT

Before the invention of the mercury-vapor lamp the chromatic aberration of the eye had no practical application to the use of light for general illumination. All other light-sources, as we have before mentioned, have full, continuous spectra, i. e., contain all the colors, and the only way to obtain monochromatic light from them is to absorb all the colors except the one desired, which was far too wasteful a process to be seriously considered. In fact, the great object sought in the improvement of artificial light was to get it as nearly white as possible, i. e., of the same color as full daylight.

When the mercury vapor lamp was first offered to the public the distinct color of its light was generally considered a fatal objection to its use for any purpose except photography, in which its usefulness was at once recognized. It was some years before the fact that the light, on account of its nearly monochromatic character, produced a sharpness of vision quite unobtainable with other artificial light, or even with sunlight. The very manifest advantage of this increase in visual acuity in the case of industrial lighting gradually overcame the objection arising from its unfamiliar, sometimes startling, color effects, and finally placed it in a class by itself as a light to work by.

The retina resembles the photographic plate in being sensitive to different degrees for the different colors, but differs from the plate in the order of its sensibility. The rays which produce the greatest effect upon the visual organs are in the middle of the spectrum—the yellow and yellow-green, while the rays that have the greatest photographic effect are in the extreme blue end and the invisible rays of still shorter wave-length, called the ultra-violet, or actinic rays. The relative brightness of the different parts of the spectrum is indicated in the curves that are shown in Fig. 3. Mercury-vapor light is peculiar in having the largest part of its rays in the most luminous part of the visible spectrum. The different lines of the mercury-vapor spectrum are shown by the heavy lines in the curve. This accounts for the high mechanical efficiency of the mercury-vapor lamp.

It may be well to explain the above curve by reference to the mechanics of wave motion, with which we started. It was stated that the mental sensation of brightness depends upon the energy of the light-waves. This is true with reference to any particular wave-length (color), but different wave-lengths do not produce the same effects of brightness with the same amounts of energy. Red and violet waves having the same amounts of energy, or physical intensity, produce a very feeble visual effect, or brightness, compared to yellow and green waves having the same energy. The relative degree of brightness of the different colors for equal amounts of energy are what the curve represents.

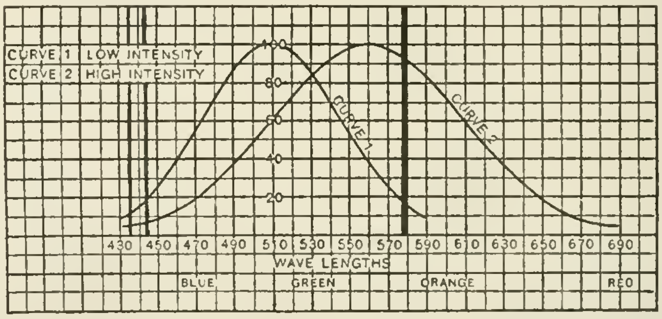


Fig. 3. Curves Showing the Relative Brightness of Different Colors for Equal Amount of Energy

APPEARANCE OF COLORS DOES NOT FOLLOW PHYSICAL VARIATION IN LIGHT

The psychological sensations of color do not closely follow the physical variations in the light-waves. The *quality* of color changes with its brightness, all colors fading into a bluish gray at very low intensities. If you look at a sample card of different colored fabrics arranged in spectral order—red, orange, yellow, green, blue and violet—under a fairly high illumination by sun light, they all show their characteristic color values. If, now, the intensity of the illumination be gradually reduced, the colors will presently begin to change their tone, as well as their brightness; the lightest part of the color-band will move from the yellow to the green, while the red and orange will become darker, and the blue and violet lighter, i. e., fainter. As the intensity decreases further the colors on each side of the green become less distinct, until they become quite invisible, leaving only the green, which finally gives way to the neutral gray, the color of all things, as well as cats, in the dark. This change of color with change of illumination is called the Purkinje effect, from the name (pronounced Poor-keen'-ye) of the Austrian who first observed it.

This peculiar psychological phenomenon enters into the general problem of industrial lighting in a very practical way. The important part is this: green light suffices to produce distinct vision at lower intensities than light of any other color. One of the greatest—probably *the* greatest—defects in artificial lighting as compared to daylight is the darkness of the shadows. Even in a large room with only side windows, it is comparatively easy to see in the darkest shadows, as under benches, tables, etc.; while

the same room, abundantly supplied with incandescent lamps and reflectors, will have shadows of obscure darkness in all these places. The large portion of green rays in mercury-vapor light results in the practical elimination of obscure shadows, so that a room illuminated with the proper general intensity by mercury-vapor lamps is as free from objectionable shadows as it is in full daylight.

The writer recently had an opportunity of putting this statement to a public test. A meeting, mostly of manufacturers, was being held in a fairly large hall in which there was a well-arranged installation of mercury-vapor lamps. A number of pieces of machinery were in the room for exhibition purposes, besides various tables and other objects. Those present were requested to find a place anywhere in the room in which 8-point type (the size of print on this page) could not be easily read. No such place could be found, though the deepest shadows directly underneath the tables, machines and other objects were diligently tried. There is no doubt about the fact, and it is just what the psychologist would expect as a result of the "Purkinje effect." It is the comparatively high visual power of green light at low intensities that "does the trick."

COLOR NOT ESSENTIAL TO VISION FOR PRACTICAL PURPOSES

Color is not an essential element of vision; but is simply ornamental. Many people are partially, and a few wholly color-blind; and yet they hardly appreciate the defect in their vision, and suffer no practical inconvenience. Evolutionists tell us that color vision is a rather recent acquirement, and that our prehistoric ancestors had no sense of color but saw only differences in light and shade. In industrial lighting, even in those branches in which color forms a part of the art, as in textiles, the color of the light is of surprisingly little practical importance. Aside from the purely artistic handling of color, which is always done by daylight, and which is entirely distinct from the mechanical manipulation of the colored materials, there is no occasion for the workman to concern himself with color, except possibly to distinguish one material from another in some cases; and then the apparent colors are of no consequence, but only their differences. The shifting of the color scale by a colored light, such as that of the mercury-vapor lamp, is therefore of very little practical account in the industries. There are not a few cases in which the exaggeration of difference between certain shades or colors is of very material assistance.

WHAT IS GLARE?

A familiar defect in a photograph is that known as halation, which results from some part of the field being very much brighter than the rest of it, as a window in an interior. Our eye-camera is subject to the same difficulty; but in vision we call it *glare*. With the possible exception of the darkness of shadows previously mentioned, glare is the most serious defect in artificial lighting. As might be expected, glare has been more talked of and written about than any other problem in the whole subject of illumination. Also, quite naturally, there has been much darkening of counsel with words without knowledge, not to mention some pure faking. The importance of the subject demands that we give it careful consideration. The analogy of the photograph will still be helpful.

Let us first distinguish between *glare* and *dazzle: glare is the result of excessive contrast in brightness between different parts of the visual field;* dazzling is the effect of light of such high intensity falling upon the retina that it produces an immediate sensation of pain, or acute discomfort. A dazzling light in the field of view will always produce glare, but not all glare is dazzling. The *effect* of the excessive contrast on the visual picture is the same as it is in the photograph; the bright spot becomes a patch of white fog, and the rest a shadowy mass with few details distinguishable. Photographically, the bright spot is fogged by overexposure, while the other part is dark and lacking in detail from underexposure. The action in the eye is very similar. So far as the result is concerned, the "exposure" in photography depends upon the rapidity of the plate and the size of the stop, as well as upon the time. In the eye the time cannot be varied, but the other two factors can. The iris can contract so as to reduce the amount of light to about one-fourth that entering at full opening. The regulation of the sensitivity, or rapidity, of the retina is a far more complicated process. The eye-camera is furnished with two different sensitive plates, one orthochromatic, i. e., sensitive to all colors, but comparatively "slow," and the other a very "rapid" plate, but incapable of giving color distinctions. The former occupies the center of the retina, and the latter the surrounding surface, the two blending into each other. Referring back to the description of the eye, we may call the slow, orthochromatic plate the "cone plate," and the surrounding, rapid plate the "rod plate." In bright light the rod plate becomes insensitive, and ceases to act, leaving the production of vision entirely to the cone plate. In very dim light the cone plate loses its power of action, and vision is produced entirely by the rod plate. The substitution of one plate for the other with the change from bright to dim light takes place slowly, requiring as much as a half-hour in extreme cases. This is called *adaptation*. The glare produced in going suddenly from a dark to a very light room is due to the excessive overexposure on the rod plate before it can adapt or non-sensitize itself. The effect is increased by the eye receiving the maximum light through the full opening of the iris. The adjustment of the iris, however, takes place comparatively rapidly, within a fraction of a minute. On going suddenly from light to darkness the eye sees nothing until the rod plate can resensitize itself.

EFFECTS OF GLARE

Now, what happens when one part of the visual field is very light as compared with the rest? The retina is confronted with the problem of doing two things at once that are of contrary nature; the bright spot is too bright for the rod plate, and the rest of the field, by comparison, too dim for the cone plate. As a result, neither is done well and strain or nervous tension is the result—the imperfect vision and ocular discomfort that result from glare.

There is another condition that undoubtedly serves to aggravate the results just described. We have previously stated that the eye naturally seeks out the most prominent point in the field, and focusses it on the center of the retina. It therefore requires an extra effort to keep any other point in the field focussed for sharp vision. Again, if there are a number of bright points in the field, as in the case of a room lighted with units in each bay, the attempt to focus them all at once leads to conflicting efforts, which must result in muscular strain and nervous discomfort.

Although the conditions producing the effects that are collectively ascribed to glare are by no means fully understood, the following seem to be fairly established facts:

Glare is due to excessive contrast in different parts of the visual field. According to the best information experimentally obtained, the bright spot must be 1,700 times the cube root of the brightness of the general field in order to be glaring. The mathematical formula is less important than the simple fact that it is contrast rather than the actual brightness of the offending spot that produces glare. As proof of this the familiar fact may be cited that a bare electric lamp is exceedingly glaring in an otherwise dark room, but in open daylight is hardly distinguishable.

Glare increases with the *quantity* of light entering the eye, as well as with its brightness.

Glare decreases with the *size* of the bright spot, and disappears entirely if the spot becomes a visual point. Distant street lamps furnish an example of this fact.

Glare is said to cease when the bright spot is more than 26 degrees from the axis of vision.

Glare may be caused by direct reflection from shiny surfaces, as well as by direct rays from light-sources.

SCATTERED LIGHT IN THE EYE

Let us once more return to our photographic analogy. If the camera bellows leaks light a foggy negative is the result. Scattered light in the eye interferes with clear vision also. This trouble is often confused with glare. The shutter of the eye-camera, the eyelid, is very different from the photo camera shutter, as we have before remarked, in being highly translucent, and thereby admitting a considerable volume of diffused light when closed. It is as if the camera shutter were made of ground glass. Light-sources anywhere in front of the eye therefore produce some extraneous light within, regardless of the direction in which eye is looking.

The final object of industrial lighting is to facilitate labor. The individual capacity for performing any given labor depends upon skill, which may be defined as the ability to coordinate muscular movement with the mental processes of perception and judgment; to a certain degree upon muscular strength; upon what the psychologist calls the "attitude," and upon the state of fatigue, muscular and mental. The most efficient lighting is therefore the kind that affords the quickest and clearest perception, and produces the least muscular and mental fatigue. The subject of fatigue as related to illumination is mostly unexplored territory as yet. There has been much loose talk about "eye strain," as there has about "glare"—the two bugbears of "illuminating engineering." Eye strain is *muscular* strain, and has nothing to do with retinal fatigue. There are two important sets of muscles connected with the eyes, one that does the focussing, and the other that keeps the two eyes so aimed that the stereoscopic effect, i. e., binocular vision, is produced. When these are overworked, more or less serious results follow, ranging all the way from slight discomfort to nervous indigestion, and insanity. Optical defects uncorrected by glasses are the most common and serious in results; but defects in illumination may produce marked discomfort. Optical defects in the eye, uncorrected by glasses, are the most common cause of this complaint. The growing practice of industrial establishments of maintaining a regular optical department, and examining and prescribing for the eyes of all employes, is not a piece of philanthropy, but a most profitable business investment like a good lighting installation. That lighting conditions which interfere with the normal action of the visual organs induce a degree of general fatigue that plainly reduces the output of labor, there is ample proof; the exact scientific relation of cause and effect needs much further experimental research to reduce it to definite laws.

SUMMARY

The organs of vision consist of the eye (eye-ball), the optic nerve, connecting the eye with the brain, and certain portions of the brain in which the effects of light are translated into sensations of vision. The mutual actions of these organs belong to the science of psychophysics.

The eye is an optical instrument similar to a photographic camera, consisting of lens, stop, shutter, dark-box, and sensitive film. The lens forms an image on the sensitive film (retina).

The image on the retina is "developed" into the sensation we call "seeing" by a mental process in the brain.

The retinal image is the thing we actually see; and vision can be no clearer than this image.

The lens of the eye is incapable of focussing different colors sharply at the same time, i. e., is not an achromatic lens. It can therefore produce a perfectly sharp image only by light of one color (monochromatic light). The nearer light comes to this quality the sharper the image.

Mercury-vapor light is the only light in commercial use that is approximately monochromatic, and hence gives greater acuity, or sharpness, of vision than ordinary light.

The retina, or sensitive film of the eye, has two kinds of sensitive surface, one that sees colors and gives sharp vision, the other that does not give colors but is used for seeing in dim light. It requires a period of time up to a half-hour for the eye to adjust itself for differences of light from very bright to very dim.

The eye can see by green light of much lower intensity than with any other or all colors.

Glare is the effect of discomfort and blurred vision resulting from excessive contrast in brightness between different parts of the field. It increases with the quantity of light entering the eye and diminishes with the size of the bright spot. It is greatest when the bright spot is looked at directly and is said to cease when the spot is at an angle of more than 26 degrees from the axis of vision.

Scattered light within the eye interferes with clear vision and may result from bright light-sources anywhere in the field.

Eye strain is the result of overtaxing the muscles of accommodation (focussing) and the muscles of fixation (those which hold the eye in position to see the desired object).

In the next issue we shall take up the application of the theory to practical cases of lighting in rubber factories.

RUBBER TRADE INQUIRIES

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

(847) A reader asks for the addresses of manufacturers of the following: Rubber plugs for pencil tip erasers; metal sleeves to hold plugs; machine for clamping on metal sleeves.

(848) A manufacturer requests the name of the manufacturer of the rubber substitute known as "Rubberaid."

(849) An inquiry has been received for "rubber glass," a wire mesh covered with several thicknesses of rubber, used extensively by mining companies.

(850) A concern with salesmen calling on the drug and hardware stores, having 15,000 dealers handling its nationally advertised product, desires to secure the selling rights or manufacturing and selling rights on an additional meritorious specialty that can be merchandised to the drug and hardware trade, preferably on a royalty basis.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS

Addresses may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or from the following district or cooperative offices. Requests for each address should be on a separate sheet, and state number.

District Offices.	Cooperative Offices.
New York: 734 Customhouse.	Cleveland: Chamber of Commerce.
Boston: 1801 Customhouse.	Cincinnati: Chamber of Commerce; General Freight Agent, Southern Railway, 96 Ingalls Building.
Chicago: 504 Federal Building.	Dayton, Ohio: Dayton Chamber of Commerce.
St. Louis: 402 Third National Bank Building.	Los Angeles: Chamber of Commerce.
New Orleans: 1020 Hibernia Bank Building.	Philadelphia: Chamber of Commerce.
San Francisco: 307 Customhouse.	Portland, Oregon: Chamber of Commerce.
Seattle: 848 Henry Building.	

(34,367) A commercial agent in Egypt is planning to open show rooms for the exhibition and sale of tractors, trucks, tires, etc., and desires to secure the representation of firms with a view to advertising and selling American goods.

(34,409) A commercial agency in Ceylon desires to secure the representation of manufacturers for the sale of insulated wire.

(34,433) A mercantile company in the Straits Settlements desires to secure an agency for the purchase of rubber.

Substitutes for Rubber Tires

The following shows German interest in almost any possible substitute for the rubber pneumatic tire. Forced to do without rubber during the war, the belief persists that solids or semi-solids made of an infinite variety of compounds may still be successfully used. The article is by Diplom. Engineer Jahr, Berlin-Lichterfelde, and appeared in "Kunststoffe."

The bristle tires which have come to notice recently were in the market more than twenty years ago and mostly in the form of cushion tires. Fig. 1 represents a tire patented in 1896 in England, the bristles of which are set in a base of wood, caoutchouc or other material *b*, which is mounted on the concave wheel rim *f* to increase the elasticity. According to an American patent the bristle tufts *a* are closed in rubber *k* and are united by vulcanization, Fig. 2. A German patent provides a cover of steel rods upon a suitable base which is embedded in an elastic ring to ease the pressure. Fig. 3 shows a more modern way of securing the bristle tufts *a*. These are wound around a bolt *q*, which is fastened in the rim. Other known examples of the same principle are those where the bristle tufts are wound around rings running parallel to the base of the tire, Fig. 4; and another one which is shown in Fig. 5. The strong tufts of wire are connected in groups by wire fastenings screwed down below the rim and the lowest layers of the wire bristles are connected by short wire fastenings *d* in Fig. 6. An example of a cushion tire is given in Fig. 7. The casing is filled with a coil of bristles *a*, which are fastened to a spiral wire center. To give more resiliency to the bristles the vacuum between the bristles is filled with a light elastic material, preferably the pith of plants. The filling of this material is effected while the bristle coil is covered with a light cover of linen to prevent the filling falling out.

FIBER TIRES

The principal material for these tires, which are mostly made in the United States and England, is fiber of all kinds in the unspun state. Plant, mineral or animal fiber can be used. Preeminently coconut fibers, jute, kapok, ramie and manila hemp are in use. Lacking these, straw, turf and other materials can be employed. The fiber is either wound around the rim or placed in layers upon it. Or they are put perpendicularly upon it, which is the newer method. The elasticity of the tires is increased by alternating the fibers with strips of canvas or linen. It has also been found useful to separate the individual layers with metal strips or rings, which, incidentally, will aid in fastening the tire to the rim. The fiber may be arranged also in upright tufts or rows and set in a bed of caoutchouc. Or the whole may be connected by enclosing it in a bed of tar, asphalt or resin until it forms a complete tire, which is supported by rings. To make the tires still stronger they have been subjected later to strong pressure and sewed together with string. In the case of a new English method the fiber bristles are treated with a rubber solution and placed upright side by side. The fiber then is cut to measure and vulcanized. This tire is made stronger by interlacing it with strips of material made out of coconut fiber or any other similar material. The space between the fiber and the strips of material, which are also placed upright, is filled with tar, balata, gutta percha, resin or any similar material and the whole is subjected to hydraulic pressure. A U-shaped rim is generally used for this kind of tires.

VARIOUS EXAMPLES OF FIBER TIRES

Fig. 8 demonstrates a fiber tire of American make. The tufts of manila hemp *f* are placed upright upon the rim, and impregnated with tar, asphalt or resin and subjected to high pressure that produces a compact tire body which can still be sewed together if necessary. This tire is fixed upon the wheel by annular rings which grip over the sides of the rim. Fig. 9 shows a tire with metal protection, the fiber layers *f* of which are made of braided hemp and pressed between strong bands of metal, *m*. The metal protection may be part of the rim. In this case the fibrous material is inserted between the metal strips as shown in Fig. 10.

CORD TIRES

The material used for this kind of tires as a rule is hemp, as it gives the most strength and resistance. A substitute is raffia. There is, however, little known about the practical use of this tire. The hemp or any other material is spun into yarn, which in turn is made into a strong cord. For the manufacture of the tire several cords are required which are placed upon the rim, side by side or cabled around each other. In some cases the cord is wound around a hollow tube. Five or six cords also may be used as a filling for an ordinary tire cover. Protection has to be given the cords against stretching and deterioration. The resistance of these tires can be increased by impregnation or by any other similar protection.

EXAMPLES OF CONSTRUCTION

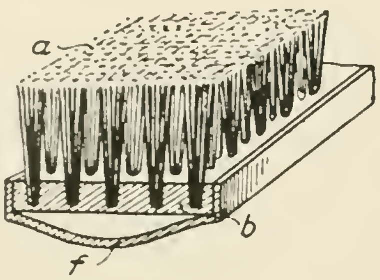
A comparatively simple cord tire is shown in Fig. 11. The cord *s* is fastened on the rim *f* and carried around it. The other end of the cord is stretched by a chain or spring pulling device which insures the cord being tight. No less simple is the construction shown in Fig. 13. A wooden tire foundation *h* is placed in the U-rim *f*. The ropes *s* are then placed upon the wooden tire, the surface of which is provided with a profile for that purpose. The ropes *s* are packed tightly beside each other and connected by hooks and hoops *b* or by means of screws and plates to prevent the slipping of the outside ropes. To produce greater elasticity, the center of the wooden tire *h* can be fitted with a flat caoutchouc tire. To keep the tire surface concentric to the hub springs *b* are inserted between the ropes and the rim which can be adjusted if required, as shown in Fig. 12.

Fig. 14 shows a cord tire with an inner metal tube *r* around which a hemp cord *s* is wound which is covered by another cord. Anti-slipping bolts are fitted upon the second cord, which also may be made of wire. The connection between the ends of the rope is usually made by easily closing connecting links. Fig. 15 shows a similar arrangement where three stronger cords are connected with three thinner ones. The cable obtained in this manner is enclosed in a rubber tube *b* and finally inserted in a cover of leather *l* and another of rubber *h*. Finally a tire may be mentioned where the rim is covered with short pieces of wire cable placed crosswise upon the rim, Fig. 16. To prevent the unwinding of the short pieces of cable the cable ends are welded together with the cable center *p*, Fig 17.

FELT TIRES

Felt is a material produced from animal hair. Not all hair, however, is suitable for the manufacture of felt. The finer the hair the better and more elastic is the felt. As a rule only pure wool felt is used for tire making. The strips of felt are reinforced and impregnated. Care is taken that the inner layers of felt are looser than the outer layer so as to retain a greater degree of elasticity. Felt tires appear in different types. These are: Tires made directly from the raw material during the felting process; tires made from felt rings and felt strips; tires made from felt disks entirely or in connection with leather, rubber, canvas, or other filling materials.

To the first-named group belongs an older felt tire, Fig. 18, where a thin rubber tube *g* is covered with a felt ribbon in succeeding layers. This is done entirely by hand. When one layer is applied the tire is cut to length and the whole is subjected to a new felting process. The two ends of the tire are finally



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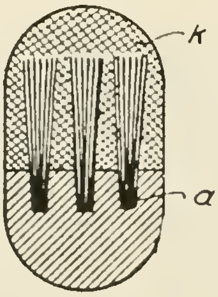

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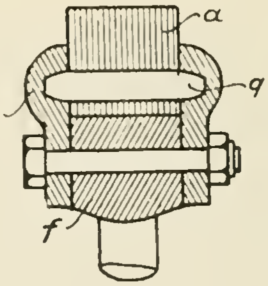

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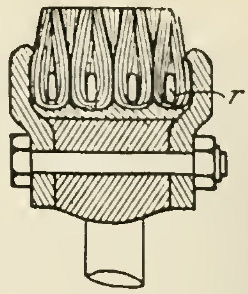

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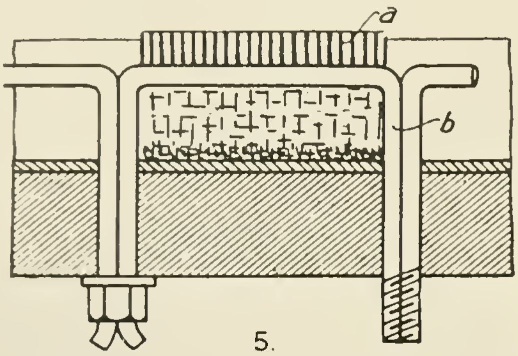

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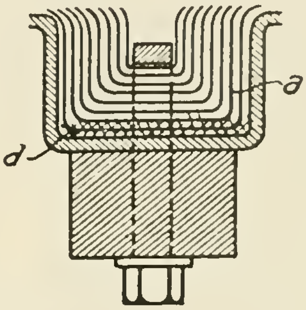

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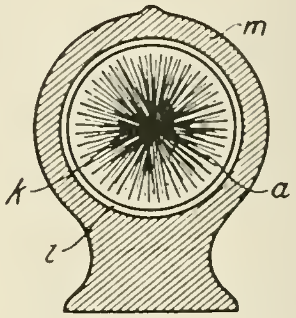

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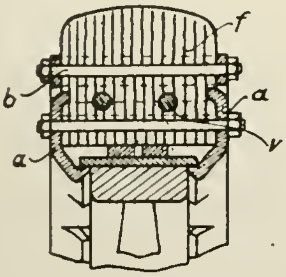

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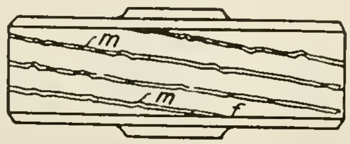

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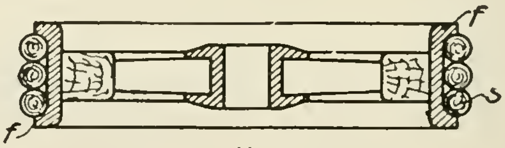

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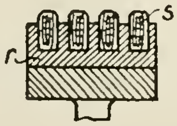

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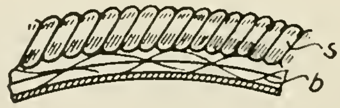

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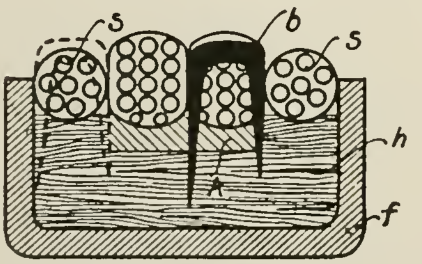

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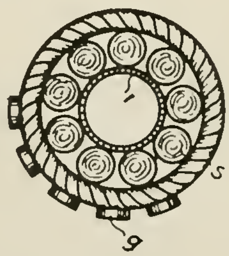

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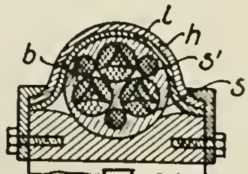

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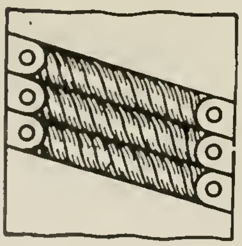
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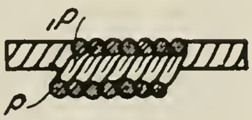

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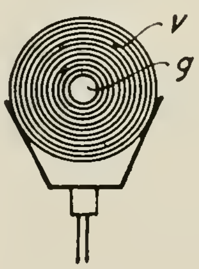

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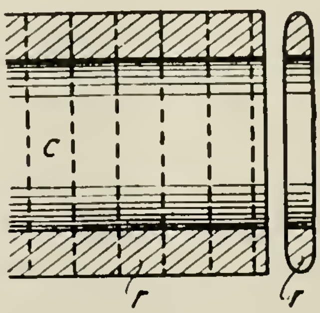

19.

connected by means of a shellac or rubber solution. Such a tire is fastened upon the rim by the use of some adhesive material. The inner rubber tube prevents the flattening of the felt layers. Another method, also of earlier date, provides for a felt band of approximately ten inches in width. This band is wound around a rim by means of a revolving table. When the tire has reached the desired thickness the band is cut and the whole is sewed together with woolen thread so that the different layers cannot get out of position. The tire then is subjected to a felting process, after which it is returned to another rim, where it is beaten circular by a hammering process. Still hot, it is put upon a third rim, where it is allowed to dry and cool. The outer layers of the tire are impregnated to harden the tire surface while the inner layers remain soft so as to give the required elasticity.

A new method of making the felt tire, shown in Fig. 19, is the following: A cylinder of felt of the diameter required for covering the rim of the wheel is first made. From this cylinder, rings of the desired thickness are cut. These are fashioned upon a turning lathe and impregnated with a waterproof solution. In another construction by the same method the ring obtained in the above manner is pressed into tire form, when it is impregnated with a waterproofing solution and covered with a surface of oil or paraffine. In every case only the outer thicknesses of the tire are impregnated.

Figs. 20 and 21 show a felt tire in which the individual felt sections *f* are placed side by side and fastened upon wires *r*. This is an American invention. Fig. 22 is of similar character. The felt sections are made of spirally cut strips of felt which are impregnated with a rubber solution. After drying they are placed side by side and compressed by a strong hydraulic pressure. The tire section obtained in this manner is vulcanized and covered with a hardening material. Each section is placed upon a U-rim and fastened by means of a bolt *b'*. If the tire is to be used upon a flat rim, the whole U-rim will have to be fastened upon the felloe which is covered for this purpose with a wooden rim *h*. To prevent the slipping of the U-rim a bolt is inserted through the felloe of the wheel.

Fig. 23 shows a dual tire which is made by laying strips of felt upon each other *f, f'* and covering the whole with a leather cover *l, l'*. The felt tires are placed upon an iron rim *e, e'* which is placed upon the rim base and fastened by bolts *b*. The tire surface is protected by layers of leather and supported by iron or steel bands. The material is wool felt. Another felt-ribbon tire, Fig. 24, is produced by placing a number of layers of felt upon the wheel surface. The felt strips *f* in this case are somewhat wider than the width of the rim and pressure is applied from the side by means of two side rings *r* and a screw-bolt *b* until the width of the tire has been reduced to the width of the rim. An outer iron or steel tire is fastened upon this base, the felt giving elasticity to the structure. The same idea is executed with the aid of two felt tires between which a steel band is introduced to separate the felt strip tires.

An American patent provides for a piece of felt which is cut in the form of an irregular square, Fig. 25. This is pressed into a circular profile, as shown in Fig. 26, which gives stronger pressure to the outer points *a, b, c, d* and leaves the center *k* comparatively soft and elastic. This tire is enclosed in a cover of rubber, leather, canvas or any other suitable material and fastened together on the inner ring. Fig. 27 also shows an inner center of elastic felt which is enclosed in a rubber casing. This casing is vulcanized to the filling material. The ends of the tire are connected as shown in Fig. 28. The rim of this tire is of U-shape, which is bent inward when the tire is fixed upon the rim.

Fig. 29 shows a dual tire also mounted upon a U-rim. The body of this tire consists of blocks of felt *f, f'* which are placed close together. To secure the blocks upon the rim two iron rings are pressed sidewise into the felt over the rim as shown in *r*. A rather interesting example is that represented in Fig. 30. This is a composition tire of rubber, cotton and felt. A rubber tube *k'* is inserted into another rubber tube *k*. The inner tube is filled with a center of cotton *b*, while the space between the inner and outer tube is filled with spirally wound layers of felt *a*. The cotton filling is intended to prevent the stretching of the tire so that it will stay upon the rim without any special preparation. T-shaped screw-bolts can be used to fasten the tire. These are inserted through the rim. A new American tire uses thin layers of felt for the body of the tire. These layers are bound together by similar layers made 50 per cent of rubber and 25 per cent of gelatine. The individual layers are vulcanized.

HAIR TIRES

These are mostly tires of the cushion or bolster type or combinations of both. Fig. 31 is a tire of the most simple kind. The hair is tightly fastened into a deeply curved rim. The center of the tire, shown in Fig. 32, consists of closely wound hair which is covered by a rubber cover and fastened upon a base which is also made of caoutchouc. The tire is inserted into a U-shaped rim.

There are several variations of this tire. Thus, the center of the hair covering may be a rubber tube. Or the hair body may be enclosed in a rubber tube.

Fig. 33 represents a cushion tire where the outer casing is made of rubber which is strengthened on the sides *k*. The center is filled with carefully pressed hair. In use this tire will flatten out and its heavier sides then will prevent friction from the rim. More elastic is a tire which contains, besides the rubber cover, a center made of rubber, Fig. 34. This tire contains, besides the rubber filling *k* and the hair cushion *h*, an air space *l*. The various sections are separated by canvas walls and a cover of caoutchouc or leather is provided. The strong rubber block in this tire retains the tire in its proper position and also supports it if the air chamber should be demolished. The same principle is applied in another tire which contains two compartments, one to be filled with air while the other contains a hair cushion. The bases of these tires may be supplied by a metal insert which takes the place of the air cushion.

Combination fillings of hair and cork have been tried in this respect and feather fillings also have been used with varying success.

PAPER AND CARDBOARD TIRES

The paper and cardboard tires follow in general principle the felt strip and section type of tire.

Layers of waterproof paper are placed side by side and pressed together by the walls of the rim. The whole is fastened by bolts. Fig. 35 shows such a tire where the body consists of paper layers *p*, connected with each other by a binding material. To prevent the slipping of this tire the rim is provided with corrugations which grip into similar ones in the tire base. The running surface of this tire is made of rubber or leather, *k*.

A French patent, Fig. 36, provides for paper blocks which are connected by tension rings. The whole is placed upon a spiral spring *s* and a solid bolt is inserted from the sides. A section tire is made of very thin layers of paper which are put upon the rim and are connected by pressure or other means. The same may be effected by making blocks out of the individual pieces of paper. The blocks are provided with wavelike incisions which grip into each other.

A paper band tire is that shown in Fig. 37. A band of paper *a* is loosely wound around the rim. The running surface *b* is fastened tightly around the paper, which presses it loosely together and brings about the desired elasticity. A soft binding material is inserted between the various layers of paper. Tar, pitch or resin are especially suitable for this purpose. The softness of the binding material, together with the loose adhesion of the paper layers, gives a great elasticity to this tire, which compares well with that of an all-rubber tire.

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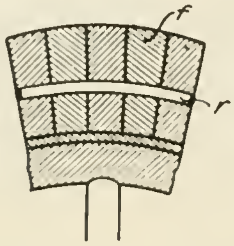

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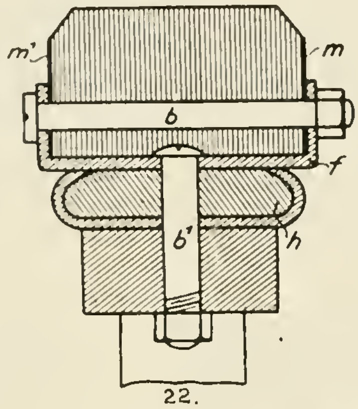

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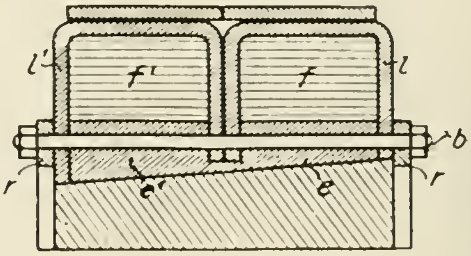

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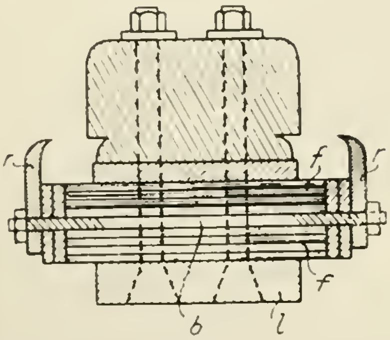

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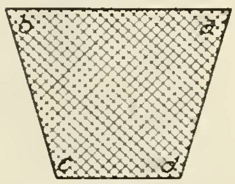

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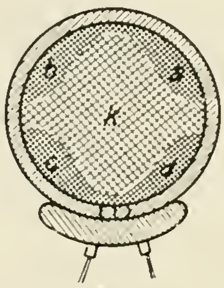

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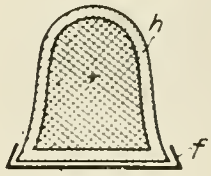

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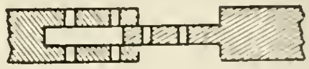
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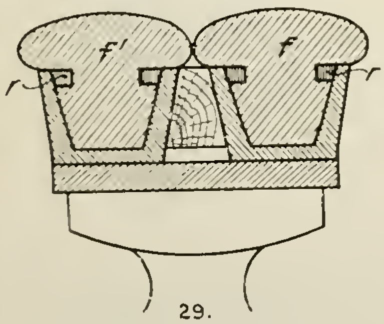

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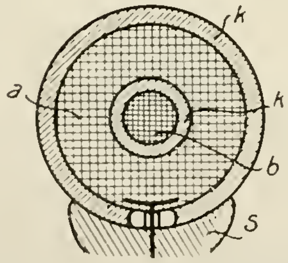

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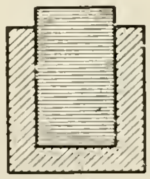
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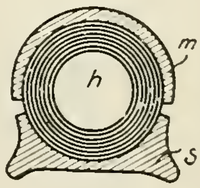

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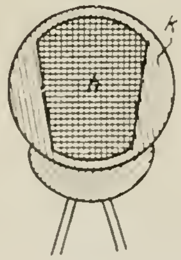

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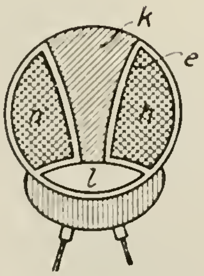

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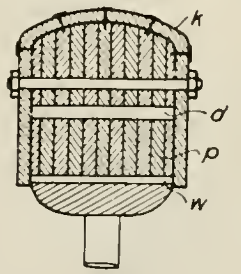

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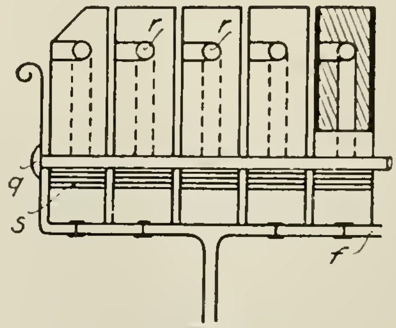

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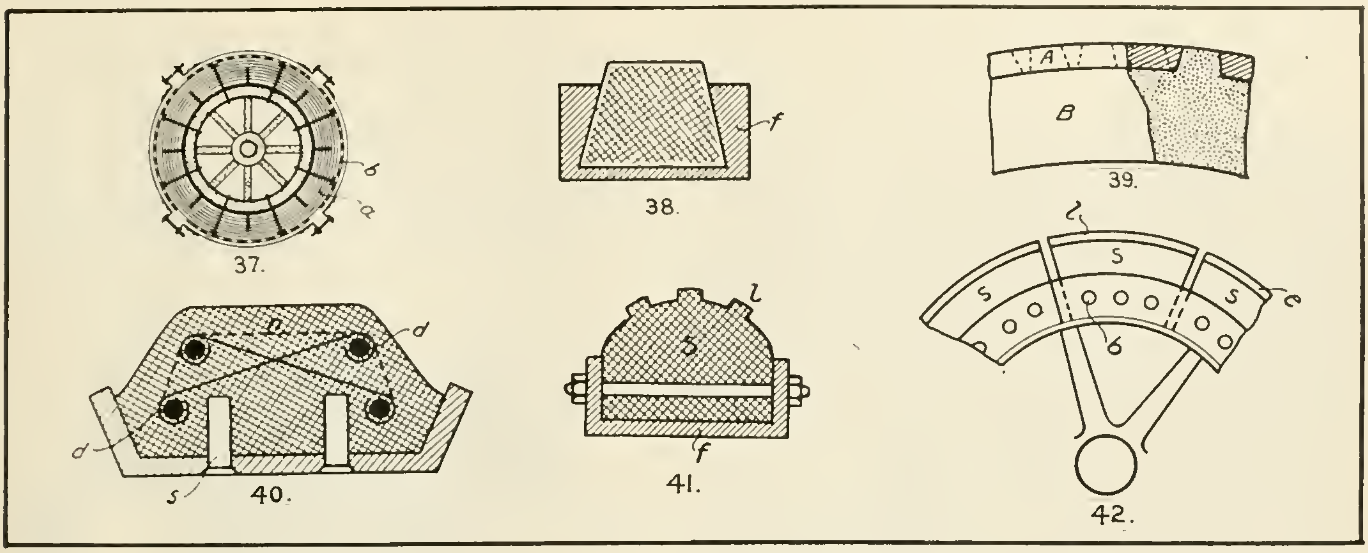


37. 38. 39. 40. 41. 42.

ASPHALT TIRES

Asphalt, bitumen, cellulose, wood pulp and other materials are used. An American method, which is also patented in Germany, provides for the filling of a heavy U-shaped rim with asphalt. While inserting the material in the rim, sand, corundum, iron filings and other hardening fillings are added to the mixture to make the tire harder in its outer parts, Fig. 38. An English patent provides for a filling of 30 per cent sawdust, 25 per cent oxide of magnesia, 10 per cent corn flour, and 35 per cent chloride of magnesia. This mixture *B*, in Fig. 39, is filled in the rim and covered with an iron tire *A* which is perforated at intervals. Fig. 40 is a reinforced concrete tire, the frame of which is made of four wire rings *d* covered by a wire mesh *n*. This tire is fastened to the rim by bolts *s*. A British tire is made of pieces of a wooden material *s*. These pieces are fixed into a U-rim *f* by means of three bolts *b*. The surface of the tire is made more elastic by a profile of various designs, Figs. 41 and 42.

Finally may be mentioned a tire where the inner composition material is covered by a ring made of cord wound tightly around the inner tire. The cord may be protected by a running surface of metal.

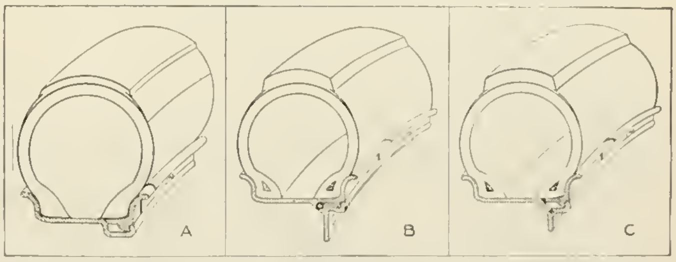
DEMOUNTABLE RIMS OF NEW DESIGN

Three new types of wheel rims have been developed which are of interest both to users and manufacturers of tires, inasmuch as they are demountable and adaptable to wire and disk wheels.

The base of the wire wheel rim *A*, in the accompanying illustration, is made of hot rolled mill section, low carbon, deep drawing stock, in which there is said to be very little cracking or distortion in cupping or punching. This type of rim lends added strength to the wheel, due to obtaining a greater angle of front and rear spokes; and this also makes it possible to secure wood wheel treads on most cars. The lock ring is of high carbon, hot rolled mill section, heat treated. It is claimed that once this ring is placed on the rim, there is no possibility of throwing it off, also the assembling and removing can be accomplished with ease.

All front and center spokes are laced in the outside channel, thereby permitting the use of shallow cupping and shorter spokes. The outside channel reinforces the entire outside circumferential surface of the wheel. The low channel shoulder is 9/32 of an inch less in diameter than the tire base, allowing the tire to be slipped over it, and doing away with all forcing or jamming. The ring shoulder locks with a fifteen-degree grip of the channel shoulder, making it impossible to unlock the ring when the tire is inflated. The pressure of the air in the tire forces the latter against the lock ring itself with an additional locking strength of seventy pounds to the square inch, and eliminates the danger of the ring being blown or knocked off. A slot ½-inch long is cut into the ring, and when the tire is not inflated the ring is removed by inserting a screw driver into this slot and giving a slight upward pressure.

B is the demountable rim, the steel flange of which covers and supports the outer edge of the felloe, protecting it from impact with the curb, etc. A combination of a T and a Y bar of great strength is formed where the flange joins the rim. The rim is held firmly in place by bolts inserted through six holes equidistant



A B C

Wire Wheel Rim Demountable Rim Disk Wheel Rim
The Johnson Demountable Rims

on the flange. The flange covers the outer circumference of the wheel, hence it is impossible to get the rim on wrong, and when put on, the weight of the tire and the rim causes it to fall into its proper position, the flange fitting tight against the felloe.

C is the disk wheel rim, the steel flange of which begins in a curve and ends in a straight line. The disk can be welded, riveted or bolted to the flange, depending upon the type of the disk. The flange supports and reinforces the disk around its entire circumference. The inverted Y-section of the rim and channel prevent a dishing of the disk or wheel from strains or stresses transmitted from the road.—Johnson Rim & Parts Co., Buffalo, New York.

STRAIGHT-SIDE TIRES ON STRAIGHT-SIDE RIMS

The use of the regular straight-side casing on a clincher rim will quickly result in a ruined tire and a blow-out. Injuries of this kind may be prevented by the use of a bead filler strip in the clinch of the rim. The prevention, however, is almost as bad as the injury, for the resultant effect on the tire is increased side sway, as the support of the tire is concentrated at nearly one point on the base of the rim. The correct procedure is to replace clincher rims with straight-side rims, which will add greatly to the pleasure of motoring at a cost incommensurate with the safety and comfort attained.—Miller News Service.

Repairing Giant Pneumatic Tires

By Roy R. Reid[1]

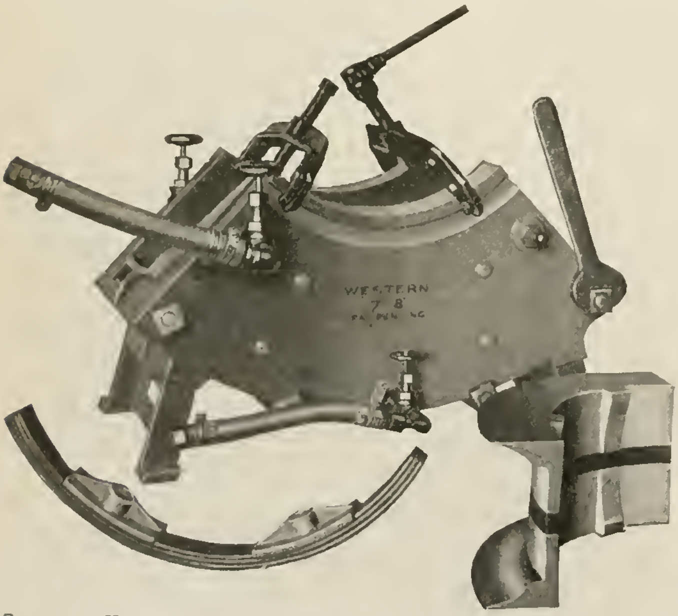
In writing an article on the repair of pneumatic truck tires it is taken for granted that it is to be of interest to tire repair men experienced at least on passenger tires, and who desire information on a new branch of the repair business about which, up to the present time, very little has been written. Therefore, these paragraphs will deal almost wholly with methods and equipment for repairing truck tires, wherein passenger tire repair methods and equipment will not apply, and details which are common and understood by average repair men will be omitted.

Generally speaking, the repairing of truck tires is a more important operation and requires the exercising of much more care than that of passenger tires because of the originally high cost of the truck casing, and because the failure of the repair will usually result in the loss of the tire. All the common injuries and many of those resulting from improper care and abuse may now be successfully repaired, since equipment has lately been manufactured to handle these tires.

The outfit needed in a repair shop, in addition to the equipment used for passenger tires, would consist of the following molds and equipment:

1—6-inch combination retread and section mold.
1—7 and 8-inch adjustable combination retread and section mold.
1—9 and 10-inch adjustable combination retread and section mold. It depends upon the locality whether or not these molds are necessary.
1—generator of sufficient capacity for above molds; unless there is a sufficient steam capacity in the generator already installed for passenger tire repairing.
1—set combination steam and air bags. Steam hose and connection to supply steam for the above bags.
1—pair giant bead spreaders.
1—flexible shaft buffing outfit.
1—36 by 6 truck tube plate.

The above equipment eliminates the necessity of having 5 molds to take care of the 6, 7, 8, 9 and 10-inch truck tires since



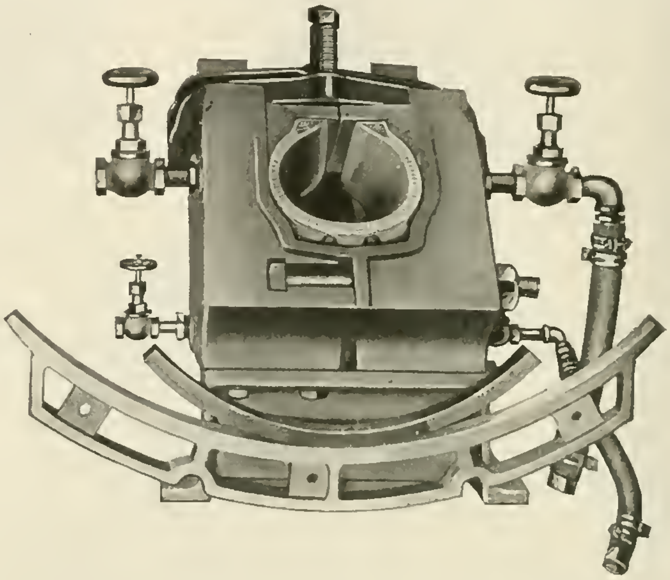
Seven to Eight-Inch Combination Retread and Section Mold

the two larger molds in the outfit are adjustable to four sizes of tires, and they are also manufactured as combination retread and section molds, eliminating the necessity of having separate molds for these two different classes of work.

[1] Western Rubber Mold Co., Chicago, Ill.

INSPECTING THE CASING

The first and most important consideration in the successful repair of giant pneumatic tires is the careful examination of the casing and for this purpose the giant bead spreaders should be used so that a clear view of the inside surface may be had. Extra



Seven to Eight-Inch Adjustable Combination Mold

care should be used in the examination of the exterior for tread and side-wall cuts which if neglected will usually result in a separation. If separation of cords is found to be local only, the repair is justifiable, but if found to be general, a local repair would result only in the failure of the repair. Watch carefully on the inside for wavy appearances at the flexing point of the tire, which indicate underinflation or overloading and cause separations. A large probing awl should be used in making the examinations. The side-wall and beads should also be carefully examined for rim cuts, side-wall cuts and worn out or torn bead covers.

The same care must be taken in preparing the job for rebuilding as that given any pneumatic tire, regarding the cleaning of the surface and buffing the old cords and rubber so that it gets a correct annealment with the new material.

REPAIRING SURFACE CUTS IN TRUCK TIRES

Where no fabric is involved, surface cuts are repaired in the same manner as passenger sizes except that the table of cures, given in this article, should be followed closely.

In tread cuts, where not more than half the plies of cord fabric are involved, it is not necessary to make a lay-back of the tread. Clean and buff and apply stock in and around the injury and repair the same as passenger sizes, but clean out the inside of the tire and reinforce with several plies of cord fabric, or a cord patch of the right proportion, according to the number of plies of cord cut through.

Where an injury involves all the plies of fabric and is less than an inch in length, it is necessary to remove only one group of plies inside the tire, stepping them out diagonally, building them in as removed and then reinforcing on top of this with extra plies as described. Be sure to buff the tire well, inside and out, before applying cement. A flexible shaft buffing outfit is best for this purpose, as it can be carried to the tire and can also be operated inside the casing.

REPAIRING BLOW-OUTS IN TRUCK TIRES

Repairing a blow-out in a truck tire is accomplished in practically the same manner as for small type cords of passenger sizes; that is, cut the plies of cords square across from bead to bead according to location of injury and simply make a lay-back nearly the full length of the mold. Step down the necessary number of plies outside and replace in the same manner, reinforcing the inside with a cord shoe of as many plies as necessary. Repairing each injury must necessarily be a case of judgment on the part of the repair man.

NUMBER OF PLIES OF CORDS IN TRUCK TIRES

6 and 7-inch tires usually have 10 plies of cord fabric
8-inch tires usually have 12 plies of cord fabric
9-inch tires usually have 14 plies of cord fabric
10-inch tires usually have 16 plies of cord fabric

TABLE OF CURES SHOWING LENGTH OF TIME AND AMOUNT OF STEAM PRESSURE WHERE COMBINATION STEAM AND AIR BAG IS USED

TREAD CUTS

	Air Bag Cure	
	Hours	Minutes
Where injury is ¼-inch deep	1	...
Where injury is ½-inch deep	1	35
Where injury is ¾-inch deep	2	10

SECTIONS

	Air Bag Cure		Steam Bag Cure	
	Hours	Minutes	Hours	Minutes
On 6-inch tire cure	1	...	1	30
On 7-inch tire cure	1	...	1	40
On 8-inch tire cure	1	...	1	50

SECTIONS WHERE CORD PATCH OR NEW CORD FABRIC IS USED INSIDE THE TIRE

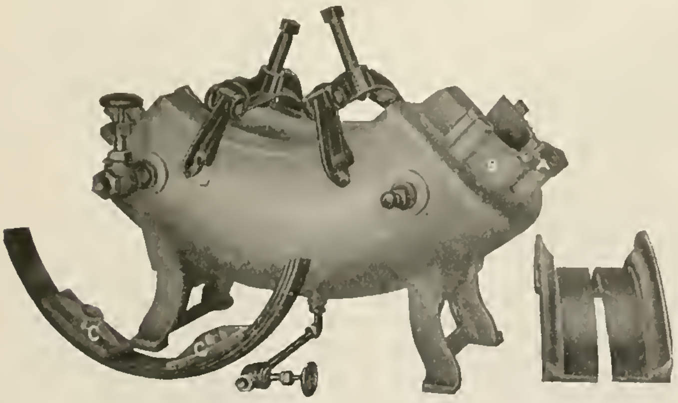
	Air Bag Cure		Steam Bag Cure	
	Hours	Minutes	Hours	Minutes
On 6-inch tire cure	...	50	1	10
On 7-inch tire cure	1	...	1	10
On 8-inch tire cure	1	...	1	10

Note: Cure with air in bag first, then tap bag and turn in steam.

BUILDING UP RETREADS ON GIANT PNEUMATIC TRUCK TIRES

No attempt is made to give a chart of specific widths to cut stock for the building up of treads on the giant pneumatic truck tires for the simple reason that the tires are of so many different percentages of over-size as to make each job a case of judgment, and also for the reason that the operator who is retreading these large tires will have had sufficient experience in the other sizes, so that specific sizes and directions are not necessary.

The most important thing to bear in mind in building the tread on a giant pneumatic tire is that the treads are semi-flat in design,



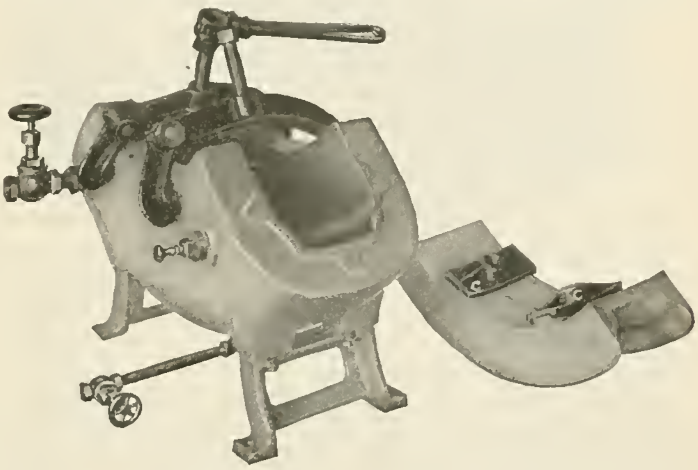
SIX-INCH COMBINATION NON-SKID RETREAD AND SECTION MOLD

thus making a shoulder on each edge of the tread and, therefore, necessitating the application of more rubber on each side of the tread.

After the tire is cemented, apply cushion gum from 3/32 to ⅛-inch thick in the center and tapering off on the side wall to 1/32-inch. Next, apply a breaker strip of about 5 inches on the 6-inch tire, 5¾ inches on the 7-inch tire and 6½ inches on the 8-inch tire. A wide breaker is necessary to avoid tread separation on the edge of the tread.

In building up the tread itself the best and easiest method of getting the proper contour with sheet stock is to start out with narrow strips on each edge of the breaker, cutting each additional strip somewhat wider than the preceding one until a semi-flat contour is obtained on the tread of the tire. Then by cutting strips which lap from one side of the tire to the other, and each ply a little wider than the preceding one, the proper shape tread will be obtained.

It is a good idea, in learning the amount of stock to apply, to set the tire in the mold after it is cut down, noting carefully the points which need the thickest application of rubber. It is also a good idea to make a template of metal or cardboard the shape



SIX-INCH SECTION MOLD—SEMI-FLAT TYPE

of a cross-section of the mold to place over the tire to determine the shape of the tread to be applied. On the 6-inch tire the shoulder should be approximately 3/16-inch thicker than the center of the tread; on the 7-inch tire, ¼-inch and on the 8-inch tire, 5/16-inch thicker.

A very excellent retread may be produced by having a special stock for building these shoulders on the tire, that is, a cross in compound between cushion gum and tread stock, or cushion gum may be used for this purpose if no other resilient compound can be obtained. This shoulder acts as a "shock absorber" for the hard knocks to which a tire is subjected and eliminates the possibility of the tread separating at the edges on flexing point of the tire. Tire manufacturers are now making camel backs for truck tires, which eliminate a lot of the difficulties of building from sheet stock.

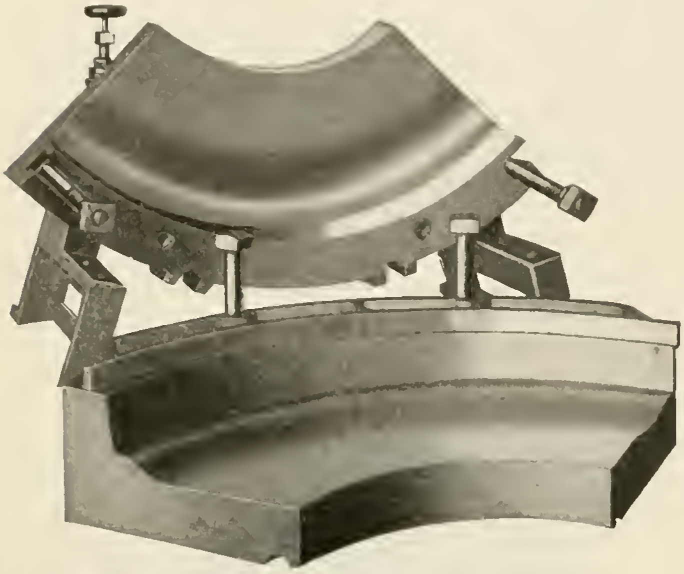
SOME "DO'S" AND "DON'TS" TO OBSERVE

It isn't necessary to put the tire in the sectional mold, provided a shoe is being cured to the inside of the casing and only a small spot on the outside, as this can be very easily done by putting the combination steam and air bag inside the tire, applying the bead molds and cross-wrapping the tire and bead molds with muslin, skipping the place where the raw stock on the exterior must come in contact with the curing surface. The tire may then be placed on the tube plate, so that the plate covers the raw spot, the steam connection made to the steam bag and cured in this manner. The weight of the tire itself will furnish sufficient pressure to cure the tread spot.

Inside sections may be cured in the sectional mold with the steam bag without heat in the mold, provided there is no break or cut to be repaired on the outside of the casing.

An electric light attached to a long cord and covered with a wire guard is a very valuable instrument to use in inspecting the interior of casings, as it will show up every defect of the casing.

In repairing a blow-out it is usually necessary to make a lay-back of the tread and make the step-offs on the outside as far as can be cured in a ¼-circle mold to insure the repair. In curing

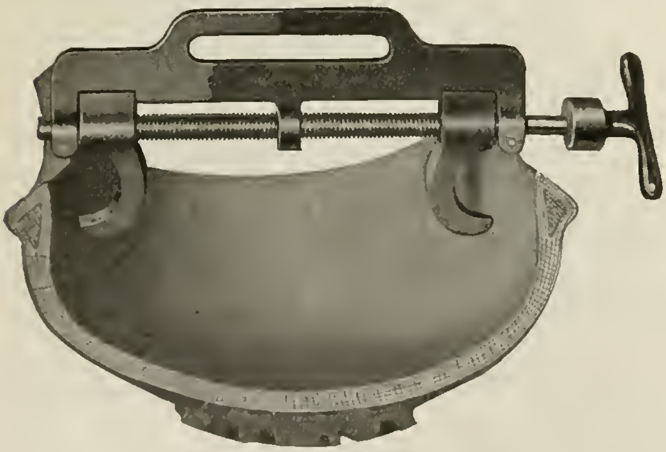


SHOWING MECHANICAL CONSTRUCTION OF THE ADJUSTABLE MOLD

a casing in which the non-skid design has not worn to any great extent, fill up these designs with a soapstone mash, place the tire in the mold with steam on, set the bead plates, put a slight pressure on the bag, and after the moisture in the soapstone mash has been allowed to evaporate put the necessary air in the bag to make the cure. This will prevent squeezing the mash out at the ends of the molds and mashing down the design.

Don't forget that it is necessary in curing built-in sections to cure from both sides; that is, use steam in the bag for a part of the cure as specified in the chart. It is impossible to cure a shoe on the inside of a tire with heat from the molds only, and much time is saved by using a combination steam and air bag and curing the shoe at the same time the section is being vulcanized in the mold.

Either use new cord patches, or make them out of successive plies of cords. Take care to see that the reinforcing cords run in the same manner as those which they replace. Different manufacturers build the tires in different ways, some building them in groups; that is, having several plies of cords run in one di-



GIANT BEAD SPREADER

rection and then have the same number running in the other direction, while other manufacturers cross each successive ply. In removing one group only from the outside of a casing, built by the former method, take care to see that the majority of the plies reinforcing the inside run in this same direction.

Do not neglect the small nail holes or tread cuts in a tire which comes in for a repair. "Large blow outs grow from little tread cuts," therefore, look carefully for smaller defects.

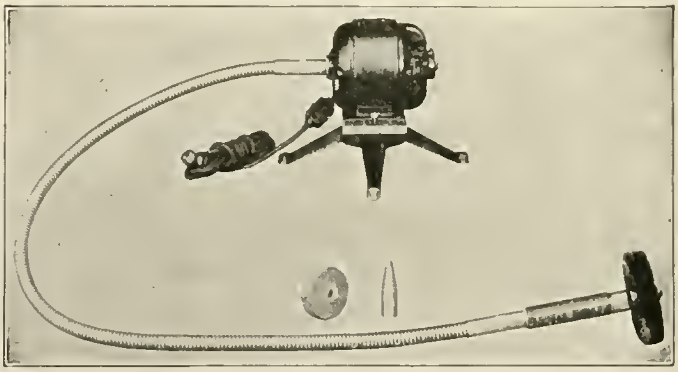
Use a rat-tail rasp in cleaning out the tread cuts or puncture so that the cement will adhere. Use plenty of cushion gum next to the cement. Cushion gum has a great deal to do with holding the repair, and the size of the casing must be taken into consideration and several plies used where only one would be used in a passenger tire.

It is often easier in curing a tread cut or sectional repair, where only a small part of the design must be reproduced, to put in a sufficient amount of rubber and pack the cure with soapstone, afterwards carving out the design with a knife and buffing it rather than making expensive impression pads from rubber and fabric.

Inside fabric breaks may usually be repaired by cord patches if they extend through several plies. However, it is necessary to build an inside section into the tire. Use the awl in finding out the fabric depth before determining what kind of repair to give it.

Place the coated side of the fabric down in rebuilding sections. In rebuilding a section where the cords run in groups, it is well to use a ply of 1/32-inch cushion gum between each group to prevent friction where the cords cross. Use plenty of soapstone before placing the bag inside the tire, to prevent it from sticking to the tire.

Allow the stem opposite to the one which the steam hose is connected to remain slightly open during any cure where steam



FLEXIBLE SHAFT-BUFFING OUTFIT

is used in the bag, closing it tight when air is used. In making a lay-back of a tread, cut across the lowest or thinnest part of the tread design, even if this makes the cut run in an irregular direction, as it will make a neater and more substantial joint.

ITALY'S EXPORTS OF RUBBER, GUTTA PERCHA, AND THEIR MANUFACTURES for the period January-June, 1920, were valued at 89,077,-950 lire (provisional returns), as against 21,885,550 lire for the corresponding period in 1919. Normally the lira is worth $0.193; present exchange value is $0.034. Par value is used in these computations. Similar imports into Italy during the January-June period of 1920 were 81,322,960 lire, as against 92,944,700 lire in the corresponding period of the preceding year.

RUBBER SCRAP EXPORTS TO THE UNITED STATES FROM THE BRISTOL, England, consular district in 1919 were valued at $3,464, as against $9,733 in 1918. From the port of Hull, 1,049,007 pounds of crude rubber, valued $342,716, were exported to the United States in 1919, as against 119,594 pounds, valued $49,690, in 1918.

Vulcanized Rubber Energy[1]

By William B. Wiegand[2]

It is proposed to discuss very briefly and nonmathematically some of the many interesting energy relationships of vulcanized rubber.

ENERGY STORAGE CAPACITY

In Table 1 is shown what is known as the "proof resilience" of the chief structural materials. This is defined as the number of foot-pounds of energy stored in each pound of the material when it is stretched to its elastic limit. You will observe that tempered spring steel has less than one one-hundredth the resilience of vulcanized rubber, and that even hickory wood, its nearest rival, also shows less than one per cent of the resilience of rubber.

This property of course is directly made use of in airplane shock absorbers, etc., but our present reference to it is made with a view to discussion, first, of the character of this stored energy and its transformation into thermal energy of two kinds; and, second, the modification and in fact remarkable increases in energy storage capacity made possible through the admixture of suitable compounding ingredients.

Table I—Proof Resilience

Material	Ft. Lbs. Per Cu. In.
Gray cast iron	0.373
Extra soft steel	3.07
Rail steel	14.1
Tempered spring steel	95.3
Structural nickel steel	14.7
Rolled aluminium	7.56
Phosphor bronze	4.08
Hickory wood	122.5
Rubber	14,600.00

THERMAL EFFECTS

What happens to the mechanical work done on a rubber sample when it is stretched to any given point? Is it in the form of potential energy of strain, as in the case of a steel spring? No. Has it all been irrecoverably lost in the form of heat, as when a lump of putty is flattened out? No. Or lastly, as when a perfect gas is isothermally compressed, has the work done on the sample been turned into an equivalent amount of heat, convertible back into work during retraction? Here again the answer is, No.

The fact is that rubber has all three properties combined. When you stretch a rubber band, some of the energy is stored as potential energy of strain, exactly as when you stretch a steel spring. Another fraction of the energy input is turned into what may be called reversible heat. You can easily feel this heat on stretching a rubber thread and touching it to your lips. The rest of the energy input or work done on the rubber appears in the form of frictional heat.

RETRACTION

We will suppose that the extension was made rapidly (i. e., adiabatically) and consider what happens on retraction, which we will assume to take place rapidly and immediately. First, the potential energy of strain will nearly all be returned in the form of useful work, exactly as in the case of the steel spring. Second, the reversible heat which on extension acted to increase the temperature of the sample will be reabsorbed, transformed into useful work, and therefore cause no energy loss. Finally, the frictional heat developed during extension will be increased by a further amount on retraction, at the expense of the potential energy of the stretched sample.

Thus, when the rubber has been stretched and allowed to return to substantially its original length, it will differ from its original state only by the total amount of frictional heat developed. By the law of conservation of energy, we can at once say that this frictional heat is exactly represented by the difference between the mechanical energy input and output of our system. This phenomenon is, of course, known as hysteresis, and is exhibited by all structural materials. The fact that in the case of rubber the energy storage capacity is several hundred times greater than in the case, for example, of steel, explains why hysteresis phenomena become relatively of such cardinal importance to rubber technologists.

REVERSIBLE HEAT AND THE JOULE EFFECT

Suppose we extend a rubber sample and allow the reversible heat thus generated to disappear. In other words, we stretch it isothermally. We are then dealing with a system substantially in equilibrium. The two factors governing this equilibrium are, first, the load on the rubber, and, second, the thermal condition. Any change in the equilibrium requires a change in these two factors. Conversely, a change in either of these factors will shift the equilibrium. Now one of the fundamental properties of any equilibrium is that when any factor is changed the equilibrium will be shifted in such a way as to offset the change in the factor. Thus, if the load is increased, the sample will stretch and become stiffer so as to resist the increased load. Similarly, if the temperature of the sample is increased, the rubber will contract, since in so doing heat is used up and in this way the disturbance minimized.

This contraction on heating was predicted by Lord Kelvin, after Joule had discovered, or rather rediscovered, the development of heat during extension. Metals and most other rigid bodies behave, of course, in a totally different fashion. Instead of generating heat on extension they consume heat and become cooler, with the result that the application of heat to a stretched metal wire causes it to expand instead of contract, as in the case of rubber.

The Joule effect has been subjected to many misinterpretations, such, for example, as attributing it to a huge negative temperature coefficient of expansion, which is incorrect, since rubber has in fact a large positive coefficient. Others have attempted to explain the phenomenon by assuming an increase in Young's modulus. Bouasse, the French investigator, who has done such masterly work on the elastic properties of rubber, disproved this hypothesis, however, and showed in fact that Young's modulus decreased with increased temperature.

The writer has not done any experimental work on the reversible heat which governs the Joule effect, but there can be no doubt as to its technical importance. Thus, for example, the internal state of a solid tire tread as well as breaker conditions in large pneumatics is clearly bound up with the reversible thermal effect as well as with the frictional thermal effect. Every time the tire tread impacts upon the road surface each part of the rubber stock traverses a stress-strain cycle. Even if we admit that the reversible heat generated during extension is reabsorbed during contraction, we have to consider the gradual building up of internal temperatures due to accumulation of frictional heat. This increase in temperature, acting through the Joule effect, will lessen the extensibility of the heated rubber as compared with adjacent regions at lower temperatures, thus setting up strains which doubtless play a role in breaker separation, the bane of large-size pneumatics. It is therefore highly desirable to work out rubber compounds which will develop not only minimum frictional heat, but also minimum reversible heat. Quantitative measurements of the Joule effect with different compounds and different cures would serve as an index to this quantity.

[1]Presented before the Rubber Division at the meeting of the American Chemical Society, Chicago, Illinois, September 6-10, 1920.
[2]Ames Holden McCready, Limited, Montreal, Canada.

MECHANICAL PICTURE OF RUBBER

The diagram in Fig. 1, which was first suggested by a former colleague, Doctor F. M. G. Johnson, of McGill University, helps clarify one's mental picture of the thermodynamical phenomena associated with rubber strains. Rubber may be viewed as a combination of a cylinder of gas, a steel spring, and a friction member. Following this picture, extension of the rubber is accompanied in the first instance by compression of the gas, thus generating the reversible heat, Q_R. In the second place, the steel spring is compressed, thus generating the increase in potential energy of strain, E. Lastly, the friction element operates through the extension, generating nonreversible heat, Q_F. When the rubber retracts, the gas expands, the spring retracts, and the friction element contributes another increment to the nonreversible heat.

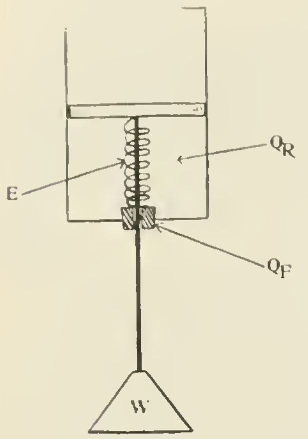


Fig. 1. Mechanical Picture of Rubber

Suppose the sample is extended and we apply heat to the system. The gas in the chamber will expand so as to use up heat, raising the weight W, thus shortening the rubber and so constituting the Joule effect.

FRICTIONAL HEAT OR HYSTERESIS

Although the reversible heat has doubtless a decided technical significance, by far the most important energy transformation is that of useful work into heat through hysteresis, and a short account will here be given of some experiments carried out under the author's direction by H. F. Schippel.

Briefly, the method consisted in generating hysteresis loops by graphically recording stress-strain curves of extension and retraction up to varying elongations. By means of the planimeter the area of the hysteresis loop was determined and the readings calculated to foot-pounds of energy referred to one cubic inch of rubber. In order to obviate the inertia of dead weight tensile machines, and for other reasons of convenience, a special machine was devised, the principal features of which were the alinement of a helical steel spring with the sample and the use of extremely light and nicely fitting parts. The rubber sample was merely a standard test piece about 0.1-inch in thickness, 0.25-inch wide, and 2 inches between shoulders. The ends of the test piece were secured in special light weight clamps designed practically entirely to obviate creeping. The spring extension measured the stress, and the separation of the clamps, the strains.

Through the use of this special machine it was possible to generate stress-strain cycles under both rapid, or adiabatic, and slow, or isothermal, conditions.

Isothermal Cycles Adopted. It is of course obvious that the size and character of the hysteresis cycles will depend on whether they are generated adiabatically or isothermally. Under the former conditions, the reversible and frictional heat developed on extension are only slightly dissipated, and so act to increase the stiffness of the sample and alter the trend of the curves. Owing to the difficulties of inertia, it was not found possible to generate adiabatic loops at speeds sufficient to allow of concordant results. The method finally adopted was to generate the cycles at low speeds, for example, 20 inches per minute, or under practically isothermal conditions.

Preliminary Extensions. It is well known that the area of the first hysteresis loop is greater than that of the second, and so on. In most cases, however, the third loop differs only very slightly from the succeeding loops, and so in our work when it was the intention to generate the hysteresis loop up to an elongation of 300 per cent, the test piece which had not been otherwise handled after cutting from the molded slab was put through two preliminary cycles up to 300 per cent, and then clamped into the machine, and its hysteresis loop graphically recorded. In taking a succession of loops at increasing elongations the same test piece was used and two preliminary loops made at each elongation. The initial length upon which the cycles were based was the length measured after the two preliminary extensions had been made.

Range of Compounds Used. The experimental results included tests on a standard series of factory compounds used in tire construction. They thus included practically pure gum friction compounds, lightly loaded breaker compounds, and more heavily loaded tread stock. These various stocks were mixed in the factory under standard conditions, and given laboratory cures ranging from 50 per cent of the optimum cure in each case up to cures 275 per cent over the optimum in some cases.

Hysteresis loops were generated at elongations ranging from 100 to 500 per cent. There is considerable difference in opinion as to whether in measuring hysteresis one should work to a fixed percentage of the breaking load, irrespective of the elongation, or work to a definite elongation, irrespective of the load required. The latter method seems to the writer the only correct one from the technical standpoint, in view of the fact that the strains incurred, for example, by the skim coat, breaker, and tread of a pneumatic tire are arbitrarily fixed by the inflation pressure and the load.

Relation Between Hysteresis Loss and Cyclic Elongation. Fig. 2 illustrates the results obtained with a typical pure gum, high-grade tire friction with a breaking elongation of upwards of 900 per cent. This particular compound contained 5 pounds of sulphur to 100 pounds of rubber, of which 60 were first latex rubber and the other 40 a soft-cured wild rubber. The only other ingredients were a small percentage of thiocarbanilide and 5 pounds of zinc as activator. The energy units are expressed as one-hundredths of a foot-pound calculated to a cubic inch of rubber. The relationship is of the character of a rectangular hyperbola, and the hysteresis increases very sharply for elongations exceeding 300 per cent. Viewing hysteresis as frictional loss, it is natural to expect sharply increased friction to accompany the rapidly increasing lateral compressions in the test piece. Following our mechanical picture, it is analogous to contraction of the friction element upon the moving arm.

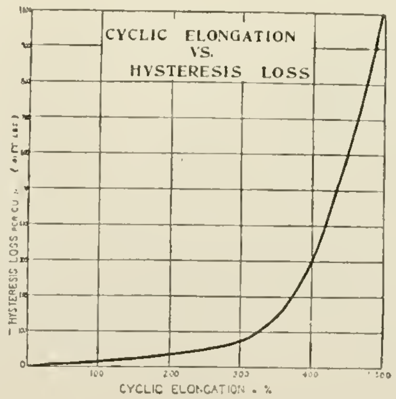


Fig. 2

Adoption of Standard Loop. For comparison of different compounds and for different cures it was decided to adopt a standard cyclic elongation, and in order to reduce experimental error it was of course desirable to select an elongation lower than 300 per cent, or lying on the flat portion of the curve. For higher elongations the energy loss changes so rapidly with slight changes in the elongation as to make concordant results difficult. Moreover, a brief calculation of the strains set up, for example in the skim coat of a pneumatic casing run under service conditions shows that under conditions of standard factory practice the rubber is strained to an elongation of not much more than 200 per cent each time the tire flattens against the road. For comparative purposes we therefore adopted a standard cycle of 200 per cent elongation.

RELATION BETWEEN STATE OF CURE AND HYSTERESIS LOSS

It is commonly held by tire technologists that the state of cure of the friction and skim coat of the carcass has a lot to do with the early or late occurrence of ply separation.

Fig. 3 does in fact show that the state of cure has an influence on hysteresis. What is shown as the normal cure on this chart is the optimum cure as determined by the tensile product. An under-cure of 50 per cent, for example, means that if the optimum curing time is 90 minutes at 40 pounds of steam pressure, the sample was cured for 45 minutes. Similarly with over-cures. Curves *A* and *B* are typical skim coat compounds. Curve *C* is a breaker compound. It will be observed that minimum hysteresis occurs in the over-cured region. It must, of course, be kept in mind that these data apply only to cycles of 200 per cent elongation, whereas the rubber stock in question has an ultimate elongation of over 900 per cent. Attention must also be called to the danger of assuming that a slight over-cure is therefore desirable. Aging conditions must be taken into consideration, and the writer is of the personal opinion that the optimum cure or, in many cases, an even shorter cure is the correct condition. It is also noteworthy that the actual magnitude of the hysteresis values characteristic of high-grade, pure gum frictions is very low, and that we must look elsewhere for the true cause of ply separation.

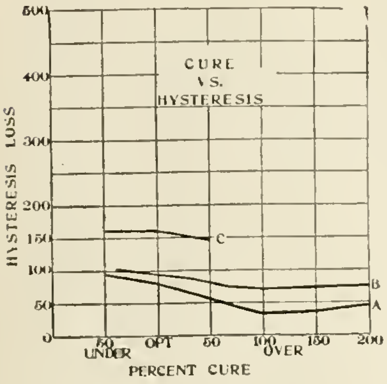


Fig. 3

(*To be Continued*)

AMERICAN RAILWAY ASSOCIATION, MECHANICAL DIVISION, MASTER CAR BUILDERS' AND MASTER MECHANICS' SPECIFICATIONS

STANDARD AIR-BRAKE AND TRAIN AIR-SIGNAL HOSE

Adopted, 1903; Revised, 1916

I. MANUFACTURE

1. Scope. These specifications supersede all previous specifications for air-brake and signal hose, including that for "woven and combination woven and wrapped air-brake hose." Air-brake hose of the woven and combination woven and wrapped type shall meet all tests of these specifications except that of friction, section 4, on those constructions where friction cannot be made.

2. Physical Properties. All hose shall be soft and pliable and not less than four-ply. They shall be made of rubber and cotton fabric, each the best of its kind for the purpose.

II. TESTS

3. Tests. Hose shall be subjected to the following tests, which shall be made with the temperature of the air not lower than 65 or higher than 90 degrees F., and the samples shall be kept at a temperature within these limits for at least one-half hour previous to the time of test.

4. Friction Test. The quality of friction shall be determined by suspending a 20-pound weight from the separated end of the duck of one of the 1-inch test specimens described in Section 9, the force being applied radially. The separation shall be uniform and regular, and the average speed shall not exceed 8 inches in 10 minutes, the distance being measured while the weight is still in place.

5. Stretching Test. Test specimens from tube and cover will be quickly stretched until the 2-inch marks are 10 inches apart and immediately released. They will then be remarked as at first within 10 seconds after starting to release and again stretched to 10 inches between the new marks, remaining so stretched for 10 minutes. The specimens shall then be completely released, and within 30 seconds after starting to release the distance between the marks last applied will be measured, and the initial set must not be more than ¼-inch. At the end of 10 minutes the distance between the marks will again be measured, and the final set must not be more than ⅛-inch. These test specimens may be cut from the tube and cover of the friction-test specimen, but shall not be used for tensile test.

6. Tensile Strength. Test specimens from tube and cover shall be pulled in a tensile machine with a test speed of 20 inches per minute. The inner tube must have a tensile strength of not less than 800 pounds or more than 1,200 pounds per square inch and the cover not less than 700 pounds or more than 1,100 pounds per square inch. The elongation shall be such that the marks, originally 2 inches apart, stretch to at least 10 inches before specimen breaks. If the tensile strength in pounds per square inch is greater than that required, the sample may be accepted, providing the per cent increase in elongation is equal to or greater than the per cent increase in tensile strength in pounds per square inch above the maximum figure.

7. Porosity Test. The remaining 17 inches shall be mounted and placed in a test rack, the circumference will be measured and the hose filled with air at 140 pounds pressure per square inch, the rubber cover shall be cut from clamp to clamp (taking care not to injure the duck) and this pressure maintained for 5 minutes. At the end of this time the hose will be submerged in water to determine whether the inner tube is porous. The escape of air through the tube shall be distinct enough so that the porosity will not be confused with the escape of air which is confined in the structure of the hose. In the event the hose fails on bursting test at the point at which cut was made for porosity test and a satisfactory hydraulic test is not obtained, the porosity and hydraulic test will be repeated on another piece of hose.

8. Bursting Tests. The section of hose which was used for porosity test shall then be subjected to a hydraulic pressure of 200 pounds per square inch, under which pressure it shall not expand in circumference more than ¾-inch for air-brake hose and 11/16-inch for air-signal hose, nor develop any small leaks or defects. After the above test this section shall then stand a hydraulic pressure of 500 pounds per square inch for 10 minutes, without bursting or developing any small leaks or defects, after which the hydraulic pressure shall be increased to a minimum of 700 pounds per square inch without bursting, at the rate of not less than 100 or more than 200 pounds per five seconds.

9. Test Specimen. (a) A hose shall be selected at random and a 5-inch section cut from one end. Two sections, each 1 inch long, shall be cut from the 5-inch section for making friction, stretching and tensile tests, the remaining 3-inch section shall be used for making additional tests, which may be desired on the tube and cover. Stretching and tensile test specimens shall be cut from the tube and cover with a die having the dimensions shown in Fig. 1.

(b) In measuring the thickness of the test specimen shown in Fig. 1 to determine the strength per square inch, a micrometer graduated to 0.001-inch having a shoe 0.24 to 0.26-inch in diameter, exerting a pressure of from 8 to 10 ounces on the test specimen, shall be used.

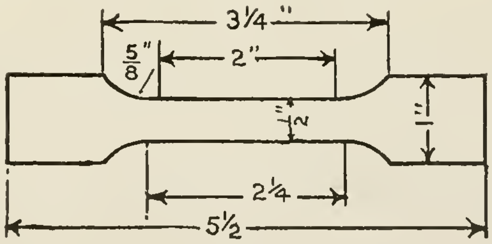


Fig. 1

10. Number of Tests. For each lot of 200 pieces of hose one extra hose shall be furnished free of cost for test purposes.

III. PERMISSIBLE VARIATIONS

	Length, Inches	Outside Diameter, Inches	Inside Diameter, Inches	Thickness of Cap Vulcanized on, Inches
Air-Brake Hose:				
Maximum	22½	2⅛	1 7/16	3/32
Minimum	22	2 1/16	1⅜	1/32
Air-Signal Hose:				
Maximum	22½	1⅞	1 3/16	3/32
Minimum	22	1 13/16	1⅛	1/32

IV. WORKMANSHIP AND FINISH

11. Workmanship. (a) Tube. The tube shall be made either by hand or machine. It shall be free from holes and imperfections, and in joining must be so firmly united to the cotton fabric that it will meet the friction tests prescribed in Section 3. The tube shall be of such a composition and so cured as to successfully

meet the requirements of tests given in Sections 4 and 5, the tubes to be not less than 3/32-inch thick.

(b) Cover. The cover shall be of the same quality of rubber as the tube and shall be not less than 1/16-inch thick, and shall meet the requirements of tests given in Sections 4 and 5.

12. Duck. Construction. The canvas or duck used as a wrapping for the hose shall be made from long-fiber cotton, and shall weigh not less than 22 ounces per lineal yard, 40 inches wide. It shall have five threads per strand and not less than 16 nor more than 22 strands per inch of width, for both warp and filler. The duck shall be cut and applied on a bias of from 42 to 46 degrees, with edges lapped at least 0.5-inch and both sides well frictioned.

13. Finish. The hose shall be smooth and regular in size throughout its entire length.

V. MARKING

14. Serial Number. Each lot of 200 or less shall bear the manufacturer's serial number, commencing at 1 on the first of the year and continuing consecutively until the end of the year.

15. Label. Each length of hose shall have vulcanized on it a label of red rubber, as shown in Fig. 2. This label shall be applied

Fig. 2

on the hose at a point 6 inches from the end (a variation of ½-inch either way will be permitted) and with the top of the lettering toward the center of the hose.

VI. INSPECTION AND REJECTION

16. Inspection. (a) The manufacturer shall afford the inspector, free of charge, all reasonable facilities to satisfy him that the material is being furnished in accordance with these specifications.

(b) The purchaser may make the tests and inspection to govern the acceptance or rejection of the material in his own laboratory or elsewhere. Such tests and inspection shall be made at the expense of the purchaser.

17. Rejection. Material which, subsequently to above tests at the mills or elsewhere, and its acceptance, or prior to being placed in service, develops weak spots or imperfections, or fails to pass any one of the tests herein required, within 60 days from date of shipment, will be rejected and shall be replaced by the manufacturer at his own expense.

18. Rehearing. Samples tested in accordance with this specification, which represent rejected material, shall be preserved for fourteen days from date of test report to the manufacturer.

INTERESTING LETTERS FROM OUR READERS

ILL-ADVISED LEGISLATION

To the Editor:

Dear Sir: I have your courteous favor, suggesting that I comment on the article on page 337 of your February issue with regard to the carbon black industry in Louisiana.

The danger to the existence of the carbon black industry from ill-advised legislation, based on an imperfect and incomplete knowledge of the facts, has called into being the National Gas Products Association, which comprises the makers of about 95 per cent of all the carbon black that is made. The situation has been carefully considered in the meetings of this association, and we are very glad to avail ourselves of this opportunity to state briefly the general situation as we see it.

Carbon black is the base of the black printing inks of this country and to a considerable extent of those of Europe and Asia. Its chief use, however, is for admixture with rubber, to which it imparts much greater tensile strength than any other material yet used for this purpose. It also possesses the great advantage of never wearing glossy, and is therefore not likely to slip, and gives good tractile effect on a smooth pavement and greatly diminishes the danger of skidding in tires.

Assuming the correctness of the article referred to, one of the largest wells would have enough gas to supply all of the carbon black factories in Louisiana, and it would be very regrettable to deprive the world of carbon black when the gas in excess of that required for its manufacture was one hundred-fold the present use for the same, and when the gas wasted in this state has exceeded and probably is exceeding the amount consumed. By "waste," I mean the escape of gas unburnt into the open air from oil wells and from gas wells that are not wholly under control.

I particularly call attention to the fact that not only the makers of automobile tires, but, also, of soles and heels for shoes, ferrules for crutches, chairs and tables; makers of rubber boots, hose and other mechanical rubber goods, can greatly increase the durability of their goods, if they will use from 10 to 25 per cent of carbon black in their mix, according as they want a very flexible rubber or a very hard rubber. I have, for years, worn black rubber heels on my shoes, and find that they will wear more than twice as long as leather heels and give a better grip on the ground beside.

I recently wrote to Mr. Polk, who is one of the leaders in the movement to transport and distribute this gas, that so far from being a hindrance in this laudable purpose, he would find the carbon black makers the greatest possible help, first, by giving such guaranties of an adequate supply of gas as could not be otherwise obtained in that field, and second, by assisting directly and indirectly in raising the needful capital.

I received a very courteous and cordial reply, and I believe that the situation is now better understood in Louisiana and that no effort will be made to interfere with existing factories.

We shall try to secure our members the permits needful to erect machinery already contracted for, and when this is done we think there will be a sufficient output to take care of the probable increase in demand for some years to come, and the question of wholly new enterprises being permitted to start is less urgent at the present time. Godfrey L. Cabot.

Boston, Massachusetts, February 7, 1921.

GOODYEAR'S RUBBER CANNON BALLS

To the Editor:

Dear sir: Here is a bit of rubber history. In 1855 Mannsell B. Field was the commissioner from the State of New York to the Paris Exposition. He wrote as follows:

"Perhaps the most creditable exhibition of all was that of Goodyear's articles of vulcanized india rubber. These were comparative novelties then and were manufactured by Mr. Goodyear in France under his patents there. After he had gone to a good deal of expense in fitting up the compartment which was assigned to him, the French exhibition authorities insisted that he should exhibit with them. This he was unwilling to do. They were all inflexible, saying, 'Does the exhibitor present himself as manufacturer or as inventor?' "

The writer does not state how the matter was settled. Then he continues: "The day before the Exposition opened the French Emperor and Queen were wandering from room to room and, coming to the writer, the Emperor said, 'Good evening,' and after a few commonplaces he said that in walking through our department of the exposition he had seen many things that interested him, but that nothing had so much pleased him as Mr. Goodyear's vulcanized india rubber; that among Mr. Goodyear's articles, however, he had noticed something which had interested him then and continued to interest him ever since.

"Continuing, he said: 'In one corner I saw stacked as one sees them in an artillery yard, a pile of vulcanized india rubber cannon balls.'

"I went directly to Mr. Goodyear's compartment, and asked the person in charge what in the world he expected to do with india rubber cannon balls. 'They are not cannon balls,' he answered, 'they are footballs.' "

It seems the Emperor wondered how any preparation of india rubber could be used for projectiles. Of course, this was before automobile tires were thought of.

Vineland, New Jersey. R. E. Hotchkiss.

What the Rubber Chemists Are Doing

Caoutchouc Considered as a Colloid[1]

By D. F. Twiss

When Graham established the difference between crystalloids and colloids he realized that they are separated by no real boundary, but joined by certain connecting links. Caoutchouc is a typical colloid, although its colloidal nature is not easily explained, as our knowledge of the colloids is still principally based upon materials that have been produced by artificial means.

Colloidal materials generally are divided into suspensoids and emulsoids. The suspensoid contains suspended in the body of the material particles which can be made visible only by aid of the microscope. Emulsoids contain particles only in fluid form, which are mostly dissolved in the body of the material. Natural caoutchouc may be designated as a double colloid. The latex forms a milky fluid which contains particles of colloidal character. Hinrichsen and Kindscher identify these particles as caoutchouc suspended in a watery fluid, the serum of the latex. The activity of these caoutchouc particles varies greatly according to the origin of the latex.

CAOUTCHOUC LATEX

If latex is exposed to electrical influence the caoutchouc particles move to the anode, leaving the fluid clear in the neighborhood of the cathode, proving that these particles are negative and that the latex is a negative suspensoid. The separation of the caoutchouc from the latex is very similar to that of clay in aqueous colloidal suspension. The separation of suspensoids of this sort is considerably facilitated by the assistance of acids, hence, latex is coagulated usually by addition of small amounts of acetic acid. Alkalies, on the other hand, strengthen negative suspensoids. The action of acids and alkalies establishes the conclusion that the presence of ketones regulates the speed of the separation of caoutchouc from latex.

By dialysis soluble salts may be extracted from the latex of the *Hevea*. Latex so treated cannot be coagulated by monovalent metallic salt solutions. Alkaline salts coagulate latex if the concentration is not above normal, while heavy metallic salts effect coagulation at a concentration of one-twentieth normal. In the case of caoutchouc latex containing mineral salts, concentration may be reduced proportionally.

According to the strength of the coagulating medium, raw caoutchouc separates as a spongy mass or a firm elastic body. The first form of separation may be regarded as the uncompleted form of the second. The quality of the caoutchouc depends largely on the form of coagulation. Selection of the coagulating medium and the system of coagulation is a matter of practical importance and has led to the attempt to introduce recognized standard methods in plantation practice.

It is possible to increase the stability of a suspensoid by the presence of a second colloid or emulsoid. This characteristic is made use of in the manufacture of photographic plates. Latex contains, besides water, the caoutchouc proteins, the presence of which strengthens the suspensoid and acts as a protector. Dilution reduces this action, which is why the addition of water to the latex aids the formation of the "cream" or spontaneous separation of caoutchouc particles. Addition of an agent neutralizing the effect of the protein also increases the separation of the suspensoid. The protective agent is not always an albuminoid. The latex of *Funtumia elastica* contains a peptonoid which exerts a similar effect. The neutralizer in this instance is formaldehyde, which in the case of *Hevea* adds to the stability of the latex.

If fresh latex has been sterilized by subjecting it to heat it becomes immune against the action of acids, and the addition of a small quantity of fresh latex becomes necessary to reestablish the property of coagulation. This occurrence has been attributed by Eaton to the presence of microbes, but the existence of microbic action is held to be not absolutely necessary to produce this effect, since the presence of enzymes appears to be a sufficient explanation.

RAW CAOUTCHOUC

When raw caoutchouc is subjected to a solvent the latter slowly enters it, causing it to expand greatly and forming, with the assistance of shaking, a viscous colloid solution. Carbon bisulphide, chloroform and benzene yield comparatively clear solutions of caoutchouc, while naphtha, gasoline or ordinary ether produce milky solutions. The difference in the appearance of the solution is due not only to variations in index of refraction of the solvent and suspended particles, but is caused also by the presence of materials of varying solubility. Caoutchouc which dissolves practically entirely in the first named of these solvents dissolves only partially in the others. The undissolved portion is held colloidally suspended. Even in apparently clear colloidal solutions, as of gelatine or agar-agar, one may discover submicroscopic particles by means of the ultra-microscope. Turbid caoutchouc solutions compared to clear ones must be regarded as colloidal solutions of a lower order. Solutions of technical caoutchouc mixtures, which contain sulphur and other filling materials, are inferior as regards the size of the particles in suspension.

CAOUTCHOUC AND EMULSOID

While latex may be classified as a simple suspensoid, caoutchouc is an emulsoid. The viscosity of emulsoids is greater than that of suspensoids. Such colloids as gelatin probably retain their colloid character permanently. They consist of a colloid substance finely dispersed in a colloid medium, which causes it to be spongy or cellular and unchanged by ordinary means. Raw caoutchouc, however, is a substance in which the caoutchouc hydrocarbon is very finely distributed in a medium formed probably by the protein of the latex. Since deproteinated caoutchouc retains its typical character, it is practically certain that its colloid nature is caused by two forms of caoutchouc substance of different molecular weight and molecular condition. The influence of heat, light, or acids brings about remarkable changes in the viscosity of caoutchouc solutions caused probably by changes in either colloidal or molecular conditions or by both combined. The lessened viscosity of gutta percha and balata solutions and the ease with which they separate from solution permits the conclusion that the hydrocarbon of gutta percha and balata is less complex in nature than that of caoutchouc.

ABSORBENT EFFECT OF CAOUTCHOUC

A characteristic of all emulsoids is the possibility of condensing upon their surface materials of a different kind, as shown in the case of coloring material. This explains why during coagulation of latex part of the coagulation material is retained which can be removed only with difficulty. Coagulation materials, therefore, should consist only of volatile substances and the quantity that is added should be small. If coagulated caoutchouc is allowed to stand several days the protein undergoes partial decomposition with formation of basic substances and acid amines which cannot be removed completely from the caoutchouc by washing and drying. Their presence exerts a marked catalytic influence upon vulcanization. The difference in quality between wild and plantation caoutchouc without doubt is caused by the varying quantities of catalysers which the two varieties contain.

[1] Le Caoutchouc et la Gutta-Percha, March 15, 1920, pages 10240-43.

The study of the colloid character of caoutchouc has led Hoehn and Ostwald to doubt the chemical nature of vulcanization. Removal of the uncombined sulphur in vulcanized rubber by prolonged acetone extraction shows that some of the sulphur has been absorbed and not simply dissolved by the caoutchouc.

Certainly absorption plays a considerable part during the changes of the vulcanization. It is still accepted as true that the sulphur is chemically united to the vulcanized material. The absorption of sulphur does not cease when the first chemical action has been completed. All of the caoutchouc in the vulcanized material loses its original character and cannot be regarded merely as a mixture of vulcanized and unvulcanized caoutchouc. It is conceivable that the part of the caoutchouc solution which has combined with the sulphur has been absorbed irreversibly by another caoutchouc part which would bring about a change in the colloidal condition and possibly also a change in the polymerization. Vulcanized caoutchouc can still be regarded as an emulsoid in a form more permanent and stabilized than raw caoutchouc. Vulcanized caoutchouc does not retain the adhesive character of raw caoutchouc, which by milling on rollers will form plastic sheets, increasing in softness and plasticity by further mechanical treatment. This treatment changes the structure of the emulsoid. Regeneration of old rubber consists in restoring vulcanized caoutchouc to a condition such that its characteristic colloids will be modified and assume the viscous condition of raw caoutchouc.

CAOUTCHOUC DIALYSIS AND COMPOSITION

A caoutchouc membrane can be used for the purpose of making dialyses of raw caoutchouc solutions. If a membrane is made from a slightly vulcanized caoutchouc disk and on one side of it is placed a sulphur-caoutchouc solution, and the pure solvent on the other, the sulphur will pass through the membrane. By renewing the solvent all sulphur can be extracted from the caoutchouc solution. The old vulcanization method of Hancock is based on the diffusion of sulphur in caoutchouc.

Notwithstanding general scientific advancement, specific knowledge of colloids is still very limited and the nature of caoutchouc and other natural colloids is still not completely solved. The colloid characteristic of coautchouc is a considerable obstacle in the production of synthetic caoutchouc. The present system of coagulation followed upon the plantations facilitates the enzymic actions. During vulcanization no special transformation can be traced; the only sign of the formation of a new product is given by the chemical combination of the caoutchouc with sulphur according to the formula $C_{10}H_{16}S_2$.

Graphical representation of the caoutchouc molecule, vulcanized or unvulcanized, is possible by a cyclic formula. The sulphur certainly is bound to the caoutchouc, at least in part. Vulcanization is a weak exothermic action. The exothermal heat of the vulcanized caoutchouc is somewhat less than that of all its components. It is generally admitted that the speed of diffusion of a gas through caoutchouc depends upon the solubility of the gas in caoutchouc and the specific speed of the gas has little influence upon the result. Caoutchouc cannot be regenerated after vulcanization by mere dialysis. The combined sulphur does not dialyze, neither can a solution of the vulcanized material be effected without the employment of very energetic means, which entirely changes the nature of the caoutchouc.

THE INTERPRETATION OF RUBBER ANALYSES[1]

In the analysis of vulcanized rubber the principal tests applied at present are: acetone extract, chloroform extract, alcoholic potash extract, ash, total sulphur, free sulphur, mineral and organic fillers, and special tests for the detection and determination of such substances as paraffine, oils, glue, etc.

[1] "The Interpretation of Rubber Analyses," by John B. Tuttle. The Chemical Bulletin, Volume VII, No. 12, December, 1920, page 323.

ACETONE EXTRACT

The acetone extract may contain resinous matter from the crude rubber, free sulphur, oils and waxes. The rubber resins average between two and four per cent in high-grade rubber, and the presence of more than these amounts suggests the use of low-grade or reclaimed rubber.

CHLOROFORM EXTRACT

The chloroform extraction is made for the purpose of detecting bituminous substances such as the so-called mineral rubbers. It is only qualitative, for a large part of these substances are soluble in acetone, and cannot be isolated. The brownish solution in chloroform is not to be mistaken, and even as little as one per cent is readily detected.

ALCOHOLIC POTASH EXTRACT

Alcoholic potash (or soda) dissolves the so-called oil substitutes. There is always a small amount of extract from the rubber, but it should never exceed one per cent of the amount of rubber present. More than this amount is a pretty fair indication of the use of oil substitutes.

FATTY OILS

Fatty oils, such as palm oil and cottonseed oil, were probably added for their softening effect, but mineral oils usually denote the presence of reclaimed rubber. Paraffine wax is desirable in insulated wire in order to close up the minute pores in the rubber. It is easily isolated and determined with great accuracy, while from the qualitative point of view its presence is easily discernible by the white flakes which separate, on cooling, from the acetone solution.

SULPHUR

Sulphur is not only added as such for the purpose of effecting vulcanization, but is contained in reclaimed rubber, oil substitutes, accelerators and fillers, and the total sulphur determination gives only the sum of the sulphur content of these various substances.

In special cases, such as high-grade insulated wire, and wherever the sulphur might have a deleterious effect on materials with which it may come in contact, the free sulphur should be kept as low as is consistent with safe manufacturing practice, but beyond this, it is in itself harmless. However, it has been observed that low-grade crude rubbers and reclaimed rubber require a larger excess of sulphur for vulcanization than do the best grades of either wild or plantation rubber, and a high free sulphur content suggests the use of these cheaper grades.

ASH

The ash is the mineral residue left on ignition. It should be remembered that some fillers change composition on heating, others react during vulcanization to form new compounds, while some fillers are more or less volatile. Hence the value of this determination is problematical and depends largely on the material being tested.

RUBBER

Probably the most important determination is one which is seldom made, and that is the percentage of rubber present. The usual practice is to calculate this quantity by difference after determining all other constituents. A vast amount of work has been done to develop methods for the direct determination of rubber, but only a few of these have any merit whatever, and these are usually time-consuming, require special equipment or have some other drawback which prevents their widespread adoption. The percentage of rubber is important because experience has shown that in order to obtain reasonable service a certain minimum amount of rubber is necessary. Rubber being normally one of the more expensive components of rubber articles, it is only natural that manufacturers should seek to use no more than that actually needed.

CONCLUSION

The interpretation of the chemical analyses of rubber articles should be approached with a consideration of the methods used in making the analyses, the probable error of these methods, the

purpose for which the article is to be used, and the effect of the various constituents on the service. If the purpose of the analysis is to determine whether or not material complies with specifications, then the latter should include the methods by which the material is to be analyzed, and if it does not, the methods should be known to anyone who attempts to decide whether or not the terms of specifications have been met. In other words, the results of analyses of rubber compounds are inseparable from the methods by which they were obtained.

DIRECT DETERMINATION OF RUBBER BY NITROSITE METHOD

A discussion on the direct determination of india rubber by the nitrosite method, by John B. Tuttle and Louis Yurow, has been published as No. 145 of the Technologic Papers of the U. S. Bureau of Standards.

The method, which was reviewed in The India Rubber World, October 1, 1917, page 17, is adapted to the analysis of vulcanized compounds containing reclaimed rubber, lampblack, bituminous substances and oil substitutes. It does not attempt to discriminate between new and reclaimed rubber and the authors state that so far as they know there is no quantitative method today which will determine the percentage of either kind in a mixture of the two. Their method gives merely the total of the two kinds, and the average quality must be determined by means of the usual mechanical tests of tensile strength, elongation, permanent set, etc.

CHEMICAL PATENTS

THE UNITED STATES

Process of Vulcanization of rubber in which an addition of dichloranilin is made to the substance to be vulcanized prior to the vulcanization step.—Carl R. De Long, Washington, D. C., and Warren Neal Watson, Auburn, Maine. United States patent No. 1,364,732.

THE DOMINION OF CANADA

Vulcanizing Rubber. A process of vulcanizing articles consisting in maintaining a chamber filled with steam at substantially atmospheric pressure and substantially excluding air from the articles contained in the chamber, and superheating the steam to effect vulcanization.—The Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, Canada, assignee of Willis A. Gibbons, Pelham Manor, New York, U. S. A. Canadian patent No. 207,221.

Vulcanized Caoutchouc, Process and Product in which caoutchouc, zinc oxide, a vulcanizing agent and an aryl substituted thiourea accelerator having an alkyl group in ortho position, are mixed and subsequently vulcanized.—The Goodyear Tire & Rubber Co., assignee of Winfield Scott, both of Akron, Ohio, U. S. A. Canadian patent No. 207,718.

Process of Producing Vulcanized Caoutchouc which comprises incorporating into rubber the products resulting from the decomposition of a proteid by means of an aqueous solution of an alkaline carbonate.—The Goodyear Tire & Rubber Co., assignee of Clayton W. Bedford, both of Akron, Ohio, U. S. A. Canadian patent No. 207,719.

Method of Vulcanizing Caoutchouc consisting in reacting upon paranitroso-dimethyl-aniline in solution in an inactive neutral solvent with hydrogen sulphide, incorporating a small percentage of the resultant base into a caoutchouc mixture and heating with a vulcanizing agent.—The Goodyear Tire & Rubber Co., assignee of Clayton W. Bedford and Robert L. Sibley, coinventors, all of Akron, Ohio, U. S. A. Canadian patent No. 207,982.

Manufacture of Thiocarbanilides and Vulcanization of caoutchouc. The method of producing a substituted thiourea which consists in carrying out the reaction between aniline and carbon bisulphide in the presence of paranitroso-dimethyl-aniline. In the art of vulcanizing caoutchouc the incorporating the above resultant mixture of substituted thiourea into the caoutchouc mix and heating the same with a vulcanizing agent to effect vulcanization.—The Goodyear Tire & Rubber Co., assignee of Clayton W. Bedford and Robert Sibley, coinventors, all of Akron, Ohio, U. S. A. Canadian patent No. 207,983.

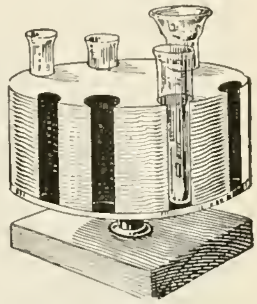
Compounding Rubber Products consisting in first forming an emulsion of water, a gel-forming proteid, oil and gas-black, incorporating the same into the rubber and evaporating out the moisture from the mixed product previous to vulcanization.—The Goodyear Tire & Rubber Co., assignee of Robert C. Hartong, both of Akron, Ohio, U. S. A. Canadian patent No. 207,984.

LABORATORY APPARATUS

TEST-TUBE HOLDER

Some reformed chemist with an inventive turn has found that his poker chip holder lends itself for easy conversion into a test-tube rack for the laboratory.

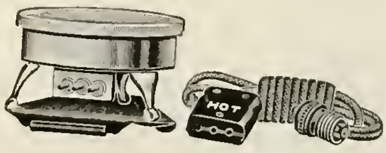
An old discarded poker chip holder can be utilized to good advantage, as shown in the illustration, for holding extra test-tubes. For further convenience, a round board may be fitted to the bottom and, with spindle attached, be arranged to revolve upon a base. Such a holder will take care of several test-tubes of varying diameters and prove a convenient laboratory utility.—*Popular Science Monthly*, New York.



Handy Test-Tube Rack

FOUR-HEAT ELECTRIC DISK STOVE

The illustration shows a very convenient electric disk stove newly placed on the market. It is adapted for laboratory use as well as for culinary purposes. It may be regulated for four different degrees of heating by placing the regulating plug in different positions. The stove contains two heating coils which are connected to the three terminals. The top is made of aluminum and the stove sets upon a metal deck provided with fiber rests for protecting the table.—The Waage Electric Co., Inc., 12 South Jefferson street, Chicago, Illinois.



Electric Laboratory Stove

LABORATORY ENAMEL

An enamel for use on the walls and furniture of laboratories should be white, adhere perfectly and be washable with either hot or cold water. Such an enamel is to be had and the makers claim, in addition to the above qualities, that it is proof against the action of sulphuretted hydrogen, acid and alkali fumes and chemicals.—Toch Brothers, 320 Fifth avenue, New York.

BARIUM SULPHATE IN SOUTH AFRICA

Samples of barium sulphate produced by a firm near Johannesburg, South Africa, have been transmitted by the American consul in that district to the Bureau of Foreign and Domestic Commerce, Washington, D. C. The firm states that it has a fair deposit of this material and is prepared to deliver it in reasonable quantities f. o. b. steamer at Cape Town. The sample can be inspected by referring to file No. 20,945, and the name of the firm desiring to market the material will be sent by the Bureau or its district and cooperative offices by referring to file No. B E—6011.

New Machines and Appliances

BICYCLE TIRE TRIMMING MACHINES

Originally when bicycle tires were first manufactured, they were made in two-piece molds and only two lines of overflow had to be removed. Today, practically ninety-five per cent of the tires contain fancy non-skid treads and to perfectly produce these non-skid designs, three-piece molds are used. Consequently, three lines of overflow must be removed and the combined length of the three circular overflow lines on each tire equals nearly 21 feet. To do this by hand is a slow and expensive proposition, and the automatic trimming machines shown in the illustrations are claimed to be rapidly replacing the hand method.

Referring to Fig. 1, the machine is removing the overflow from the tread of a bicycle tire which rests on a grooved roller in front of the cutters. The shaft supporting this roller is driven from the counter-shaft which is fastened to the base of machine, and as the tire travels with the grooved roller the overflow is removed. It is held in a vertical position by two idle rollers, the grooves of which are made large enough to accommodate all sizes of tires. They are held in position by steel rods fastened to the mounting board and can be adjusted to tires of different diameters.

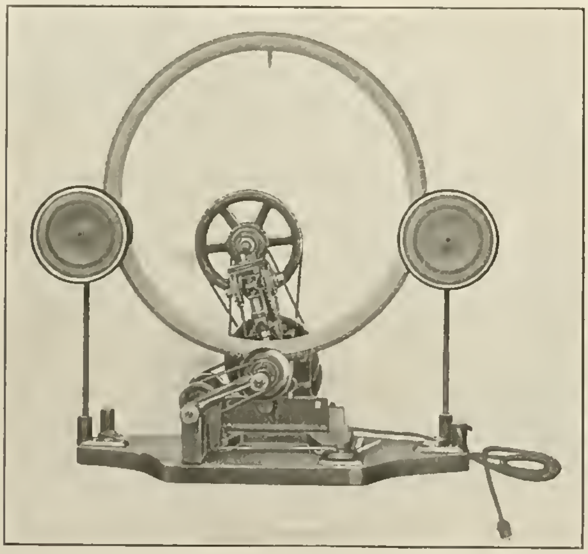


Fig. 1 Trimming Bicycle Tire—Tread Overflow

Fig. 2 is a side view of a horizontal machine, showing the overflow being removed from the inside of the tire which is supported by idle rollers on each side and in the rear. The shaft and grooved roller in front of the cutters are held in place by an extension arm bearing. The extension arm is connected to a steel support which is securely fastened to the mounting board by a rod running through its hub. The rod is threaded on one end and enters the knob on the left side of the support. By turning the knob, the extension arm and the tire is moved into or away from the cutters as desired, either trimming the tire very closely or allowing a small margin of rib. From the extension arm, a projection extends downward with a rod attached to the end. The rod hooks into a disk which is fastened to the mounting board. A lever extends from the side of the disk and by moving this lever the extension arm and the tire are raised or lowered as desired. A spring is attached on the shaft between the bearings of the extension arm and this presses the tire against the cutters and acts as a cushion, allowing the tire to give and take as it revolves

Each machine is complete with a motor and necessary cord with connecting plug for attaching to the lighting system. The tire starts revolving as soon as it is placed in position on the machine and it can be stopped or taken away at any time while the machine is running. The average production of a skilled operator is 20 to 25 tires an hour. Under the same conditions the machine is claimed to trim 100 tires per hour.—T. W. Morris, 3304 Warren avenue, Chicago, Illinois.

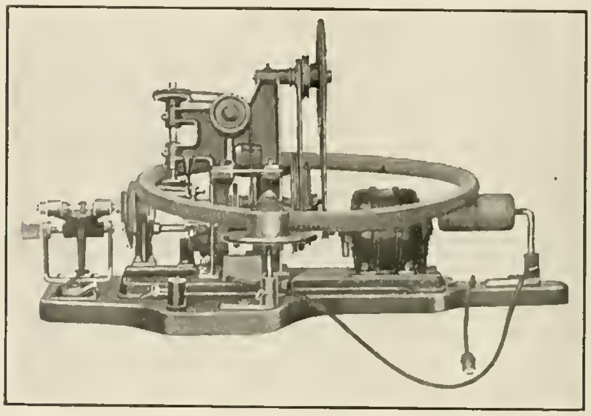
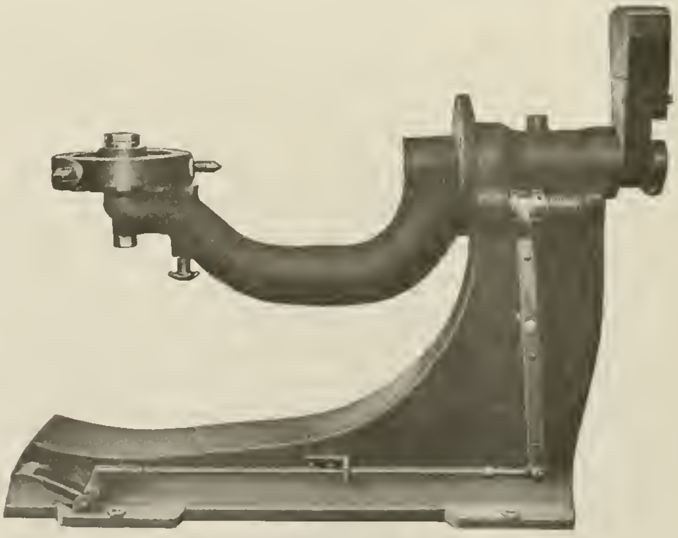


Fig. 2. Trimming Bicycle Tire—Inside Overflow

GIANT TRUCK-TIRE BUILDING STAND

Every rubber tire manufacturer will be interested in this new model tire-building stand which has been particularly designed for use in the construction of heavy pneumatic truck tires. It is strongly built of cast iron, and provided with bolt holes for attaching to the floor. It is fitted throughout with Timken roller bearings. The core upon which the tire is built is placed in the rotatable chuck attached to the arm, and as the tire is built up, layer upon layer, the operator can easily turn the core around, as the result of perfectly balanced bearings. The arm support can be moved in any direction which will enable the operator to perform the work better and quicker. A foot lever on the right-hand side of the stand is connected with two powerful springs which are part of the operating mechanism.



Reynolds Tire-Building Stand

The floor space required is five feet and six inches by two feet four inches and the weight is 1,250 pounds unpacked.—The Reynolds Machine Co., Massillon, Ohio.

METAL STEAM OR AIR BAG

The short service duration of the ordinary rubber and fabric air bag, used for inflating and curing cord tires, is the source of great expense in the production of such tires. Frequently such air bags are serviceable only for six or eight cures, which necessitates practically continuous replacements. In the expansible metal steam or air bag shown in the illustration the inventor has provided a very durable and efficient substitute in either the sectional or endless type.

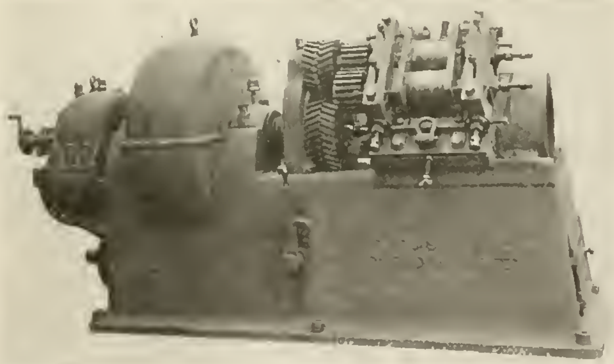
Expansible Metallic Air Bag

These bags are made of sheet metal and are operated by steam, or steam and air combined, raising the working pressure up to 150 pounds per square inch. The sectional type is designed for repair work while the endless type is collapsible and is intended for the elimination of the usual cast-iron building cores. Tires may be built directly on the steam bag, which is removable sectionally from the tire after the cure.—The Allsteel Ridewell Tire & Rubber Co., Dayton, Ohio.

ENGLISH TUBING MACHINE FOR SOLID TIRES

Forming solid truck tire stock, especially in the larger sizes, requires very strongly and heavily built forcing machines. In American rubber manufacturing practice such machines are fed by hand. In English practice it is customary to employ some form of machine feeding device.

A 14-inch motor-driven tubing machine for running the largest sections of truck tires is shown in the illustration. It was specially designed to meet the English and Continental demand for



Solid Tire Tuber

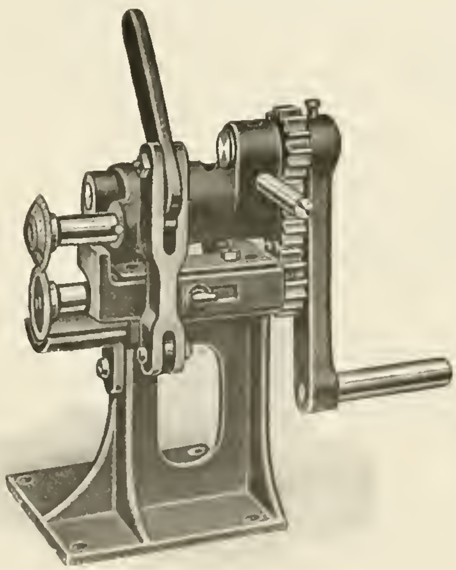
a machine capable of running continuously. The screw of the machine is hollow and fitted with a water-cooling device.

The stock is fed into the machine by a pair of rollers geared to the spindle and made adjustable so that the feed can be regulated to suit the size of the tire desired. It has a two-speed gear, low for the smaller sections and high for the larger ones. The gearing throughout is machine-cut and a large ball-thrust washer of special design is provided to take the full thrust of the screw when in operation.

The illustration shows the machine with a pair of feed rolls. To insure a more even feed and elimination of all back pressure the machine has recently been provided with an improved single roller feed in which the roller is placed in direct contact with the screw. This was illustrated and described in The India Rubber World, December 1, 1920, page 179.—Francis Shaw & Co., Limited, Manchester, England.

MACHINE FOR REMOVING BEADS

In resoling tires, and also when reclaiming tire carcasses, it is necessary to remove the bead, which operation involves considerable time and labor when done by hand. The machine shown in the accompanying illustration offers the repairman a more practical way to do this class of work. The machine itself is of cast iron with steel knives which rotate by turning the hand-crank, each knife turning forward and each entering the fabric at the same time. The head of the machine is hinged so that the tire can be inserted between the two circular knives without first cutting the bead by hand. The knives can be adjusted farther apart for extra heavy tires by means of a lever. Furthermore, the knives are so constructed as to feed the tire along when cutting. The operator needs only to guide the tire and the machine does the rest of the work. As an aid to guiding the tires, two rollers are frequently placed under the casing. The bead cutter is made to become a staple piece of equipment and has bolt holes for bolting to the bench.—Progressive Shoe Machinery Co., Minneapolis, Minnesota.



The Progressive Bead Cutter

TIRE CORE CONVEYING SYSTEM

A very convenient overhead system for handling tire cores is shown in the illustration. The track is suspended from the ceiling and is provided with a series of switches which permit the transference of the tire and core to any desired point.

Overhead Tire Conveyor

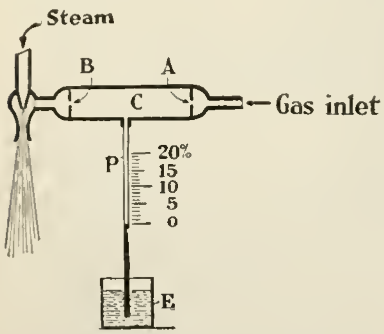
The track extends the full length of the building, from the calender to the curing room, and is used for handling both fabric

and rubber, particularly frictioned fabric from calender to bias cutter. At this point in the system the fabric is weighed as it passes over a certain section of track which is connected to a scale in the floor.

The stock of tire cores is never allowed to rest on the floor, but hangs on individual hooks. The tires are transferred in the building process over the tracks which extend through the entire building department into the curing room alongside the alleys where the cores are transferred from the hooks into the molds for curing. The saving in labor is particularly great when operating the core equipment to capacity.—Lampson Company, Des Moines, Iowa.

NEW CO_2 RECORDING INSTRUMENT

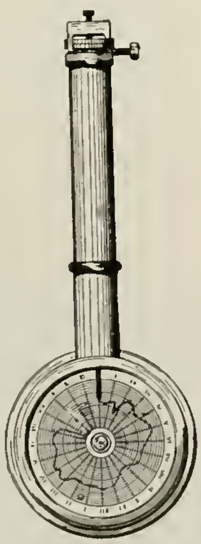
Rubber manufacturers who are striving to overcome fuel and heat wastage in the boiler room will be interested in this new model CO_2 recording equipment, for which are claimed simplicity, quicker action and greater accessibility of parts. The economy and compactness of combining in one machine means for determining CO_2 simultaneously from any number of boilers up to a total of six, are easily recognized.



Principle of Operation of the CO_2 Meter

A single unit equipment for one boiler consists of three principal parts, the CO_2 meter proper, recorder, and auxiliary boiler front indicator. The meter is placed wherever more convenient. Its function is to determine the CO_2 and then actuate the boiler front indicator and recorder in the engineer's office accordingly. An aspirator draws the gas continuously through first aperture A and then B. Absorption of the CO_2 content between the two apertures causes a change of pressure or tension in chamber C which is transmitted to the recorder and indicator.

Indicator for Boiler Front


Recorder for Engineer's Office


Meter for Four Boilers

The CO_2 meter consists of this analyzing mechanism and a regulator. The regulator keeps the suction created by the aspirator constant, thereby eliminating changes in tension between apertures A and B, except those caused by absorption within chamber C. It is the latter changes in tension which the indicator and recorder register instantaneously. The gas travel is hastened by utilizing the main aspirator's exhaust in an auxiliary aspirator for drawing the gas from the boiler up to the absorption chamber, while the main aspirator draws the gas sample through this. Suitable filters remove soot and dirt from the sample.

The record is not intermittent but furnishes an autographic history of the operation of each boiler for every second of the day. The indicator guides the fireman in supplying just the right amount of air to burn the fuel with least loss of heat up the chimney. This recording equipment is designed primarily for rough and ready boiler plant service.—Uehling Instrument Co., 71 Broadway, New York.

MACHINERY PATENTS

MACHINE FOR REFINING RUBBER

An attempted improvement upon the ordinary chilled two-roll refining mill is shown in Fig. 1. The essential parts of this machine are a vertical hollow, water-cooled spindle *A* provided with a stock feed-screw *B* and an enlarged conical portion *C* which is a central obstruction filling in greater or lesser degree the circular water-cooled die *D*. The adjustment of the opening for passage of the stock is effected by vertical movement of section *E* by the motion of screws *F* and *G* actuated by hand-wheel and worm-gearing *H* and *I*. Below the die *D* a circular table *J* is attached to the spindle *A*. The latter is driven by gear and worm *K* and *L*.

In operation the stock, fed into hopper *M*, is forced by screw *B* downward through the adjustable circular space between the die and spindle and emerges onto the table *J* refined from mechanical impurities. The advantages claimed for this machine are a larger working surface in proportion to its size than with rolls and that it obviates the difficulty of producing the necessary pressure that rolls require.—William A. Gordon, assignor to Birmingham Iron Foundry, both of Derby, Connecticut. United States patent No. 1,364,549.

MODIFIED FRICTION CALENDER

Fig. 2 illustrates a vertical side elevation of a three-roll friction calender modified by the addition of attachments so that two rolls of fabric *A* and *B* may be friction-coated with rubber composition at the same time. The bank of stock is applied at points *C* and *D* and the coated fabrics received on the rewinding rollers *E* and *F*. The latter are operated by sprocket chains *G* and *H* acting through sprocket wheels *I* and *J*.—Edward H. Scribner and Harry A. Bell of Revere, assignors to Revere Rubber Co., Chelsea, both in Massachusetts. United States patent No. 1,364,211.

TREAD MAKING MACHINE

This machine, illustrated in Fig. 3, in longitudinal vertical section, is for building and curing tire tread bands. It comprises the foundation plate *A*, frames *B*, and a number of radiating arms *C* connected by circular braces *D*, the lower arms being secured to the base plate. The standards and arms are duplicated on each side of the machine.

The outer ends of the arms *C* form a guideway in which is mounted a guide *E*. On the lower end of each guide is a shoe *F*, its inner surface forming the arc of a circle. Six of these shoes when in their innermost positions, form a complete circle of the size required for the outer circumference of the tread band. Keyed to shaft *G* are two large hand-wheels *H*, *H*, for operating each side of the machine.

Just inside the frames, pinions *I* mesh with two sets of fan-shaped gear sections *J*. The gear sections in each set of six are placed in staggered relation and engage with pinion *I*, the rotation of which rocks the segments and moves the slides *E* radially

through the eccentrics *K* formed on the outer end of the short shaft *L*. On the outer ends of the center shafts *G* slidable drums *M* are mounted, upon which tire tread bands may be built. A screw mechanism operated by a hand-wheel *N* serves to slide the building drum under the contracting shoe-like section *F* for curing the band.

In operation, a tire tread band is built on the drum *M* at one

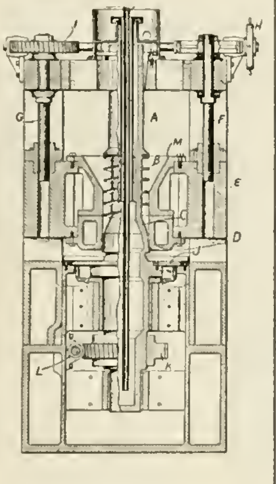


FIGURE 1
Rubber Refiner

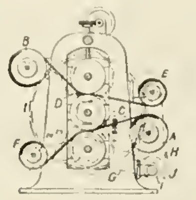


FIGURE 2.
Multiple Friction Calender

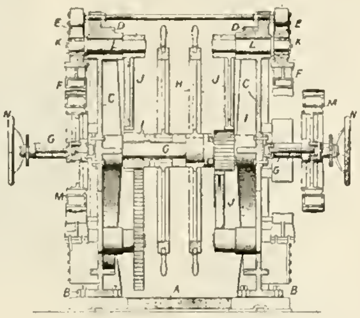


FIGURE 3. Tire Tread Machine

side of the machine and moved into curing position. By turning the capstan wheel *H*, sections *F* are closed upon the band.

Sections and drums are chambered for steam circulation to provide the heat for curing. One workman operates each side of the machine alternately.—Harvey F. Maranville, assignor to the Firestone Tire & Rubber Co., both of Akron, Ohio. United States patent No. 1,365,115.

OTHER MACHINERY PATENTS

THE UNITED STATES

No. 1,364,132 Toothed roller for treating raw rubber and rubber substitutes. C. E. Miller, Anderson, Ind.
1,364,133 Tube-splice vulcanizer. C. E. Miller, Anderson, Ind.
1,364,183 Take-off mechanism for rubber mixing mills. S. Dietrich, Cudahy, Wis.
1,364,241 Mold for tire treads. G. W. Brownell, Leominster, Mass.
1,364,362 Pneumatic-pad tube-splicing apparatus. E. Fetter, assignor by mesne assignments to The Pneumatic Tube Steam Splicer Co.—both of Baltimore, Md.
1,364,386 Tire-making machine. C. Kuentzel, assignor to The Akron Rubber Mold & Machine Co.—both of Akron, O.
1,364,845 Machine for shaping the lip of an insole. H. A. Sadler, Swampscott, assignor to Plymouth Rubber Co., Canton—both in Mass.
1,364,985 Inner tube connector and vulcanizer. W. C. Ehrenfeld, Flemington, N. J.
1,365,066 Machine for wrapping and unwrapping tires. E. E. Shoopman, Cairo, Neb.
1,365,104 Expansible core for curing tires. A Huetter, Dayton, assignor to the Firestone Tire & Rubber Co., Akron—both in Ohio.
1,365,294 Tire mold. G. E. Tiller, Sioux City, Ia.
1,365,365 Tube repair vulcanizer. J. W. Arthur, assignor to The Williams Foundry & Machine Co.—both of Akron, O.
1,365,463 Apparatus and method for manufacture of inflated rubber articles. N. D. Crawford, Milford, Conn., assignor to The Mechanical Rubber Co., a New Jersey corporation.
1,365,528 Dipping and drying apparatus for rubber articles. H. A. Mitzel, Providence, Rhode Island, assignor to Revere Rubber Co., a Rhode Island corporation.
1,365,560 Apparatus and method for making rubberized cords. W. J. Steinle, Elmhurst Heights, N. Y., assignor to The Hartford Rubber Works Co., a Connecticut corporation.
1,365,581 Apparatus for cleaning inside of tire casings. H. G. Ballou, Los Angeles, Calif.
1,365,709 Collapsible core for tires. E. M. McCurry and G. R. Bilger, assignors to The Banner Machine Co.—all of Columbiana, O.
1,365,764 Apparatus for removing flexible rubber articles from forms or cores. J. W. Brundage, assignor to The Miller Rubber Co.—all of Akron, O.
1,366,290 Tire mold core. F. Smith and T. H. Brittain—both of Akron, O.
1,366,342 Hose-coating apparatus. L. Atwood, Boston, Mass.
1,366,547 Apparatus for wrapping tires with paper. W. M. Wheildon, Ashland, and Edward H. Angier, Framingham, both in Mass.; said Wheildon assignor to said Angier.
1,366,750 Tire mold core. F. Smith and T. H. Brittain—both of Akron, O.

THE DOMINION OF CANADA

207,070 Tire expander of soft rubber, etc. O. A. Peterson and O. M. Brancel, coinventors—both of Minneapolis, Minn., U. S. A.
207,135 Mold for retreading tires. A. B. Legnard, Waukegan, Ill., U. S. A.
207,295 Tire-building core and chuck. P. and B. De Mattia, coinventors, both of Clifton, New Jersey, U. S. A.
207,296 Tire-building core. P. and B. De Mattia, coinventors, both of Clifton, New Jersey, U. S. A.
207,299 Tire-peeling machine. E. P. Hafner and J. T. Roberts, coinventors, both of St. Louis, Mo., U. S. A.
207,516 Steam connection for hollow tire core. The Fisk Rubber Co., Chicopee Falls, assignee of T. Midgley, Hampden—both in Mass., U. S. A.
207,517 Collapsible tire core. The Fisk Rubber Co., Chicopee Falls, assignee of T. Midgley, Hampden—both in Mass., U. S. A.
207,518 Collapsible tire core. The Fisk Rubber Co., Chicopee Falls, assignee of T. Midgley, Hampden—both in Mass., U. S. A.
207,519 Collapsible tire core. The Fisk Rubber Co., Chicopee Falls, assignee of T. Midgley, Hampden—both in Mass., U. S. A.
207,520 Apparatus for building up cord blankets for pneumatic tires. The Goodyear Tire & Rubber Co., assignee of E. A. Nall, executrix of the estate of E. Nall, deceased—both of Akron, Ohio, U. S. A.
207,560 Collapsible tire core. The Fisk Rubber Co., Chicopee Falls, assignee of T. Midgley, Sr., Hampden, both in Mass., and T. Midgley, Jr., Dayton, Ohio—all in U. S. A.
207,591 Tire repair vulcanizer. G. B. Cooper, Joplin, Mo., U. S. A.
207,717 Automatic valve controller for hydraulic press. The Goodyear Tire & Rubber Co., assignee of W. E. Shively and E. B. Kilborn, coinventors—all of Akron, Ohio, U. S. A.
207,741 Tire repair vulcanizer. The Western Vulcanizer Manufacturing Co., assignee of H. K. Wheelock—both of Chicago, Ill., U. S. A.
207,776 Mold for pneumatic tire covers. W. N. Rees, Sydney, and F. Jolly, Randwick, both in New South Wales, coinventors.
207,806 Apparatus for vulcanizing rubber. W. B. Burke, Cleveland, Ohio, U. S. A.
207,976 Overflow cavity for tire molds. The Fisk Rubber Co., Chicopee Falls, assignee of T. Midgley, Hampden, both in Mass., U. S. A.
207,985 Vulcanizing press for cord tires. The Goodyear Tire & Rubber Co., assignee of E. G. Templeton, both of Akron, Ohio, U. S. A.

THE UNITED KINGDOM

151,867 Rubber-heel mold. A. Mond, 19 Southampton Buildings, Chancery Lane, London. (The Miller Rubber Co., Akron, Ohio, U. S. A.)
152,305 Tire-repair vulcanizer. F. Sinzig, 33 Aarbergergasse, and H. Wenger, 39 Neuengasse, both in Berne, Switzerland. (Not yet accepted.)
152,520 Apparatus for coating cloth, etc., with plastic substances. C. A. Harnden, Newton House, Newton, Hyde, Cheshire.
152,744 Apparatus for molding flushing-tank-valve balls. F. T. Roberts, 1105 Lakeview Road, and R. H. Rosenfeld, 1895 East 71st street—both in Cleveland, Ohio, U. S. A.
152,804 Device for opening tire molds. Dunlop Rubber Co. and C. Macbeth, 1 Albany street, Regent's Park, London.

PROCESS PATENTS

THE UNITED STATES

1,365,061 Manufacture of unwoven rubberized cord fabric and product. R. B. Respess, New York City. (See THE INDIA RUBBER WORLD, June 1, 1919, page 482.)
1,365,327 Curing rubber hose by pressure and heat. E. G. Kimmich, assignor to The Goodyear Tire & Rubber Co.—both of Akron, Ohio, U. S. A.
1,366,220 Manufacture of cord tires. J. A. Swinehart, Akron, O.

THE DOMINION OF CANADA

207,527 Building up cord tires. The Goodyear Tire & Rubber Co., assignee of E. A. Nall, executrix of estate of E. Nall, deceased—both of Akron, Ohio, U. S. A.
207,904 Manufacturing pneumatic tires from fabric treated with neutral amorphous non-colloidal sulphur compound, etc. W. B. Pratt, Wellesley, Mass., U. S. A.
207,981 Improved method of splicing inner tubes. The Goodyear Tire & Rubber Co., assignee of C. B. Orr—both of Akron, Ohio, U. S. A.
207,995 Manufacturing battery-jars of uncured rubber. The Joseph Stokes Rubber Co., assignee of H. L. Boyer—both of Trenton, New Jersey, U. S. A.
207,996 Forming hard rubber storage-battery jars. The Joseph Stokes Rubber Co., Trenton, New Jersey, assignee of T. A. Willard, Cleveland Heights, Ohio—both in U. S. A.

THE UNITED KINGDOM

150,143 Treating crude rubber with live steam, to produce uniform degree of softness. Dunlop Rubber Co., J. V. Worthington and A. W. T. Hide, 14 Regent street, Westminster.
152,275 Combining sheet rubber or leather with vulcanizing solution of rubber and sulphur as adhesive. J. Brown, 10 Market Square, Auckland, N. Z.

GERMANY

PATENTS ISSUED, WITH DATES OF ISSUE

331,018 Improving soles and heels of rubber shoes. Heinrich Karl Major and Marie Alexandrine Major, née Odou, Helmstrasse 10, Berlin, Schöneberg.

New Goods and Specialties

A CHANTICLEER FROM FRANCE

Many imported toys are now making their appearance in the shops, bearing mute witness to the efforts of the erstwhile warring countries to "come back" in even the simplest ways. Bits of different kinds of material are combined cleverly to produce a toy that is grotesque or humorous, but always unique.

Inflatable Whistling Cock

The toy shown in the accompanying picture is a real French cock, made of good-quality natural cream-colored rubber of the kind used for balloons. The legs are wood, to which shaped pieces of heavy cardboard are tacked for feet. The legs themselves are securely cemented to the rubber. The bill, which is a whistle, and the mouthpiece at the tail, are both of wood, likewise cemented in place. The eyes are painted on the rubber, to produce a raised effect. The wings are carefully colored in red, yellow and green, beneath the stamped design, and the crest and tail are simulated by real colored feathers cemented in position.

When the toy is inflated it will stand alone, and the whistling bill produces a shrill note. This gradually weakens as the air escapes and the cock falls over and "goes West."

This toy is protected by the French registered trademark "DD."

THE "GINGERBREAD" DOLL IN RUBBER

Reminding one at once of the old-fashioned gingerbread doll, comes a line of toys made of sponge rubber, cut to shape and

Some Members of the Bobs Family

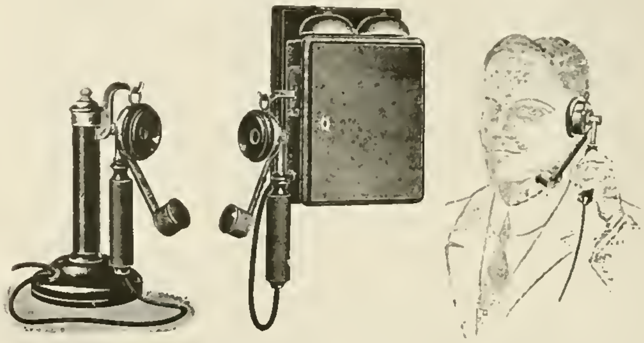
sewed where necessary to produce a finished doll. One of these, Betty Bobs, greeted the readers of The India Rubber World September 1, 1920, where a more detailed description was given. We are now glad to present her with her brothers and sisters. The "Bobs Family" includes Betty, Bobby and Billy Bobs and the Bobs Twins.—Rees Davis Toy Co., 180 North Dearborn street, Chicago, Illinois.

THROAT MICROPHONE TRANSMITTER DEFIES AIR-BORNE SOUNDS

The telephone with the throat microphone transmitter is a direct outcome of a war need, as it was invented especially for use in airplanes where the noise of the engine rendered it impossible for pilot and passenger to communicate by any known telephone. This type of microphone is insensitive to air-borne sounds but when placed against the side of the throat while a person is talking, transmits speech clearly, unaffected by external noises.

The telephone instrument equipped with the throat microphone transmitter is similar to the ordinary English hand combination telephone, except that it is held to the ear while the microphone transmitter rests lightly against the side of the throat. The instrument has all metal parts nickel-plated and is fitted with an ebonite handle, which not only adds to the appearance but also provides insulation. For long conversations, such as central work, the transmitter is mounted in a cloth necklet to be used in conjunction with a head-gear receiver.

The illustrations show both a wall and table central battery telephone with throat microphone transmitters, and the manner



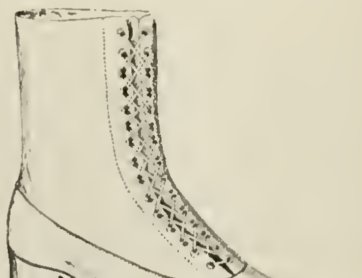
English Telephones Equipped with Throat Microphone

in which the device is held. Other types have also been developed, including magneto and battery call telephones for both wall and table, interphones with automatic cut-in and cut-out device, etc.

The throat microphone transmitter is invaluable in noisy places, and in addition to its acoustic superiority over the ordinary telephone mouthpiece, it possesses great advantages from a hygienic point of view.—The Sterling Telephone & Electric Co., Limited, 210-212 Tottenham Court Road, London, W. 1, England.

TIME-SAVING ELASTIC SHOELACE

An elastic shoelace that requires no lacing, tying or fastening of any kind after the first insertion, and no change in the construction of the shoe, is a recently patented invention. Its use permits the shoe to be pulled on and off without unlacing. The elastic shoelace consists of a length of narrow elastic tape, with an extra amount of stretch, having ordinary metal shoelace tips on the ends, put on for convenience in the first lacing and then cut off. The ends of the lace are then kept from pulling out by attaching soft metal clips, which are provided with each pair of shoelaces. A particular method of inserting the lace must be followed, and is in fact part of the patent, as this allows the elastic to stretch sufficiently to permit inserting the foot easily. The lace is claimed to last the life of the shoe. It can be applied to all styles of shoes, including oxfords or low shoes, as well as

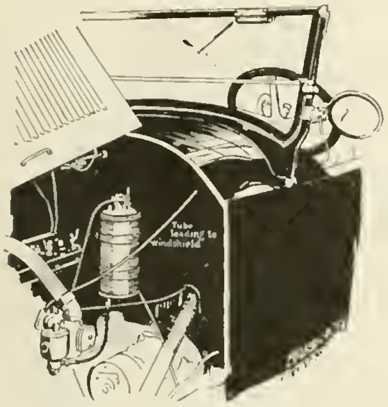


Method of Lacing

ladies' high top boots.—United States patent No. 1,358,753, Benjamin F. Killam and Samuel Schlesinger, Jr., Denver, Colorado.

AUTOMATIC WINDSHIELD CLEANER

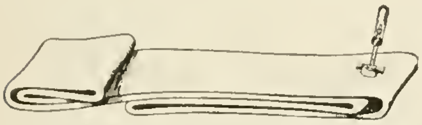
A new form of the familiar rubber windshield cleaner is that known as the Folberth Automatic. It consists of a compact mechanism with a light metal sweep bearing a rubber cleaning edge which bears against the outer side of the windshield. The apparatus is mounted on top of the shield and is operated automatically by the suction of the engine. A convenient finger control is turned to start the cleaner sweeping back and forth, preventing rain, sleet or snow from settling and obscuring the driver's vision, leaving both his hands free when most needed for safe guidance of the car.—The Folberth Auto Specialty Co., 7914-7922 Lake avenue, Cleveland, Ohio.



Folberth Automatic Windshield Cleaner

HEAVY INNER TUBE FITTED WITH "TIROMETER"

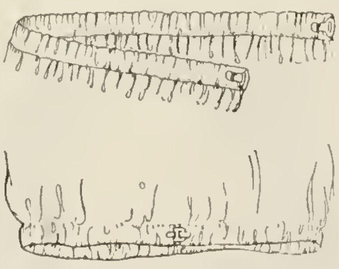
The exact air pressure in a tire casing is shown at all times by the "Tirometer," a combination air valve and air pressure gage, which was described in The India Rubber World, April 1, 1920. This accessory is now to be had only as fitted to "Tirometer" heavy touring tubes, which are pure gum, full laminated tubes made with a special preservative that is said to assure endurance and resistance against heat. A transparent, practically unbreakable dust cap protects the "Tirometer," without interfering with the instant reading of the air-pressure gage. "Tirometer" heavy touring tubes are made in red and gray, in sizes from 28 by 3 inches to 40 by 8 inches.—Currie Brothers Co., Inc., Atlanta, Georgia.



"Tirometer" Heavy Touring Tube

THE "HOLDZIT" CLASP MAKES ELASTIC LAST

Manufacturers as well as wearers of women's garments will welcome the advantages of the "Holdzit" elastic belt fastener, which is attachable to any garment without sewing. On account of the perishable nature of rubber when subjected to the process of laundering, women everywhere will be glad to get the "Holdzit" elastic which can be easily and quickly inserted, and as easily removed for the purpose of washing a garment, besides permitting the garment to be spread out flat for ironing, even in an ironing machine.



"Holdzit" Fastener for Elastic Bands

The patented "Holdzit" clasp acts as a hook at one end and an eye at the other, while either end can be used as a bodkin for threading the belt into the tube in the garment. A portion of the clasp is bent into a flat hook which lies close against the material and prevents the elastic from slipping back into the tube when unfastened, yet is easily detached when removing the elastic. The "Holdzit" fastener comes in black and white non-corrosive metal attached to any quality of elastic in black or white, in any length desired, in widths of 1/4, 3/8, 3/4, and 7/8-inch. It commends itself for use with blouses, petticoats, bloomers and pajamas, also in the finer qualities of silk elastic for camisoles, brassieres, and undervests.—Holdzit Fastener Corporation, 18 Broadway, New York City.

TO AID THE WOULD-BE SWIMMER

The latest device to assist the amateur swimmer or the one just trying to learn is called the "Rubba-Float." It consists of a rectangular inflatable cushion or bag, provided with an inflating valve at one corner and tapes firmly cemented to two corners of the bag by triangular-shaped pieces of fabric, for tying the float in position back of the wearer's waist, as illustrated.

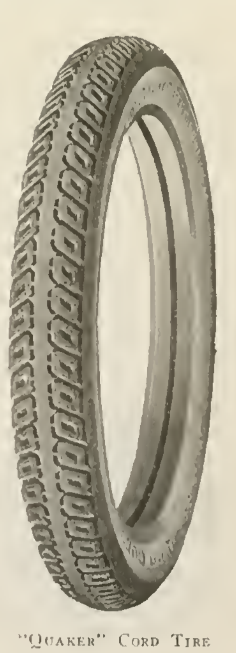
The "Rubba-Float"

The "Rubba-Float" is inflated in the same way as a toy balloon and by pressing between the thumb and forefinger the rubber tube at the end of the valve, the air within will not escape while a fresh breath is being taken. The device will fit better if not filled too full with air. When sufficiently inflated, the valve is closed by inserting a screw and tightening it as much as possible. The air will then remain within indefinitely, no subsequent inflation being required.

The "Rubba-Float" is absolutely waterproof and will, it is claimed, sustain either child or adult in the water.—United States patent No. 1,364,275. I. B. Kleinert Rubber Co., 719-727 Broadway, New York City.

A CORD TIRE FROM PENNSYLVANIA

"Quaker" cord tires, though new to the trade, have been undergoing severe service tests for the past three years and have exceeded all expectations of their makers and users. They are extra-size and their construction is said to make them remarkably easy-riding. The typical "Quaker T. T. T." raised black tread has been found to be as nearly non-skid as it is possible to make a tire. "Quaker" tires are built to deliver mileage, to stand up under the hardest kind of work, and to give the least trouble to their users.—Quaker City Rubber Co., 629 Market street, Philadelphia, Pennsylvania.



"Quaker" Cord Tire

"TOPAZ" RUBBER SPONCE

A gem among rubber sponges is the "Topaz," which is said to be the result of conscientious experiment and effort to produce a sponge surpassing any other aid to thorough body cleansing. It is made of fine quality sponge rubber in the light tan color of the sea sponge, and comes in three sizes. It has a firm, pliant texture, and the large holes are readily washed free from dirt and soapsuds. An interesting test made in a Chicago hospital is said to have demonstrated the superiority in cleanliness of the "Topaz" over sea sponges and wash-cloths. At the end of the test the rubber sponge was comparatively free from bacteria while the sea sponge and the wash-cloth contained many germs.—Featheredge Rubber Co., Inc., Chicago, Illinois.

A RUBBER-SHOD WINDOW CATCH

Almost a necessity in these days of burglaries and petty thieving is the "Burg-La-Proof" window catch which automatically locks any window, open or shut.

This clever device fits over the top of the lower sash and is attached by tightening a screw which makes it fit securely on any width of sash. An automatic spring-controlled binding lever has a rubber tip securely vulcanized over the bent portion of the steel lever which engages the upper sash so that forcing windows only locks them more securely. The rubber tip prevents injury to the woodwork and holds with a tight grip.

"Burg-La-Proof" Window Catch

By using this catch, windows can be left open for ventilation without fear of them being opened by thieves or by venturesome children. It provides a factor of safety in the home incommensurate with the small cost of the article. No tools are required for installing this device, the slot of the fastening-screw being of sufficient width to accommodate a coin, case-knife or key, if a screw-driver is not available. This catch is made in two sizes, regular and large.—Burg-La-Proof Window Catch Manufacturing Co., Everett, Massachusetts.

FOUNTAIN PEN WITHOUT INK SAC

The newest type of fountain pen has been devised without the usual ink sac. Instead there is a "little red pump handle" that does away with side levers, compression rods, and rubber sacs, and operates, as its name indicates, on the principle of the good

Construction of the Dunn-Penn

old-fashioned pump. As a result, the barrel of this pen will hold considerably more ink than the ordinary fountain pen. At the same time, the usual claims are made as to its being non-leakable and self-cleaning. Besides the gold pen, there are only four other simple parts, all of which are made of hard rubber. A portion of the pen here pictured is cut away to show the pump.—Dunn-Pen Co., 709 Sixth avenue, New York City.

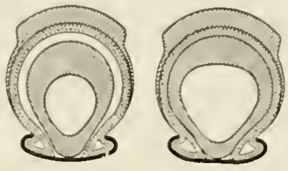
DOUBLE DISK WHEEL WITH FIRESTONE TIRE RIM

The trim appearance of a motor car equipped with disk wheels appeals to many an owner and prospective purchaser. One of the pioneers in this line is the "Indestructible" pressed steel, double disk wheel, which has been developed through eleven years of experimentation by its manufacturer. Its method of construction insures maximum strength with minimum weight. Road shock is taken up and dissipated through the entire circumference of the wheel as the circular triangle bracing principle of the sheets in the wheel counteracts and absorbs these forces. The disks are flanged with long flanges which are riveted to the felloe band, each supporting and strengthening the other. The "Indestructible" wheel provides for the use of the standard Firestone demountable rim. The valve stem in this wheel comes through at the back of both sheets and is in an indentation in the sheet so that the inflating nozzle can be applied easily. Owing to the symmetrical lines this wheel is very easy to keep clean.—Indestructible Wheel Co., Lebanon, Indiana.

Inside View, "Indestructible" Double Disk Wheel

NOVEL BRITISH INNER TUBE

A puncture proof inner tube with novel features is a recent British invention. It is much smaller than the inside of the cover and is expanded to fit by a pressure of 30 pounds to the square inch. The walls of the tube are considerably thickened to resist the strain, and the tube takes much of the pressure that usually is carried by the cover. It is claimed that the working pressure of the cover used with this tube is only 55 pounds, whereas the usual average is computed at 75 pounds. With the tube inflated by 30 pounds pressure only 25 pounds is left for the cover to sustain.

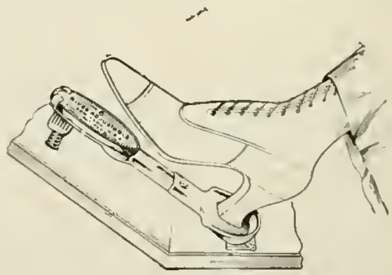


"Pressurelastic" Inner Tube

The extra thickness of the Pressurelastic tube makes it somewhat heavier than the ordinary tube, but it is practically immune from puncture, does not creep, and cannot be nipped when being fitted into the cover. It is said that extensive tests have proved the advantages of this new tube and that it is in large demand by taxi drivers.—Pressurelastic Inner Tube Co., 27 Colonnade, Russell-square, London, W. C.

EXTENSION ACCELERATOR PAD AND HEEL REST

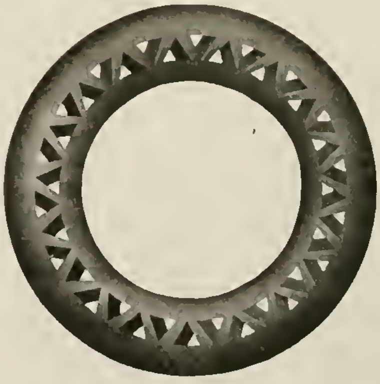
The well-known Rives "Neverslip" auto pedal pads with which a large percentage of American-built automobiles are equipped are now made in an adjustable heel rest combination, as shown in the illustration. The adjustable feature permits accommodation to any size desired and thus ensures full control of the accelerator without discomfort.—George H. Rives, Manufacturing Co., Inc., 2187 Woolworth Building New York City.



"Neverslip" Pedal Pad

HOLLOW BRICK PRINCIPLE APPLIED TO TIRES

The ceaseless endeavors of inventors to perfect a device that will supersede pneumatic rubber tires brings out daily a number of clever ideas. One which seems worthy of note is the "Triangle" tire core, molded of soft rubber with triangular open portions so arranged as to displace in cross-section an equal amount of rubber throughout the circumference of the core. The triangle is said to be the only known geometrical device that can accomplish this. The maker of this airless tube guarantees the "Triangle" tire core to ride more easily than air, to supply a much greater resiliency, and to make accidents from blowouts impossible.—Triangle Tire Core Co., 1209 Grand avenue, Des Moines, Iowa.



Triangle Tire Core

THE OBITUARY RECORD

A PIONEER IN RUBBER SUNDRIES

Word comes from Columbus, Ohio, of the passing of one who was one of the well-known Eastern rubber men, who became in time a resident of the Middle West.

Albert T. Holt

The record of achievement of Albert Thompson Holt is most interesting. Born in Andover, Massachusetts, educated in the public schools, he entered the employ of the Tyer Rubber Co. at the age of 17 years. Later he became superintendent of the Davol plant in Providence, Rhode Island. After two years he took charge of the Brooklyn factory of C. B. Dickinson. Becoming interested in rubber reclaiming, he associated himself with Loewenthal & Morganstein, at Jersey City, having charge not only of manufacture but of marketing as well. In his travels he became struck with the development of the rubber business in Ohio, and first entered the specialties department of The B. F. Goodrich Co., then took charge of the plant of the Victor Rubber Co., and finally settled in Columbus as consulting rubber expert.

Mr. Holt was a thoroughly equipped and practical rubber man, the inventor of many processes of value and an excellent organizer. Personally, he was dignified, courteous, firm in his convictions, and a tireless worker. An accident in a factory where he was doing expert work brought on heart trouble, which resulted in his death.

FORMER MASSACHUSETTS RUBBER MAN

Barnabas Thacher Morrison, formerly treasurer and general manager of the Reading Rubber Manufacturing Co., Reading, Massachusetts, died at his winter home in Pasadena, California, January 7, after bearing bravely an illness of nearly six years. In 1909 he retired from active business, after having been identified with the rubber trade for twenty-three years, and has since devoted himself to the care of large property interests which came to him partly through inheritance.

Mr. Morrison is survived by his wife, daughter of the late Daniel Demmon, of Boston, and Weston, Massachusetts; by a brother, Philip G. Morrison, and two sisters, Miss Mary G. Morrison and Mrs. George Horace Blake.

FOUNDER OF TWO RUBBER COMPANIES

Dorman T. Warren, founder of the Gutta Percha & Rubber Manufacturing Co., New York City, died suddenly, on January 20, at his home, 170 Central Park South, New York City. He was born in West Townsend, Massachusetts, in 1827, and received his education at Andover Academy, Andover, Massachusetts. On graduating, he went to New York and became interested in the jewelry business, where he gained the friendship of the late Amedée Spadone, another jeweller in the same building.

At the close of the Civil War Mr. Warren established the Gutta Percha & Rubber Manufacturing Co. of New York, of which Mr. Spadone became a director and afterward president. In 1887 Mr. Warren organized the Canadian concern of the same name at Toronto, Ontario, now known as Gutta Percha & Rubber, Limited. In time, however, the New York and Toronto companies became entirely distinct, Mr. Warren relinquishing all interest in the former and Mr. Spadone in the latter. In 1892 Mr. Warren retired from the Canadian firm and his son, the late Henry D. Warren, became head and guiding spirit of the business. On the latter's death in 1909, his son, Captain Trumbull Warren, served as president and treasurer until killed in action overseas in 1915. Mrs. S. T. Warren is now president of the company.

Dorman T. Warren was a member of the New York Board of Trade and the Chamber of Commerce. He is survived by two sons, Professor Howard C. Warren of Princeton University, and Ralph H. Warren of Montclair, New Jersey.

PROMINENT AKRON MANUFACTURER

William Franklin Warden, president of The Burt Manufacturing Co., and also vice-president of the Akron Gear & Equipment Co., both of Akron, Ohio, died of acute heart trouble at De Land, Florida, on January 19, 1921.

Mr. Warden was born in North Robinson, Ohio, February 23, 1874, and received his education at the Soldiers' & Sailors' Orphans' Home, Xenia, Ohio. His first work was with a printing concern in Chicago. Later he was employed on *The Wadsworth Banner*, and for the past thirty years has been connected with The Burt Manufacturing Co. as president. He was also president of The Burt Building Co. and vice-president of The Akron Gear & Engineering Co.

Mr. Warden was a member of the Akron Chamber of Commerce, Portage Country Club, De Land Golf Club of De Land, Florida, and a member of the Grace Reformed Church.

Interment was at Wadsworth, Ohio, the body being accompanied by the widow, his elder son, William, and Mr. Warden's brother-in-law, E. O. Curry, of Wadsworth.

Mr. Warden's death comes as a great shock to a large circle of friends and he will be sadly missed by his business associates.

THE EDITOR'S BOOK TABLE

"RUBBER GOODS MANUFACTURE." BY "FACTORY MANAGER." Maclaren & Sons, Limited, London, 1920. Cloth, illustrated, 496 pages, 6 by 9½ inches.

This work embraces 28 chapters, which appeared originally as a series of articles published in *The India-Rubber Journal*, London. The early chapters treat of factory location, plans, equipment and the various departmental divisions of the manufacturing operations. A special chapter is devoted to the discussion of the machinery and other equipment employed for each line of goods, the making of which is described in detail. In these chapters also are given many typical formulas for the rubber mixings employed.

The last two chapters are devoted to factory management and costing, followed by a series of ten appendices that treat on a variety of matters, such as compounding ingredients, milling, calendering, vapor cure, molding of heavy springs and the manufacture of miscellaneous articles.

The book is furnished with a very full index, which is a convenience always appreciated in a reference work. The subject matter details English rubber factory practice, which in many respects is much different from American methods.

"CREATIVE CHEMISTRY." BY EDWIN E. SLOSSON, M.S., PH.D., The Century Co., New York, 1920. Cloth, illustrated, 311 pages, 5½ by 8 inches.

This book is one of "The Century Books of Useful Science." The wonderful story of scientific discovery and development in the varied departments of industrial chemistry is clearly and most entertainingly told in untechnical language for the instruction of the layman interested to learn what civilization owes to the chemist.

The rubber worker will be particularly interested in the chapter on rubber, in which is sketched the chemistry of rubber, the discovery of synthetic rubber, the development of plantation rubber, vulcanization, and the future possibilities dependent on cheap raw rubber.

"POCKET DIRECTORY OF SHOE MANUFACTURERS, 1921." THE Shoe and Leather Reporter Co., 166 Essex street, Boston, Massachusetts. Leather, 340 pages, 2¾ by 5½ inches.

This handy pocket volume contains the latest information concerning the shoe manufacturers of the United States and Canada, giving location of factories, members of firms, capitalization, names of buyers and superintendents, days on which buyers see salesmen, capacity of plants, and many other important details; also specially drawn maps showing the relative location of shoe manufacturing towns. It includes in one small volume that can easily be carried in the pocket all necessary information about the great and prosperous shoe trade of this continent. The 1921 edition has been carefully revised from original sources.

"HOW TO KEEP INVENTION RECORDS." BY HARRY A. TOULmin, Jr., J. D., Litt. D., with introduction by James T. Newton, a former United States Commisioner of Patents. D. Appleton & Co., New York City. Cloth, 85 pages, 5 by 8 inches.

This little volume on the keeping of invention records is of great value to inventors. The first part discusses the general nature of industrial property and monopolies granted to protect it. The second part presents a practical method of insuring the recording of dates, and a final chapter deals with methods of patent investigation. Failure to keep adequate records of inventions and their development and reduction to practice has often deprived inventors of the fruits of their ideas and labor, and has cost thousands of dollars in litigation that might have been avoided had the inventor used some such recording system as outlined in this volume.

A DICTIONARY OF CHEMICAL TERMS. By James F. Couch. New York, 1920. D. Van Nostrand Co., New York City. Flexible cloth, 204 pages, 5 by 7 inches.

This volume of pocket size is designed by its author, who is a chemist in the Bureau of Animal Industry, United States Department of Agriculture, to serve the convenience of anyone who has occasion to read chemical literature. Examination of the book shows that the author has attained this object very successfully. His work merits appreciation of chemists and students alike for the concise and accurate definitions presented in the book.

NEW TRADE PUBLICATIONS

The Yarnall-Waring Co., Chestnut street, Philadelphia, Pennsylvania, manufacturer of "Yarway" power plant devices, has issued a leaflet describing the Yarway Junior seatless valve, which has recently been developed to meet the need for a valve that would stay tight under high pressure steam on turbine drips, superheater drains, water columns, blow offs, etc. Copies of the descriptive sheet will be sent free upon request to the maker.

The Boonton Rubber Manufacturing Co., Boonton, New Jersey, maker of molded material for electrical insulations and for mechanical, chemical and other purposes, has issued a 48-page booket, attractively bound in leather-colored pebbled cardboard covers, embossed with the company's trade-mark and stamped and bordered with brown. The subject matter treats of the company's products, giving a brief but comprehensive classification of molded material, useful data on molded insulation, etc. Especially beautiful and in a class by themselves as illustrations of mechanical processes, are the eleven full-page half-tones of workmen at various machines, enlarged from photographs to give the soft-focus effect so familiar on the screen. The printing and presswork of the booklet are also to be commended.

The Birmingham Iron Foundry, Derby, Connecticut, has issued a large two-color illustrated catalog of its rubber mill machinery, printed on heavy plate paper which clearly shows every detail of the various machines. Besides several full-page views of the plant and its interior, there are forty-seven full-page illustrations of machines, reproduced from photographs, including crackers, washers and sheeters, light and heavy duty mills, refiners, two to four-roll calenders, embossing calenders, experimental machinery, presses, bias shears, tread-making machinery and many others.

The Birmingham Iron Foundry is one of the best-known institutions of its kind in this country, and its long experience makes it an authority on rubber machinery. It is always willing to make suggestions and is able to supply machinery for the manufacture of tires and accessories, boots and shoes, soles and heels, mechanical and molded goods, hard rubber goods, carriage cloth and clothing, asbestos sheeting, etc. Besides the many machines illustrated, the Birmingham company also produces hose-making and cross-wrapping machines, duck slitters, fabric dryers, gutta percha calenders and washers, mixing aprons, doubling drums, etc.

The catalog is substantially bound in heavy paper covers, and is intended to serve as a bulletin to make it easier for clients to prepare their inquiries. Full descriptions and prices of each specific machine will be sent upon request.

Under the name, "*Tire Trade Journal and Vulcanizer & Tire Dealer*," the first issue of these two combined periodicals appeared in January. The Gardner-Moffat Co., 225 Fourth avenue, New York City, has bought the *Vulcanizer & Tire Dealer*, the Chicago publication, first issued in September, 1919, and merged it with its own monthly, *Tire Trade Journal*, the first issue of which was published in July, 1919.

An address, "Making The 1921 Grade," delivered by George M. Graham, vice-president of the Pierce-Arrow Motor Car Co., Buffalo, New York, at the annual meeting of the Motor and Accessory Manufacturers' Association, Hotel Biltmore, New York, January 12, 1921, was an able survey of the national automotive field, a careful analysis of conditions helpful and deterrent to the progress of the motor vehicle industry, and a well-reasoned, stimulating plea for greater optimism. Of especial interest to the tire industry is the testimony he submits to prove that automobile production is still far from reaching the point of saturation, and he prophesies that the country will shortly enter upon an era of motor mileage that will soon equal the total now provided by all-rail and river transportation.

CALENDARS

Tyson Brothers, Inc., Woodbridge, New Jersey, maker of rubber substitute and chemicals for the rubber industry, has presented a very beautiful calendar bearing no advertisement other than the company's name and trade mark inconspicuously stamped beneath the silk cord hanger. The calendar bears a hand-colored print after the original water color "Our Daily Bread," by Edwin Lamasure, which shows a golden wheat-field stretching back to a group of farm buildings set beneath fine old green trees. It is a typical representation of the peace and plenty that characterizes our great land, in spite of the business flurries and anxieties that prevail at times in crowded centers.

A daily date calendar with tear-off leaves bearing extra large size figures has been presented to the trade by the Stamford Rubber Supply Co., Stamford, Connecticut, maker of rubber factice

The Buffalo Foundry & Machine Co., Buffalo, New York, maker of the "Buflovak" line of special machinery, has sent out a 1921 calendar pad, fitted with an adhesive strip at the back to enable it to be fastened to the calendar presented by the company last year.

David Bridge & Co., Limited, Castleton, Manchester, England, the well-known British engineers and rubber machinists, have sent out an attractive calendar bearing a reproduction of a drawing by W. Alister MacDonald of the Old Shambles, Market Place, Manchester. Its quaint half-timbered houses with many-gabled roofs and small-paned bow windows are reproduced in soft colors.

Repairing Rubber Footwear Is Fully Described in This Issue.

News of the American Rubber Industry

THE GOODYEAR REFINANCING PLAN

After several weeks of negotiation between The Goodyear Tire & Rubber Co., Akron, O., and representatives of its creditors and its stockholders, a plan for the readjustment of the debt and capitalization of the company has been agreed upon. The plan contemplates the issue of approximately $25,000,000 first mortgage 20-year 8 per cent sinking fund bonds, $25,000,000 10-year 8 per cent sinking fund debentures and $35,000,000 8 per cent prior preference stock.

The bonds and debentures, or their proceeds, will be used to pay off the bank debt, which is largely secured, and for other corporate purposes, including new working capital. General creditors will receive prior preference stock for existing debt and in part payment for future deliveries of materials. Holders of existing preferred stock will receive preferred stock of the reorganized corporation having substantially the same rights and preferences as the present preferred stock, share for share, and holders of existing common stock will receive common stock of the reorganized corporation, which will probably be without par value, share for share. The $25,000,000 of debentures, together with 250,000 shares of common stock, and also the $35,000,000 prior preference stock, are to be offered for subscription to existing stockholders.

The plan will be carried out under the supervision of a bank creditors' committee, composed of Robert C. Schaffner, Chicago, Illinois; John Sherwin, Cleveland, Ohio; and Ralph Van Vechten, Chicago, Illinois; a merchandise creditors' committee composed of W. E. Bruyn, New York City; F. L. Jenckes, Providence, Rhode Island; and Myron C. Taylor, New York City; a preferred stockholders' committee composed of George W. Crouse, Akron, Ohio; Reamy E. Field, Cincinnati, Ohio; Charles A. Morris, Cleveland, Ohio; A. H. Scoville, Cleveland, Ohio; and J. Herndon Smith, St. Louis, Missouri; and a common stockholders' committee composed of Fred S. Borton, Cleveland, Ohio; C. R. Erwin, Chicago, Illinois; E. E. Mack, Canton, Ohio; Russel L. Robinson, Akron, Ohio; and F. A. Seiberling, Akron, Ohio.

In order to satisfy those who are to furnish the new money and accept prior preference stock for existing indebtedness as to the future management of the company, provision satisfactory to the merchandise creditors' committee is to be made for the future election of directors.

The refinancing plan agreed upon is based upon a present debt, exclusive of interest, of $65,964,290 including bank indebtedness, merchandise indebtedness and contingent obligations. Present commitments for future deliveries of merchandise on which specifications and prices have been fixed total $54,959,503 of which $7,200,740 is for rubber, $5,664,000 is for cotton, $41,879,763 is for cotton fabric, and $215,000 is for other materials. The company's estimate for depreciation covered by commitments not heretofore written off is $18,247,000.

The approximate present capitalization of the company is $65,000,000 eight per cent preferred stock and $61,000,000 common stock. Treating the capital stock as a liability at its par value, the estimated deficit on December 31, 1920, exclusive of loss upon commitments for merchandise not yet delivered, was approximately $24,400,000. For indebtedness existing January 1, 1921, merchandise creditors will receive 125 per cent of the amount in prior preference stocks. For future commitments, that is after January 1, 1921, merchandise creditors will receive 75 per cent in cash, payable not later than the 10th of the month following shipment from American point of shipment, and 28 per cent of the amount in prior preference stock to be delivered upon the consummation of the plan of readjustment. Carrying charges with reference to such commitments will be paid in cash, but dividends accrued to date of delivery of materials on stock delivered against commitments will, when paid, be credited on such charges.

Contingent creditors holding obligations upon which the company is secondarily liable will receive certificates evidencing their rights. Upon the release of the company from its liability to such creditors there will be deposited with a trustee as security for the payment of such obligations—on or before April 1, 1922, if they mature prior to that date, or at maturity if they mature later—125 per cent of the principal amount thereof in prior preference stock, the holders of such obligations to have the option to exchange them at any time prior to maturity for the prior preference stock so deposited.

The negotiations leading up to the plan have developed a spirit of cooperation by all parties in interest to preserve the valuable good will which the company has built up through the excellence of its product and the efficiency of its sales organization. It is believed that if assented to by the creditors with substantial unanimity and by the requisite proportion of the stockholders, the plan will not only save the company from its present embarrassment, to the advantage of its creditors as well as itself, but will also put it upon a sound financial basis for future operations. The company has assurances from strong banking interests which it believes justify the expectation that if the necessary assents of creditors and stockholders are forthcoming the bonds and debentures can be underwritten and the plan consummated. Holders of a majority of the common stock and the largest creditors have already indicated their assent.

The proposed stockholders' meeting called for final authorization of this plan was again postponed from February 11 to March 4, owing to inability of the committees to complete arrangements for putting the plan into operation.

The loan of $18,825,000, which was arranged several months ago by a banking syndicate, headed by Goldman, Sachs & Co., for The Goodyear Tire & Rubber Co., and which matured on February 15, has been extended for thirty days, with an option for a further extension of sixty days.

FINANCIAL NOTES

PRELIMINARY REPORT OF THE UNITED STATES RUBBER CO.

Owing to the unusual prevailing business conditions the United States Rubber Co. has issued to stockholders a detailed preliminary statement in advance of the customary annual report in April, showing the volume of business and profits for the year 1920 and the position of the company at the close of that period. Net sales amounted to $255,744,685, an increase of $30,155,220 over 1919, the best previous year. Net profits were $21,275,524, equivalent, after preferred dividends, to $19.82 a share on the $81,000,000 common stock, against $17.59 a share in 1919 on the $72,000,000 common stock then outstanding.

The following table shows the principal items of the income accounts for 1919 and 1920:

	1920	1919
Net sales	$255,744,685	$225,589,465
Net income after depreciation and taxes	26,925,173	21,396,099
Interest	5,649,649	3,665,862
Net profits	21,275,524	17,730,237
Preferred dividends	*5,200,000	5,041,476
Subsidiary companies' dividends	18,718	19,567
Common dividends	*6,480,000	2,098,576
Surplus	9,576,806	10,570,618
Credit adjustments	460,258	108,506
Total profit and loss surplus	†53,247,227	52,310,263

*Including dividends payable January 31, 1921.
†After deduction of $9,000,000 stock dividend paid February 19, 1920.

Inventories have been written down $11,020,605, the reserves created in past years being adequate to effect this shrinkage without using any part of the income for 1920 for the purpose.

However, the directors will consider the advisability of appropriating to reserves a sum, not exceeding $6,000,000 from the net surplus for the year 1920.

A substantial part of the inventory shrinkage applies to cotton fabrics made to the company's own specifications and necessarily ordered well in advance. On the basis of fairly normal business all contract fabrics will soon be consumed. The company has had no forward contracts for crude rubber and has taken advantage of prevailing low market prices. At the close of the year there was on hand and subject to delivery about seven months' supply at an average cost of 26.79 cents per pound, making it unnecessary to write off anything on account of crude rubber. A short inventory position on all other materials and supplies has enabled taking advantage of declining prices, with the result that inventories are considered fair on the basis of the prevailing market. Discounts for prompt payment of purchase invoices have substantially exceeded the interest paid on current borrowing.

Chairman Samuel P. Colt points out that with the fall in prices of materials and supplies, inventories should come down and current borrowing be proportionately reduced. Operations for the year 1921 will obviously get the benefit of writing down inventories, and while, owing to general business conditions, the present outlook is not what it was a year ago, there are signs of improvement in trade, and considering the large and diversified product of the company it is believed that earnings will be satisfactory to stockholders. The larger part of the new construction laid out prior to 1920 has been completed and paid for so that no additional expansion of fixed properties will be necessary for some time.

The chief items of the preliminary general balance sheet as of December 31 for the years 1919 and 1920 are as follows:

	1920	1919
Current assets	$195.505.243	$161,875,05[illegible]
Total assets	389.245.980	319,534,204
Current liabilities	66.425,626	24,332.718
Total liabilities	153,452,426	92,139,718
Reserves	29,459.852	33.074,447
Capital stock	146,277,200	135,300,600
Surpluses	60,056,502	59,019.438
Total liabilities, reserves and capital	389,245.980	319.534.204

DIVIDENDS DECLARED

Company	Stock	Rate	Payable	Stock of Record
American Chicle Co.	Pfd.	1½% q.	Apr. 1	Mar. 19
Brunswick-Balke-Collender Co.	"A" Com.	1¾% q.	Feb. 15	Feb. 5
General Electric Co.	Com.	$2 q.	Apr. 15	Mar. 9
Goodrich, B. F. Co., The	Pfd.	1¾% q.	Apr. 1	Mar. 22
Hood Rubber Co.	Pfd.	1¾% q.	Mar. 1	Feb. 21
Miller Rubber Co., The	Pfd	2% q.	Mar. 1	Feb. 10
Rub-Tex Products, Inc.	Pfd.	7% an.	Feb. 1	......
Tyer Rubber Co.	Pfd.	$1.50 q.	Feb. 15	......

AKRON RUBBER STOCK QUOTATIONS

The following are closing quotations of February 17, supplied by The App-Hillman Co., Second National Building, Akron, Ohio:

	Bid	Asked
American R. & T. Co., com	40	65
Amazon Rubber Co., The	..	45
Firestone T. & R., Com	79	83
Firestone T. & R., 6% pfd	84	87
Firestone T. & R., 7% pfd	80	83
General T. & R. Co., The, com	180	205
General T. & R. Co., The, 7% pfd	80	85
Goodrich, B. F., The, com	39	39½
Goodrich, B. F., The, pfd	82	85
Goodrich, B. F., The, 5-yr. 7% notes	90	90¾
Goodyear T. & R. Co., The, com	13	13¾
Goodyear T. & R. Co., The, 7% pfd	30½	31
India T. & R. Co., com	100	130
India T. & R. Co., 7% pfd	..	80
Mason T. & R. Co., The, com	17	20
Mason T. & R. Co., The, 7% pfd	64	66
Marathon T. & R. Co., com	3	4
Miller Rubber Co., The, com	84	85
Miller Rubber Co., The, 8% pfd	86	87
Mohawk Rubber Co., The	140	152
Portage Rubber Co., The, com	17	19
Portage Rubber Co., The, 7% pfd	..	42
Republic Rubber, com	¾	1
Republic Rubber, 7% pfd	..	30
Republic Rubber, 8% pfd	9	11
Rubber Products Co., The	..	100
Star Rubber Co., com	..	100
Star Rubber Co., 8% pfd	.	100
Swinehart T. & R., com	30	40
Swinehart T. & R., 7% pfd	..	70
Phoenix Rubber Co., com	..	18
Phoenix Rubber Co., pfd	..	88
Standard Tire Co., com	..	100
Standard Tire Co., pfd	..	90

NEW YORK STOCK EXCHANGE QUOTATIONS

February 24, 1921

	High	Low	Last
Ajax Rubber Co., Inc	28½	25⅛	25½
The Fisk Rubber Co	14⅛	14	14
The B. F. Goodrich Co	36¼	34½	35⅞
The B. F. Goodrich Co., pfd	78	78	78
Kelly-Springfield Tire Co	44	39	39⅛
Kelly-Springfield Tire Co., pfd	..	..	..
Keystone T. & R. Co., Inc	15½	14⅞	15⅜
Lee R. & T. Corp	20¾	20¾	20¾
United States Rubber Co	68¼	65⅞	66⅛
United States Rubber Co., 1st pfd	..	..	..

NEW INCORPORATIONS

Acme Mfg. Corp., February 15, 1921 (New York), $15,000. L. B. Wishnevsky, 422 Lenox Road; L. N. Larson, 4814 New Utrecht avenue, both in Brooklyn; W. F. White, 250 West 103rd street, New York City—both in New York. To manufacture auto rims.

Armorcord Co., Inc., February 9, 1921 (Maine), $100,000. D. O. Campbell, president and treasurer; J. H. Hudson, clerk—both of Sangerville, Maine. Principal office, Sangerville, Maine. To manufacture and repair automobile tubes and tires.

Asiatic Rubber Import Corp., January 28, 1921 (New York), $25,000. A. Marcus, 912 Tiffany street; D. Kolkin, 943 East 179th street; J. Zalowitz, 35 Norfolk street—all of New York City.

Automobile Tire Co. of California, December 27, 1920 (California), $150,000. H. A. Demarest, Bryson Apts., 2701 Wilshire Blvd.; E. W. Demarest, 2806 Dalton avenue; J. A. Leuthold, 1232 West Fifth street—all of Los Angeles, California. Principal office, Los Angeles, California. To manufacture, buy, sell and deal in rubber tires and tubes, etc.

California Rubber Co., October 1, 1920 (California), $5,000,000. R. L. Brown, president; H. P. Adams, vice-president and treasurer; J. R. Jones, secretary; R. F. Boyles and A. E. Littler, directors—all of 2 Pine street, San Francisco, California. Principal office, Oceanic Building, 2 Pine street, San Francisco, California. To manufacture tubes, tires and rubber goods.

Camp Tire Co., Inc., February 1, 1921 (New York), $20,000. Geo. E., Harold H. and Genevieve H. Camp—all of Utica, New York. Principal office, Utica, New York.

Eagle Belting Corp., February 11, 1921 (New York), $150,000. J. H. Zimon, 749 Fillmore avenue; J. Pryzgucki, 261 Chandler street, both of Buffalo; S. Pryzimski, Post Office Box 478, N. Tonawanda—both in New York. Principal office, Buffalo, New York. To manufacture leather and rubber belting, etc.

Economy Tire Exchange, Inc., December 23, 1920 (New Jersey), $100,000. H. Cohen, 197 Livingston street; H. A. Harrison, 220 Weequahic avenue; H. Setten, 381 Peshine avenue—all of Newark, New Jersey. Principal office, 9-15 Clinton street, Newark, New Jersey. Agent in charge, M. Rashkes. To deal in tires and automobile accessories of every kind.

Ellicott Tire & Repair Co., Inc., February 3, 1921 (New York), $20,000. Leonard S. and W. Kenneth Allen, 320 Sumner street; T. R. Wheeler, 170 Anderson Place—both of Buffalo, New York. Principal office, Buffalo, New York. To repair automobile tires.

Eskridge Tire Co., October 18, 1920 (Maryland), $100,000. D. R. Eskridge; M. R. Robinson; J. Michaelson; F. Caplan. Principal office, 868 N. Howard street, Baltimore, Maryland. To purchase and sell tires of all kinds.

Hansen Wind Shield Cleaner Co., February 7, 1921 (New York), $300,000. H. P. Hansen; W. E. Caldwell; H. Bjornwaldo—all of 25 Park avenue, New York City.

Ibex Rubber Corp., February 7, 1921 (Delaware), $125,000. G. O. Smalley, Bound Brook; W. F. Jennings, Plainfield—both in New Jersey; H. J. Lindsley, Detroit, Michigan. To manufacture rubber and rubber products.

Lockwood Tire & Mfg. Corp., February 18, 1921 (Delaware), $2,500,000. O. M. Lockwood; H. J. Clay; R. Becker—all of Buffalo, New York. To manufacture tires.

Manhattan Tire Corp., February 3, 1921 (New York), $75,000. W. Beaney, 144 West 54th street; E. Antkes, 701 Seventh avenue; R. A. Wicksel, 15 East 40th street—all of New York City. To manufacture automobile tires.

Master-Craft Fountain Pen Corp., February 7, 1921 (New York), $250,000. M. E. and I. H. Heilbrun; A. A. Flescher—all of 59 Park Place, New York City. To manufacture fountain pens.

Nu-Air Tire & Rubber Corp., February 8, 1921 (Delaware), $1,000,000. T. L. Croteau; M. A. Bruce; S. E. Dill—all of Wilmington, Delaware. To manufacture tires.

O. C. T. Sectional Tire & Rubber Co., February 8, 1921 (Delaware), $1,000,000. J. B. O'Connor; L. T. Atwater; S. L. Carter—all of Kansas City, Missouri. To manufacture and sell pneumatic tires.

Philadelphia Vulcanizing Machine & Rubber Co., January 27, 1921 (Delaware), $50,000. R. Satterthwait; M. Daniel; M. Kosher—all of Philadelphia, Pennsylvania. To manufacture tires and tubes.

Red Raven Rubber Co., January 26, 1921 (New Jersey), $62,750. J. H. Dwork; A. Freedman; D. Feingold—all of 152-158 Sussex avenue, Newark, New Jersey. Principal office, 152-158 Sussex avenue, Newark, New Jersey. Agent in charge, J. H. Dwork. To manufacture, buy, sell, export all kinds of rubber tires and tubes, etc.

Watertown Steam Vulcanizing Works, Inc., February 11, 1921 (New York), $25,000. E. B. Salmon, Jr.; C. J. Grabosky; G. W. Fox—all of Syracuse, New York. Principal office, Watertown, New York. To repair tires.

Wids Co., The, January 20, 1921 (Massachusetts), $300,000. B. Sanderson; H. L. F. Kreger; R. B. Wigglesworth; W. S. Felton; B. Harwood; E. T. Connolly—all of 84 State street, Boston, Massachusetts. Principal office, Boston, Massachusetts. To manufacture and deal in rubber products, etc.

Wonder Garter Co., January 7, 1921 (Massachusetts), $100,000. J. J. Moore, Hingham; A. P. Watson, 105 Middle street, Braintree; J. Kelley, 342 Washington street, Weymouth—all in Massachusetts. To manufacture and deal in furnishing goods of all kinds including garters, supporters, elastic goods, webbing, etc.

PERSONAL MENTION

James Newton Gunn, president of the United States Tire Co., 1790 Broadway, New York City, has been elected president of the Lincoln Highway Association, to succeed F. A. Seiberling, recently resigned. As one of the directors and founders of the Lincoln Highway Association, Mr. Gunn has long been in close touch with the aims of the organization to stimulate interest in highway development. An "ideal section" somewhere along the highway will be constructed and maintained by the United States Rubber Co.

Louis V. Keeler, formerly with J. Frank Dunbar, is now with E. G. Curry & Co., Inc., crude rubber broker, Woolworth Building, New York City.

R. J. Firestone, whose connection with the rubber industry has made him well known throughout the country, has been elected a vice-president of the United States Motor Truck Co., Cincinnati, Ohio.

John J. Braham, Jr., Brooklyn, New York, formerly with the sales department of The Keystone Tire & Rubber Co., Inc., has become a member of the selling force and been elected a vice-president of the Delion Tire & Rubber Co., Baltimore, Md. He will have his headquarters at the company's branch at 203 West 72d street, New York City.

W. F. Roberson, for several years an instructor in the Miller School of Tire Repairing, Akron, Ohio, has been appointed manager of the Legion Schools Association, Brooklyn, New York.

E. H. Wilson, president of the Dural Rubber Corporation, Flemington, New Jersey, has been appointed representative of The Rubber Association of America on the Motor Vehicle Conference Committee for New Jersey.

A PROMINENT RUBBER COMPANY EXECUTIVE

John D. Carberry, assistant secretary and assistant treasurer of the United States Rubber Co., has been with that company since its organization in 1892, and his official connection with numerous subsidiary and other companies offers eloquent testimony to his marked ability as a corporation executive.

John D. Carberry

He was born in Troop, New York, on January 16, 1869, and received his education at the Port Byron Free School and Academy and Albany Business College, from which latter he graduated in 1889.

In 1890 he began his business career as a stenographer to Charles E. Bush, president of the First National Bank, Orwell, Vermont, and treasurer of the Ticonderoga Pulp & Paper Co. In 1892 he acted as secretary to the appraisement committee during the formation of the United States Rubber Co., and after the company was organized was employed as stenographer to the president and secretary. In 1903 he was elected assistant secretary of the company, which office he still holds. In 1907 he was elected secretary to the president, and in 1919 resigned this office to become assistant treasurer.

Mr. Carberry is also an officer or director in the following companies: American Commerce Co., American Dunlop Tire Co., Joseph Banigan Rubber Co., Eureka Fire Hose Manufacturing Co., G. & J. Tire Co., General Rubber Co., General Rubber Co. of Brazil, Goodyear's India Rubber Glove Manufacturing Co., Goodyear's Metallic Rubber Shoe Co., The Hartford Rubber Works Co., Hastings Wool Boot Co., India Rubber Co., Lycoming Rubber Co., Marvel Rubber Co., Meyer Rubber Co., Morgan & Wright, National India Rubber Co., Naugatuck Chemical Co., New Brunswick Rubber Co., Revere Rubber Co., Rubber Regenerating Co., Shoe Hardware Co., U. S. Rubber Export Co., Limited, United States Tire Co., Woonsocket Rubber Co., and ten lumber, water power and other development companies.

He is a member of the following clubs and societies: Crescent Athletic Club of Brooklyn, New York; New York Athletic Club; Lotus Club, New York; Brooklyn Institute of Arts and Sciences; Cayuga Society in New York; Champlain Association; Vermont Society in New York.

CLARENCE H. LOW—BONDS AND INVESTMENTS

Clarence H. Low, familiar in rubber circles as secretary of the United States Rubber Reclaiming Co., has recently retired from active connection with the rubber industry to associate himself with the bond and investment department of Halle & Stieglitz, 30 Broad street, New York City. Mr. Low will continue as a director of the United States Rubber Reclaiming Co. and of the Madison Tire & Rubber Co. He is also president of the National Chain Co., College Point, New York.

Clarence H. Low

Mr. Low is a native New Yorker, born in New York City in 1885. He spent three years in the banking house of Ladenburg, Thalmann & Co., the prominent Broad street financial concern, and in 1906 became interested in the rubber industry and entered the Buffalo factory of the New York Rubber Reclaiming Co., later becoming secretary of the company.

In social circles Mr. Low is a prominent and popular member of the Harmonie Club, the Sunningdale Country Club, the Uptown Club and the American Iron and Steel Institute. He goes in enthusiastically for athletics and is recognized as an expert tennis player and a clever boxer.

THE RUBBER TRADE IN THE EAST AND SOUTH

By Our Regular Correspondent

THE NEW YORK RUBBER COMPANY

The New York Rubber Co., 84-86 Reade street, New York City, is this year celebrating the seventieth anniversary of its corporate existence. The company was incorporated under the laws of the State of New York, August 9, 1851, by John Greacen, Jr., Benjamin Franklin Lee, and Charles Dutch. The familiar trade name "Wiccapee" has been used on its products since the incorporation of the company.

The New York Rubber Co., perhaps more than any other in the rubber industry, has what might be termed a solid organization. The office staff has seldom been changed except by the death of a member. At one time the combined service in the company of 13 employes and officials was 324 years. The New York offices have remained in the same location, 84 Reade street, for an unusually long period. The Chicago branch is located at 323-325 West Randolph street.

In 1858 William H. Acken became connected with the company and remained with it all the rest of his life. Within ten years after he became associated with the company he was appointed treasurer, and in 1883 succeeded to the presidency, which he held until his death, January 11, 1906. The office was then filled by John P. Rider, who had been successively secretary and vice-

president. Mr. Rider continued as chief executive until 1911, when he resigned because of advancing years. He was succeeded by John Acken, son of the former president, who still remains in office. Other officers are Henry Montgomery, vice-president and secretary, and Henry F. Hering, 2nd vice-president.

The factory of the New York Rubber Co. was located for many years at Matteawan, New York. In 1917 an addition to the plant was begun at Beacon, New York and in 1919 the mechanical goods department was removed from Matteawan to Beacon. There are few things in the way of rubber specialties that the company does not manufacture. Its factories are located in the heart of a hat manufacturing district and one of its specialties is the production of rubber bags, flanges and blocks for hat makers.

Plant of the New York Rubber Co., Beacon, New York

In 1917 the capital stock of the company was increased from $300,000 to $500,000 to meet the demands of constantly increasing business. The company has now arrived at the advanced age of three-score years and ten with more than youthful vigor and with prospects bright for an unlimited continuance of success.

NEW YORK NOTES

The New York offices of the Hope Webbing Co., Pawtucket, Rhode Island, manufacturers of narrow woven and braided fabrics, are located in the Fourth Avenue Building, 381 Fourth avenue, New York City, where it has on display practically all of its forty-six thousand patterns.

Guy H. Noble has been appointed assistant manager of the New York offices of the H. H. Robertson Co., Pittsburgh, Pennsylvania, which are located at 170 Broadway, New York City. The company manufactures Robertson's mineral rubber and hydrocarbons.

The Walker Webbing Co., with factories in Providence, Rhode Island, and Brockton, Massachusetts, has effected an important consolidation, succeeding DeGraff & Palmer, agents for a number of staple lines of notions, and combining the Townsend Braiding Co., Providence, and the Byron Braiding Co., Lowell, Massachusetts. Among the woven and braided fabrics manufactured in these mills are many different kinds of elastic webbings. The officers of the newly organized corporation are: J. Townsend Walker, president and treasurer; L. F. Howe, vice-president. The directors include: A. C. Weisker, general manager; J. T. Walker, L. F. Howe, F. E. Ringwald, A. L. Palmer, C. P. Holland, Joseph Elmes, Philip S. Mosher and Philip Rising. A. Lincoln Palmer and Frank J. Tynan will continue in charge of the Chicago and Boston offices, respectively. Arrangements to cover the Pacific Coast will be made later. The New York offices, through which correspondence and general direction and selling will be carried on, are at 881 Broadway.

The H. W. Johns-Manville Co., New York City, manufacturer of asbestos products, has changed its name to Johns-Manville, Inc.

The Star Suspender Co., maker of suspenders, garters, arm bands and hose supporters, whose home offices are located at 721-29 Arch street, Philadelphia, Pennsylvania, has opened an office at 256 Church street, New York City.

The recent annual meeting of the Syracuse Rubber Co., Inc., manufacturer of "Syra-Cord" tires, was held at the company's plant at Syracuse, New York. The following directors were elected: E. R. Caldwell, R. L. Caldwell, R. P. Byrne, Frank Shane, J. B. Losey, present general manager; F. G. Mauthe, sales manager, and K. D. Smith, general superintendent. The directors reelected E. R. Caldwell president. Reports by the different officers indicate that the company's technical position compares favorably with that of any other rubber company today, with prospects bright for the coming year and a fine lot of spring orders.

The National Association of Waste Material Dealers, Inc., will hold its annual meeting at the Hotel Astor, New York City, Wednesday, March 16, at 10 A. M. A meeting of the Scrap Rubber Division will be held at the hotel on March 14, at 11 A. M. On the evening of Tuesday, March 15, the eighth annual banquet of the association will be held. It is hoped that there will be a full attendance and members are urged to apply for reservations to the office of the secretary, Charles M. Haskins, Times building, New York City.

The *India Rubber Review*, Akron, Ohio, now has as Eastern manager, Theron R. Lyle, with offices at 23-25 East 26th street, New York City.

CONNECTICUT NOTES

The Kelley Tire & Rubber Co., New Haven, Conn., has changed its name to the Martin Tire & Rubber Co., Inc. The company has taken a contract from James Martin to manufacture Martin cord tires under his specifications. Mr. Martin has bought an active interest in the company and has been elected president to succeed Edward J. Kelley, who has resigned because of failing health. The new factory is expected to be in operation about March 1.

PENNSYLVANIA NOTES

The L. H. Gilmer Co., manufacturer of machinery belting and other woven products, whose main office and factory is located at Tacony, Philadelphia, has sold its plant at Allentown, Pennsylvania, and moved the machinery to its factory at North Wales, Pennsylvania, which has been expanded to accommodate the added equipment.

The Rubber Association of Philadelphia has elected the following officers for the ensuing year: president, William F. Metzger, Quaker City Rubber Co.; vice-president, C. D. Garretson, Electric Hose & Rubber Co.; treasurer, Jacob R. Baltz, William M. Moore Co., Inc.; secretary, Daniel P. Morgan, Trenton. The following were elected as additional members of the executive committee: F. L. Bacon, Gustin-Bacon Manufacturing Co., John Kearns, Lee Tire & Rubber Co.; A. B. Means, United States Rubber Co. of Pennsylvania; H. D. Worthington, Hewitt Rubber Co. of Pennsylvania. A drive is being made to secure new members, residents of Delaware and New Jersey being eligible as well as those connected with rubber companies in Pennsylvania.

S. L. Warner has resigned as vice-president and general manager of The National Tire & Rubber Co., East Palestine, Ohio, to accept an executive position with the Robinson Clay Products Co., Clearfield, Pennsylvania.

The officers of the Pennsylvania Rubber Co., Jeannette, Pennsylvania, elected at a recent meeting, are: Charles M. Du Puy, president; Seneca G. Lewis, vice-president and general manager; George W. Daum, assistant general manager; A. H. Price, treasurer; C. G. Morrill, assistant treasurer; George W. Shiveley, secretary; James Q. Goudie, general sales director; H. H. Salmon, purchasing agent. Herbert Du Puy is chairman of the board of directors.

SOUTHERN NOTES

The DuBois Rubber & Tube Co., Chattanooga, Tennessee, is erecting a two-story brick and steel tire plant, 80 by 160 feet, to cost in excess of $220,000, including machinery. A power house, 42 by 48 feet, will be erected, to be used for steam purposes only. The initial output will be 500 tires and 500 tubes per day. The general offices of the DuBois Rubber & Tube Co. are at 1121-23 Hamilton National Bank building, Chattanooga, and the officers include M. N. Whitaker, president; L. H. Lightfoot, vice-president; K. G. Whitaker, secretary and treasurer. W. L. McLane is production superintendent, and is in charge of erection of the plant and installation of machinery.

The Virginia Carolina Rubber Co., Richmond, Virginia, has increased its capital to $500,000, and has taken bids for the first unit of its new plant, comprising a one-story building, 50 by 245 feet. It will also erect a machine shop for general repair, manufacture of parts, and similar work.

The Cord Tire Corporation, Chester, West Virginia, has added E. H. Hall and M. Harrison to the directorate, which includes also I. E. Fair and the officers, J. D. Comstock, president; H. J. Powers, vice-president, and H. B. Woodbury, secretary and treasurer.

THE RUBBER TRADE IN NEW JERSEY

By Our Regular Correspondent

TRENTON NOTES

The rubber manufacturers of Trenton believe that the rubber business has reached its crisis and will begin to pick up in a short time. The Bergougnan Rubber Corporation has resumed operations and for the present a force of 125 hands is at work, the output being 75 per cent of normal. Expectations are that within a short time the present force will be increased to 200. The company has taken advantage of the suspension of activities by completing the erection of new buildings and installing the necessary machinery. The new building includes a modern cafeteria and other features contributing to the welfare of the employes.

The Grizzley Rubber Co., of which Richard R. Rogers, is the head, has opened an establishment on Perry street, Trenton. The company deals exclusively in Braender tires and tubes, having secured the South Jersey agency for these products. Mr. Rogers was for six years connected with the Empire Rubber & Tire Corporation in the compound department and as chief adjuster, and is well known in the tire industry.

John S. Broughton, president of the United & Globe Rubber Co., Trenton, was one of the prominent Masons to attend the institution of the new Forest of the Tall Cedars of Lebanon in New York recently. It was the first lodge of its kind to be instituted in New York state.

Charles E. Stokes, vice-president of the Home Rubber Co., Trenton, has disposed of his 100-acre farm and summer home at Trenton Junction, and will seek a summer home elsewhere.

Samuel H. Popkin, Trenton, has purchased a half interest in the Free Bridge Motor Co. garage and tire sales establishment at Morrisville, Pennsylvania.

The Woven Steel Hose & Rubber Co., Trenton, held its annual meeting on February 7 and reelected the following officers: John S. Broughton, president; Horace B. Tobin, vice-president; Karl G. Roebling, treasurer; H. B. Skellinger, secretary. Directors elected were: John S. Broughton, Horace B. Tobin, Karl G. Roebling, John H. Janeway and H. Albert Rogers.

E. B. McKay, formerly first vice-president of the Empire Tire & Rubber Corporation, Trenton, has been elected vice-president and general manager of the Inland Rubber Co., of Chicago, Illinois. Mr. McKay has been connected with the Inland Rubber Co., for the past year and a half. He has been identified with the rubber industry for twenty years and is also president and treasurer of the McKay-Grubb Rubber Co., of Minneapolis, Minnesota, jobbers in automobile parts and accessories throughout the Northwest.

Bruce Bedford, president of the Luzerne Rubber Co., Trenton, and Mrs. Bedford have gone to Bermuda, where they have taken a villa for the remainder of the winter season.

The Fay & Youngs Rubber Corporation, with offices at 36 Prince street, Trenton, has filed a certificate of dissolution in the office of the secretary of state at Trenton. Frederick H. Miller was the agent in charge of the company. The company was incorporated some time ago with $350,000 capital to manufacture druggists' sundries, etc., and purchased a plant in East Trenton. The incorporators were M. L. Youngs and C. L. Fay, of Mount Vernon, New York; F. H. Miller and A. H. Youngs, of Trenton. The company has a plant at Barberton, Ohio.

A drive is being made for members of the newly formed Rubber Association of Philadelphia, Pennsylvania. Any one directly engaged in the manufacture or distribution of rubber goods in the states of New Jersey, Pennsylvania and Delaware is eligible. Daniel P. Morgan, 1021 Filbert street, Philadelphia, is secretary.

MISCELLANEOUS NEW JERSEY NOTES

At a meeting of the stockholders of the F. A. Cigol Rubber Co., of Paterson, held nearly five years ago it was voted to increase the capitalization by issues of additional stock, both common and preferred. The meeting further voted to turn over to Mr. Cigol 12,940 shares of common, $10 par value, as consideration for the assignment by him to the corporation of certain patents and applications for letters patent covering processes for the manufacture of rubber toys, etc.

The preferred stock was to be taken by another concern which held stock in the Cigol company and was a creditor in the amount of $49,000. The money was paid in for the preferred stock and the corporation was set on its feet again. At the end of June, 1919, Mr. Cigol resigned from the presidency and management of the company and it was then found that the letters patent, the applications having been granted, had never been assigned by Cigol to the corporation. A Chancery Court action was instituted in the name of the company and resulted in a decree directing Cigol to assign the patents in dispute.

The Red Raven Rubber Co., of Newark, New Jersey, has been authorized to issue, without par value, 1,750 shares of common stock to sell at $35 each, and 1,500 shares of Class B common to sell at $1 each. The company was recently incorporated by Joseph H. Dwork, Anshel Freedman and David Feingold.

The Manufacturers' Engineering Co. has leased for a term of years a part of the building at 247 Sherman avenue, Newark, New Jersey, for the manufacture of a new style tire pump and a gasoline recording machine.

Judge Lynch, of the United States District Court, has granted the appointment of Francis L. Kohlman, of New York, as receiver in equity of the Rambler Tire & Rubber Co., a Delaware corporation with offices in New York, and said to have assets in Garfield, New Jersey. The complainant, Emma Nurnberg, of New York, claims a debt of $3,500 for money loaned to the company. The petition gives the assets as $60,699.41 and the liabilities as $28,873.73. The petition also alleges that the company has no working capital, and cannot raise money to pay off its employes or its creditors, several of whom are said to have started suits.

The Atlantic City Tire & Rubber Corporation, Atlantic City, New Jersey, is erecting a plant at Mediterranean and Drexel avenues, for the manufacture of tires. The first unit will be a one-story brick structure 168 feet long by 90 feet wide, and is expected to be ready for the installation of the machinery the latter part of April. The proposed output for the first year is 300 tires and tubes a day. The temporary offices and a demonstration room have been opened at Massachusetts avenue and the Boardwalk.

The officers of the company are: A. Lincoln Pearce, president; R. M. Pearce, vice-president, and William C. Little, secretary.

THE RUBBER TRADE IN RHODE ISLAND

By Our Regular Correspondent

The nearly 10,000 employes at the plants of the National India Rubber Co., at Bristol, and the Alice Mill of the Woonsocket Rubber Co., at Woonsocket, and the Millville Mill of the same concern at Millville—all of which are subsidiaries of the United States Rubber Co.—are anxiously awaiting some indication of improvement in business conditions which may bring about a complete resumption of operations at an early date. Announcement has been made that the shoe ("Keds") division at the plants will reopen on March 7. On February 9 announcement was made that the wire division, which had been shut down for several weeks, would resume operations on a limited schedule beginning February 14.

On the same day of the announcement of the resumption of the National plant at Bristol, notices were posted at the Alice Mill of the Woonsocket Rubber Co. that the plant would close February 19. The reason assigned for this suspension of operations is given by the management as the condition of orders. Employes to the number of nearly 1,100 are affected.

The American Wringer Co., the largest concern of its kind in the world, with a large manufacturing plant at Woonsocket, was placed in the hands of a temporary receiver on January 26 by a decree entered by Presiding Justice Willard B. Tanner of the Superior Court for Providence County, on petition of Sullivan Ballou, of Woonsocket, a stockholder and secretary of the corporation. Judge Tanner appointed the Industrial Trust Co., of Providence, of which Colonel Samuel P. Colt is chairman of the Board of directors, as temporary receiver to take charge of the effects of the company and to carry on the business. On February 2 the receivership was made permanent.

The petition for the appointment of a receiver alleged that the company was insolvent and unable to pay its debts and that a receiver was necessary to conserve the assets. Mr. Ballou, who filed the petition, stated that the action was taken for the purpose of protecting all the stockholders in a time of pressing obligations and of slow collections. He said that the proceedings would in no way affect the operation of the plant, which at normal time employs between 900 and 1,000 persons, and that the action was taken solely as a precautionary measure to avert difficulties which might be caused by pressing creditors.

Mr. Ballou also stated that the stock of the company, which is capitalized for $1,750,000, is largely owned in Rhode Island. Its 600 stockholders are mainly residents of Providence, Woonsocket and other Rhode Island towns with a few in adjoining communities in Massachusetts. The company closed its wringer department last November since which time it has been shut down, but the mechanical rubber roll department has been in operation and there are at the present time about 200 persons at work in that section of the plant.

The decree for the permanent receiver contains provision limiting the time for filing claims with the receiver to the period ending March 15. In addition to the usual powers of a receiver the court gives the Industrial Trust Co. authority to operate the plant, purchase supplies and materials, employ labor and to borrow money not to exceed $50,000. Notes may be given by the receiver from time to time, payable within sixty days and bearing interest at not more than 7 per cent. The holders of such receiver's notes are made preferred creditors under the provisions of the decree. The receiver is authorized to collect or compromise claims belonging to the corporation and to adjust or compromise claims against the company.

The American Wringer Co. was incorporated in 1889 and authorized to manufacture and deal in wringing machines. Its capital stock comprises 17,500 shares of $100 par value. Walter S. Ballou of Providence is president, J. F. Fletcher of New York is treasurer, while Sullivan Ballou of Woonsocket is secretary. The directors are: Walter S. Ballou, Robert J. Sullivan and Gilbert M. King of Providence, A. G. Beardsley, Jr., of Auburn, New York, J. F. Hemenway and John D. Aiken of New York City, and L. A. Milles of Middlefield, Connecticut.

At the Revere Rubber Co., Valley street, Providence, some of the departments are working on a shortened time schedule with a curtailed force. This is the situation principally in the tire section but in the departments producing medical supplies, household goods and other domestics they are not only operating full time schedules and forces but are running nights with many orders ahead.

To maintain the high standard of morale that has existed at the Revere plant, Franklin O. Kenyon, manager of the industrial relations department and a committee composed of workers from the various departments, has arranged a series of socials and dances to continue through the rest of the winter. The first of these was held in the cafeteria of the plant early in the past month and proved very successful. More than 200 factory and office workers were in attendance.

THE RUBBER TRADE IN MASSACHUSETTS

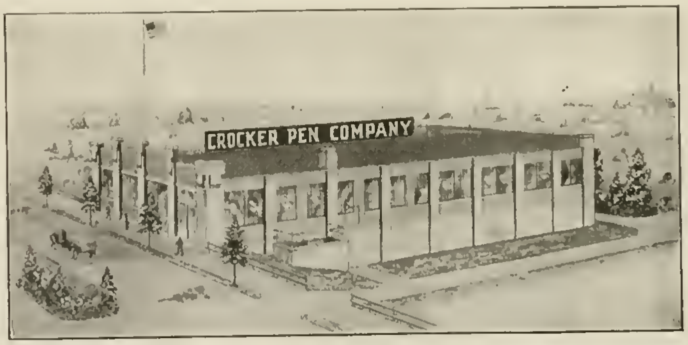
By Our Regular Correspondent

One man's meat is another man's poison, and so the continuance of an exceptionally open winter, which minimizes the demand for rubber footwear, is increasing the consumption of tires considerably. Tire dealers report that business is beginning to pick up. Consumption has exceeded production for several months past and the surplus of last September seems likely to be almost exhausted before the heavy buying days of the spring. The B. F. Goodrich Co. anticipates an actual shortage.

Owing to the unprecedented war demands and the extreme weather conditions of last year the footwear capacity of the industry has been absorbed in 1920 without undue accumulations of stock. A few light snows during the past month have materially increased footwear sales, but the movement of retail stocks has been greatly retarded during the past two months and the volume of business still continues below normal. All indications now point to a big canvas shoe season, and manufacturers are particularly anticipating an increased vogue for white sport oxfords on the part of both men and women. Factories are still operating on part time schedules, however.

MISCELLANEOUS MASSACHUSETTS NOTES

The Crocker Pen Co., Boston, has moved its general offices and factory to a newly erected building located on the Revere Beach Parkway in Everett, just north of Boston. This is the first factory to be built in this part of New England for the exclusive produc-



New Plant of the Crocker Pen Co., Everett, Near Boston, Massachusetts

tion of fountain pens. The company has expanded rapidly in its seven years of existence from desk room and a 1914 production of 10,000 pens to its present modern building with a capacity of 1,000,000 pens. The new structure is designed to carry two additional stories, which it is believed will be needed within a short time.

S. Jane Williams, of the Hood Rubber Co. forces, Watertown, is first vice-president of the New England Industrial Nurses' Association, an organization of 215 factory nurses with headquarters at 3 Joy street, Boston, where monthly meetings are held to keep members in touch with health work progress in other plants. The association was organized in 1915.

The American Tire Fabric Co., Newburyport, employing about 300 hands, shut down its mills for two weeks or more at the end of the first week in February.

The Panther Rubber Co., Stoughton, Massachusetts, announces the appointment of Dudley Freeman as general sales manager of its combined plants, which include besides the Stoughton branch, the Panther Rubber Co., Limited, Sherbrooke, Quebec, Canada, the Panco Rubber Co., Chelsea, Massachusetts, and the Puritan Rubber Manufacturing Co., Trenton, New Jersey. Mr. Freeman has been sales manager for the Canadian branch and has been very successful. He is a native of New York City and has made a specialty of marketing. He will make his home in Boston. The Panther Rubber Co., manufactures the Panther tread and several other brands of rubber heels, besides soles, soling mats, mechanical molded rubber goods, etc.

The Cambridge Rubber Co., Cambridge, Massachusetts, is now manufacturing a general line of rubber footwear in its recently completed footwear factory. For several years the company has been making a line of high-grade tennis shoes in addition to its canvas and rubber outing shoes, rubber clothing, fabrics, molded goods and rubber heels for manufacturers. E. W. Dunbar, formerly superintendent of the Apsley Rubber Co., Hudson, Massachusetts, and a specialist in footwear production, is now factory manager of the Cambridge Rubber Co. Mr. Dunbar's long experience has made him favorably known in the industry. The name "Cameo" identifies the Cambridge Rubber Co.'s products and is a synonym for quality among distributers of rubber merchandise everywhere.

Warren MacPherson, president of the Cambridge Rubber Co., Cambridge, Massachusetts, is on his way to the Northwest and the Pacific Coast, where he will call on the company's distributers.

F. H. Ayers, for the past four years sales manager for The Fisk Rubber Co., Chicopee Falls, Massachusetts, has been promoted to director of sales; William Wield, former assistant sales manager, has been advanced to sales manager. Other appointments include K. S. Chamberlain as manager of export sales and C. H. Gage and L. N. Southmayd as assistant sales managers.

PHENOMENAL GROWTH OF THE MEADE RUBBER CO.

The Meade Rubber Co. has recently completed a large three-story addition to its plant at Stoughton, Massachusetts, which increases its floor space from 26,000 square feet to 54,000 square feet, more than doubling capacity. The new factory addition is equipped with the latest type of machinery and has been running virtually full time through the present lull in business, manufacturing rubber heels, proofing, hospital sheeting, and rubber specialties for the shoe trade.

James Meade

James Meade, president of The Meade Rubber Co., is well known as a proofing expert and inventor of machines and processes peculiar to adhesive fabrics, including a multiple spreading and doubling apparatus, a process of making double texture fabrics, and a method of preparing and applying adhesive coats without solvents. Mr. Meade was formerly superintendent and vice-president of the Plymouth Rubber Co., but after that company's plant was removed to Canton, Massachusetts, he returned to Stoughton. In July, 1916, he established The Meade Rubber Co., which has been very successful and of phenomenal growth. For many months the company was working day and night to keep abreast of orders, which congestion resulted in the erection of the addition to its plant.

The Boston office of The Meade Rubber Co., located at 111 Lincoln street, is under the managership of Charles C. Dailey, for over ten years manager of the fabric department of the Seamans & Cobb Co., Boston. The New York office is located at 45 East 17th street, and is in charge of E. J. Hooper, formerly manager of the New York office of the Plymouth Rubber Co.

Plant of The Meade Rubber Co., Stoughton, Massachusetts

THE RUBBER TRADE IN OHIO

By Our Regular Correspondent

AKRON NOTES

The outstanding development in the rubber industry in Akron for the past month, or even the past year, is the completion of the refinancing of the Goodyear Tire & Rubber Co. and of plans to increase production at the plant to 18,000 tires a day.

Although many factors combine to add a better tone to the industry, the probability that the Goodyear company will soon be in a position to reshape its affairs for the best possible business not only caused the business men and bankers in the city to be enormously elated, but gave added confidence to the rubber industry in general.

The feeling prevailed that with eastern bankers ready to shoulder the troubles of the Goodyear company temporarily, the outlook for the rubber industry as a permanent proposition was given the approval of the best financial men in the country, and also showed that these men look upon Akron as the real heart of the rubber industry in the United States.

Although the revival of Akron may not be brought about as speedily as is hoped, yet the prospect that the Goodyear company will soon be standing with both feet on the ground, ready to go into the market to sell its output with all the energy which has always characterized the operations of the company, is regarded as the opening wedge for better business and it may be taken for granted that no opportunities to increase business will be overlooked by Akron factories.

Other signs of better business, if taken separately, do not look enormous but when added together indicate that the corner has been definitely turned and the uphill trail has been entered. Orders at every one of the larger rubber companies have increased from 10 to 60 per cent during the past month over the December business. Practically every rubber company has taken back some of its former employes, the lowest number taken back being 100 and the highest thus far reported is 2,000.

Indications are that the Goodyear Tire & Rubber Co. must go to 18,000 tires a day in the very near future if money is available for the increased payroll. Goodrich has gone to one ten-hour shift, Miller has gone to nine and one-half hours and indications are that Firestone will soon go to ten hours.

Besides the greatly increased number of orders from the dealers, automobile manufacturers, encouraged by the business done at the New York automobile show, have gotten in touch with the larger rubber companies and are talking contracts. Reports from all over the country show that the dealers' shelves and storerooms are bare, and the first buying in the Spring will find them short. Already several of the companies have been compelled to refuse orders for odd sizes because they were not in stock. The stocks in the factory warehouses have been worked off and orders in the future must be filled by the production departments.

This actual and anticipated increase in orders finds the rubber companies in an admirable position to take full advantage of the increased prosperity. Changes in operation, increased efficiency and decreases in overhead will not be lacking in the new scheme of things. It may be stated that when business is back at the new normal the working day in Akron will probably be ten hours, with the third shift a thing of the past. The third shift has been expensive because of the low efficiency of the average workman, but during the past it was a necessity.

The companies have written off large sums for inventory with large amounts of raw material on hand and if the crude rubber market and the fabric market take a turn upwards this year the earnings of the Akron companies will show up well as compared with the depreciated earnings of last year.

The failure on the part of two rubber companies during January is not looked upon as being significant because of the causes which led to their failure. Evidence produced in court tends to indicate that the Interlocking Cord Tire Co., of Mogadore, failed because of mismanagement. Four of the Interlocking officials have been indicted by the grand jury for violation of the Ohio "blue sky" law, but the creditors have joined the stockholders in plans looking towards the working out of the difficulties of the company and putting it back on its feet.

The Lanahan Rubber Co., Akron, a small concern, was obliged to go into receivership because of the lack of working capital.

The Oldfield Tire Co., formerly at Cleveland, Ohio, has removed to Akron. Dick Jemison has been appointed advertising and sales promotion manager and will direct an extensive advertising campaign in national publications, trade papers, farm journals, and newspapers and direct by mail in the near future. Mr. Jemison was for the last year in charge of sales promotion for The Miller Rubber Co., Akron. Barney Oldfield is president of the Oldfield Company.

L. Grant Hamilton, well known in automotive selling and advertising circles, has recently joined the staff of The Akron Advertising Agency Co., Akron, Ohio.

A handball game between Jacob Pfeiffer, vice-president of the Miller Rubber Co., and one of the employes featured the opening of a new gymnasium at the Miller plant. One large room in the factory has been fitted up as a gymnasium through the voluntary efforts of 150 operatives.

W. O'Neil of the General Tire & Rubber Co., has been elected president of the Ohio Savings & Trust Co. to succeed F. A. Seiberling, whose duties have become too heavy to continue as chief officer.

S. B. DeRachi, export manager of The Miller Rubber Co., has resigned to take a similar position with the Quaker City Rubber Co.

Closer cooperation between Akron rubber manufacturers and the foreign trade department of the government is forecast by the appointment of W. W. Hall, traffic commissioner of the Chamber of Commerce as Akron representative of the Foreign and Domestic Trade Bureau of the Department of Commerce.

William J. O'Neil, founder and president of the O'Neil Tire & Rubber Co., formerly with The B. F. Goodrich Co., died suddenly of apoplexy on February 10, while on the way to his office. He was one of the pioneers in the rubber industry in Akron.

AKRON'S 1920 BUSINESS

Fourteen Akron rubber companies during the year 1920 did a combined business of $544,729,000, according to figures compiled by the Akron Chamber of Commerce. The total capitalization of these companies is $309,037,922 and the total payroll amounted to more than $126,000,000.

This was the banner year against which much of the future business of the industry will be measured. The total business would have been nearly 50 per cent more than that of the previous year but for the curtailments in credits which seriously affected the industry the last half of the year. However, the increase in sales over 1919 was considerable. The following figures showing the capitalization, sales and payroll of practically the same industries for the past six years is an indication of the rapidity with which the rubber industry has developed:

	Capitalization	Value Products	Payroll
1914	$118,493,800	$93,980,000	....
1915	117,336,900	121,085.000	$19,154,887
1916	157,820,500	188,740,000	32,568,465
1917	165,871,986	279,883,054	56,860,640
1918	221,908,418	332,085,090	60,591,838
1919	227,119,275	427,796,317	101,178,591

Of the 1920 total, $504,872,639 was done by the Goodrich, Goodyear, Firestone and Miller companies.

During the past year the Firestone Tire & Rubber Co. led all other Akron companies in sales growth, jumping from $91,000,-

000 to almost $115,000,000, an increase of almost $24,000,000, or 26 per cent.

The Miller Rubber Co. sales show an increase of 21 per cent, advancing from $28,000,000 to more than $32,000,000 during the year.

The Goodyear Tire & Rubber Co. sales jumped from $169,-000,000 in 1919 to approximately $205,000,000 in 1920, being an increase of 20½ per cent, while The B. F. Goodrich Co. sales increased approximately $8,600,000, or 6 per cent during the year.

Firestone profits dwindled to $1,245,163 as compared with 1919 profits of $9,306,978 while Goodyear, instead of showing a profit of $23,272,245 as in 1919, faced a deficit of not less than $34,000-000. Goodrich with a smaller increase in sales than the other companies, will show a larger net profit, which is estimated at not more than $3,000,000 as compared with profits in 1919 amounting to $17,304,813. Miller profits will probably be well sheared down by the writing off of inventories.

CLEVELAND NOTES

A. E. Christensen has joined the organization of The Cleveland Rubber Mold Foundry & Machine Co., Cleveland, Ohio, and will have charge of production of the mold and core and rubber machinery departments. Mr. Christensen has held similar positions with the Bridgewater Machine Co., the Vulcan Welding & Machine Co., and The B. F. Goodrich Co., all of Akron, Ohio.

John P. Haney, for some time eastern district manager of United States Tire Co., with headquarters in Boston, has been promoted to branch manager at Cleveland, Ohio. Mr. Haney came to Boston as office manager some ten years ago, having formerly been identified with the Morgan & Wright interests.

The H. H. Robertson Co., Pittsburgh, Pennsylvania, has appointed Benton Hopkins manager of its Cleveland office in the Kirby Building. This office is operated as a part of the Pittsburgh district office in charge of William R. Frazier, district manager.

MISCELLANEOUS OHIO NOTES

The Allsteel Ridewell Tire & Rubber Co., Dayton, Ohio, was recently incorporated with a capitalization of $250,000 to manufacture the Huetter metallic steam bag for curing tires, described elsewhere in this issue. The officers and directors include Andrew Huetter, a former industrial engineer with The B. F. Goodrich Co. and the Firestone Tire & Rubber Co., Richard P. Burkhardt, George F. Kramer, A. J. Pocock, and Henry Knapp. The company has adopted the name "Artyr" to serve as a trade mark and a short company name as well. A new plant will be erected in Artyr Park, a suburb of Dayton, and work will shortly be started on ideal homes for employes as well as the new factory.

The general offices of The Columbia Tire & Rubber Co., maker of automobile and motorcycle tires and tubes and tire accessories, have been removed from Columbiana, Ohio, to 270 West Sixth street, Mansfield, Ohio.

The Ohio State Rubber Tire Co., Port Clinton, Ohio, has elected the following officers: president, Anthony Schroeder; vice-president, J. F. Langenau; treasurer, G. J. Daum; secretary, C. E. Gerner. The board of directors includes also F. P. Reichert and W. S. Lee.

The Electric Rubber Reclaiming Co., of Barberton, has been compelled to ask creditors to accept paper at 7 per cent because of the crude rubber market which made the reclaiming of rubber unprofitable. The company is now reorganizing for the manufacture of specialties. The reclaiming department is to be completely abandoned.

The Marathon Rubber Co., Cuyahoga Falls, reelected last year's officers for the ensuing year. W. H. Jenks remains president.

H. M. Cook has been appointed manager of the Columbus, Ohio, branch of the I. J. Cooper Rubber Co., Cincinnati, distributers of tires, accessories, batteries, vulcanizing equipment, etc.

THE RUBBER TRADE IN THE MID-WEST

MID-WEST RUBBER MANUFACTURERS' ASSOCIATION

THE regular monthly luncheon and meeting of the Mid-West Rubber Manufacturers' Association was held at the Chicago Athletic Association, February 15. A large number of the members were in attendance, and after the luncheon interesting remarks and suggestions were made by the following members:

Charles F. H. Johnson, Brighton Mills, Passaic, New Jersey, spoke on guaranteed mileage of tires. Thomas F. Whitehead, president of the National Tire Dealers' Association, Chicago, Illinois, made a suggestion that manufacturers should make and sell to dealers only standard make of tires, and junk the seconds, in order to prevent the "gyp" tire dealer from putting such defective tires on the market. S. P. Woodard, president of the Gillette Rubber Co., Eau Claire, Wisconsin, submitted a report of the meeting of the Committee on Cooperation, which was held previous to the regular meeting.

The above remarks and suggestions were listened to with great interest and appeared to meet the hearty approval of all present. A note of optimism was evident in what nearly all of the speakers said, the apparent feeling being that business in the tire industry was on a firmer basis and that demand was increasing among the dealers. It is believed by all those present that there will be a shortage of tires by mid-summer.

H. S. Vorhis has resigned as secretary and general manager, and C. S. Sutherland is acting general manager of the association.

MISCELLANEOUS MID-WESTERN NOTES

The Iowa branch of the Hood Rubber Products Co., Inc., has been moved from Davenport to 206-210 West Eleventh street, Des Moines, Iowa. A. J. Wylie, who has been manager of the Davenport branch will move to Des Moines and continue in charge.

The Rub-Tex Products, Inc., Indianapolis, Indiana, at its annual meeting of stockholders, January 10, 1921, elected the following officers: Edwin H. Emrick, president; L. E. Klug, vice-president in charge of production; George E. Goble, 2d vice-president; Everett L. Deupree, treasurer; Scott C. Legge, secretary and assistant treasurer. These officers also constitute the board of directors. The company specializes in mechanical and molded rubber goods. It was organized early in 1920, and purchased the machinery and equipment of the Everwear Rubber Company of Milwaukee, which it moved to Indianapolis in September, 1920.

L. A. Brown, formerly district manager for the United States Rubber Co., has been elected president of the Grand Rapids Tire & Rubber Corporation, of Grand Rapids, Michigan. Mr. Brown is well known among tire dealers and distributers, who will be interested to hear of his appointment. The plant of the Grand Rapids Tire & Rubber Corporation will be under production by April 1, 1921, and has a capacity of 1,000 tires and 5,000 heavy gray tubes a day. The company will manufacture cord tires exclusively, which it will market under the trade name "Corduroy Cord."

The receiver appointed by the Allen County Circuit Court, Fort Wayne, Indiana, for the Fort Wayne Tire & Rubber Manufacturing Co. has been removed by the United States Court, sitting in Indianapolis, on the ground that the appointment of the receiver was improvidently made, and the property was returned to the company. J. C. Brown and L. E. Kraft, former officers and directors of the company, have resigned, and Albert E. Thomas and C. M. Billings have been appointed to the board of directors. Plans have been formulated for financing the company through the stockholders, and the campaign is reported to be progressing very well. It is predicted that in a short time the company will be on a solid manufacturing basis.

E. B. McKay, formerly vice-president of the Empire Tire & Rubber Corporation, Trenton, New Jersey, has been elected vice-president and general manager of the Inland Rubber Co., 146 West Twenty-seventh street, Chicago, Illinois.

The Badger Raincoat Co., Port Washington, Wisconsin, reports business in a very good condition. Recently the company shipped a carload of raincoats.

C. W. Moon, formerly with the Detroit Steel Products Co., has been appointed manager of the Detroit branch of the H. H. Robertson Co., Pittsburgh, Pennsylvania.

The Miller Rubber Co., Akron, Ohio, has opened a direct factory tire branch at 2220 Farnum street, Omaha, Nebraska, with A. G. Wall as branch manager.

Hillis F. Hackedorn, formerly manager of the Detroit office of the H. H. Robertson Co., Pittsburgh, Pennsylvania, manufacturer of mineral rubber and hydrocarbons, has moved to Chicago, where he will have charge of that company's central district territory, including Indiana, Michigan, Wisconsin, Illinois, Missouri, Iowa, Minnesota, North and South Dakota, Nebraska, Kansas and parts of Ohio, Arkansas, Oklahoma and Ontario.

The Jeffery Manufacturing Co., Columbus, Ohio, has removed its Denver office from the First National Bank Building to 421 United States National Bank Building, Denver, Colorado.

The KeHawKe Manufacturing Co., 1006 West Lake street, Minneapolis, Minnesota, maker of the KeHawKe revolving tire spreader, is officered by J. Earle Kemp, president; D. W. Kemp, vice-president; P. E. Hawkinson, secretary.

The Burdick Tire & Rubber Co., 10 South La Salle street, Chicago, Illinois, is offering for sale to former stockholders a part of its preferred stock issue amounting to approximately $100,000. The company's new plant at Noblesville, Indiana, is expected to be ready for operation early in the spring and will manufacture Burdick "shingle" tires and automobile tubes. Officers of the company are H. G. Steinbrenner, president; F. E. Teachout, vice-president and general manager; H. P. Steinbrenner, secretary and treasurer.

The stockholders of W. H. Salisbury & Co., Chicago, Illinois, at their annual meeting February 8, reelected the following officers and directors to serve another year: M. B. Salisbury, president; H. H. Salisbury, vice-president; Richard H. Geier, secretary; L. H. Winne, J. C. Kettner, T. R. Claffy and George J. Holmes, directors. The company's new rubber mill in Chicago is now fully equipped and ready to take on increased volume of business in molded rubber goods, etc. The increase in the business done by the company in February was marked and would seem to indicate a revival of trade.

THE RUBBER TRADE ON THE PACIFIC COAST

By Our Regular Correspondent

As indicating what may be expected in tire replacements for 1921, it is stated that the automobile registrations in seven Pacific states show an increase for 1920 over 1919 of 26.6 per cent. The totals are: For 1919, 822,061; for 1920, 1,032,901.

Improving business conditions are reported by many of the leading rubber manufacturers and dealers on the Pacific slope. The United States Rubber Co. states that February business in its many lines has averaged well above that of the corresponding period in 1920 and the outlook, judging from orders and inquiries, is very encouraging for 1921.

Tire manufacturers and dealers have been preparing to contest a proposition made in the California state senate by Senator Walter Eden of Santa Ana for the imposition of a tax, graded according to size, on automobile tires to provide additional funds for the upkeep of the state highways.

LOS ANGELES NOTES

The E. M. Smith Co., 618 Clarence street, Los Angeles, has shipped to Colombia, South America, the first instalment of a carload of rubber and canvas belting to be used on oil-drilling machinery in the newly opened fields in the interior. The goods on reaching Cartagena will be transhipped by mule-back.

All departments are being operated well up to capacity at the West American Rubber Works, 400 Avenue 19, Los Angeles. The concern supplies considerable rubber goods for the oil fields of the Coast and Southwest, and also manufactures many patented specialties.

"A notable increase in orders," is the report made by Roy R. Meads, president and general manager of the Pacific Rubber Co., one of the largest tire distributers in Los Angeles, and which has several branches on the Pacific Coast.

A. F. Osterloh, vice-president and general manager of the Goodyear Tire & Rubber Company of California, has been appointed by Sylvester L. Weaver, president of the Los Angeles Chamber of Commerce, chairman of its Committee on Manufacturing. During his short residence in the California metropolis, Mr. Osterloh has taken an exceptionally active interest in the civic and commercial welfare of the city.

With the installation of delayed electric equipment, the new plant of the West Coast Asbestos Co. at Downey, a suburb of Los Angeles, was scheduled to start operations March 1. The concern, which will employ 100 men, reports large advance orders for asbestos brakes, clutch-blocks, facings, linings, and disks, belts, gaskets, and other asbestos textile goods. A large part of the orders is for export.

The Process Rubber Co., 5918 Hollywood Boulevard, Hollywood, Los Angeles, of which H. A. Schnelbach is manager, is a new concern which specializes in processing new and old tires with laboratory treatment of carcass and tread.

In a model adobe home at Larchmont avenue and Third street, Los Angeles, built and equipped at a cost of $85,000, one of the novelties is a kitchen floor covered with rubber tiling laid in continuous strips; also a sink drain board similarly covered. The tiling was made by the West American Rubber Works, of Los Angeles.

West Coast distributers of Brunswick tires report to the Pacific headquarters of the Brunswick-Balke-Collender Co. in Los Angeles that February sales are well abreast of those of last year, and that the outlook for 1921 business is very promising.

The Goodyear Tire & Rubber Co. of California has established a legal first aid department for its employes which is in charge of Walter I. Lyon, formerly deputy prosecuting attorney at Youngstown, Ohio.

J. A. Ankrom, of Los Angeles, who owns a large plantation adjacent to the Davao gulf in the Philippine Islands, and has been actively engaged in trade there for twenty-two years, is arranging with Los Angeles capitalists for extensive developments, largely in rubber growing, in the islands. Mr. Ankrom's plan contemplates a land grant from the Philippine Government similar to that obtained by the Southern Pacific Railway Co. and other such concerns in the United States, to alternate sections, and in which both Filipino and American capital would be employed

The Climax Rubber Co., Columbus, Ohio, has had a representative, Frank B. Thompson, looking over the Southern California territory with a view to establishing a Pacific Coast factory branch, probably in Los Angeles.

The National Airless Tire Co., Los Angeles, has bought a site for a factory in Norwalk, Los Angeles County, and will soon begin building. The Norwalk stockholders recently held a meeting and dinner, the presiding officer being A. D. Bradbeer, of Norwalk. The speakers were: C. H. Braden, secretary and manager; Reverend Horace E. Partridge, F. R. Bryant, O. A. Lane, president; C. F. Evans, treasurer, and Mayor O. C. Jones, of Buckeye Lake, Ohio.

The C. H. Rapp Tire Co., one of the largest concerns in its line in Los Angeles, has left its old stand at Broadway and Tenth street and joined the fast-growing automobile and tire colony centering about Pico and Figueroa streets.

NORTHWESTERN NOTES

Seattle tire dealers, who are members of the Seattle Automotive Trade Division, have elected C. C. "Cy" Miller chairman of the division; C. W. Sexsmith of the Metropolitan Tire Co., secretary; and A. T. Mapson, of the Tyre Shop, as representative on the trades council.

Rubber men on the Pacific Coast are much interested in plans being made by Lieutenant Colonel C. A. Sloane, U. S. A., of the Washington-Alaska Cable System, for a new high-speed duplex cable from Seattle to Sitka, Alaska, a distance of 1,000 miles, and thence to Dutch Harbor, Aleutian Islands, 1,000 miles more. The distance from this point to Yokohama is another 2,000 miles, and if the long-talked-of cable line from Seattle to Japan were thus hooked up, quick communication could readily be provided with the rubber shipping ports of the Far East. It is explained by the government expert that a cable could not be extended across the Pacific without some such system of relays.

The B. F. Goodrich Rubber Co., carrying out its recently adopted policy of selling to the trade only, has closed its uptown branch at 1522 Twelfth avenue, Seattle, where it has been established twelve years. This branch has been used for wholesale and retail business, and will henceforth, or until it can secure larger headquarters, maintain a general warehouse at King and Occidental streets.

Henry E. Schmidt, one of the foremost automobile men in Seattle, has taken an agency at 1529 Eleventh avenue for Hewitt tires and tubes.

L. E. Carpenter has been appointed by the Goodyear Tire & Rubber Company of California as district manager at Portland, Oregon. George Bellis has been made division manager in charge of mechanical goods sales.

SOUTHWESTERN NOTES

The Spreckels "Savage" Tire Co., San Diego, California, has announced promotions including Wayne Compton, formerly manager of sales to corporations, to assistant sales manager; George W. Greene from assistant superintendent to superintendent; and Ralph E. Brown from chemist to assistant superintendent. Reports from the company state that business is now beginning to feel the influence of the spring demand and that the prospects are bright for a healthy and reasonably rapid return to normal.

STATEMENT OF THE GOODYEAR TIRE & RUBBER COMPANY OF CALIFORNIA

The balance sheet of the Goodyear Tire & Rubber Company of California for the fiscal year ended October 31, 1920, shows an earned surplus of $568,654 before Federal taxes and dividends. Of this amount $500,128 was allowed by the Akron company out of profits of the territory from July 12 to November 1, 1919. The deduction of $635,000 is made for adjustment of inventories of raw materials and work in progress on a basis of rubber at 26 cents a pound and cotton at 60 cents a pound. Dividends paid during the year totaled $597,139, or $28,484 more than the earned surplus. The quarterly payment due January 1, 1921, was passed. Total assets and liabilities are $21,942,476.

THE AMES HOLDEN TIRE CO., LIMITED

The plant of the Ames Holden Tire Co., Limited, Kitchener, Ontario, Canada, is located in the heart of the business district of that city, having been built on the estate formerly owned by the late Crown Attorney. This property was one of the city's landmarks and its setting between well-kept lawns and luxuriant shrubs and trees affords a view not often enjoyed by industrial enterprises.

The factory building proper is two stories high, 90 feet wide by 400 feet long, with all footings, framing, etc., arranged for its expansion to six stories. It is a structural steel-frame building with red-facing brick exterior and has a floor space of 87,000 square feet.

The technical building, a one-story structure of construction similar to the factory building, with a floor area of 7,000 square feet, was built for the accommodation of the chemical and technical division where intensive research peculiar to tire manufacture takes place in a completely equipped laboratory. Quartered in this building as well is the engineering staff of the company, which is responsible for the factory construction, equipping and maintaining of the plant.

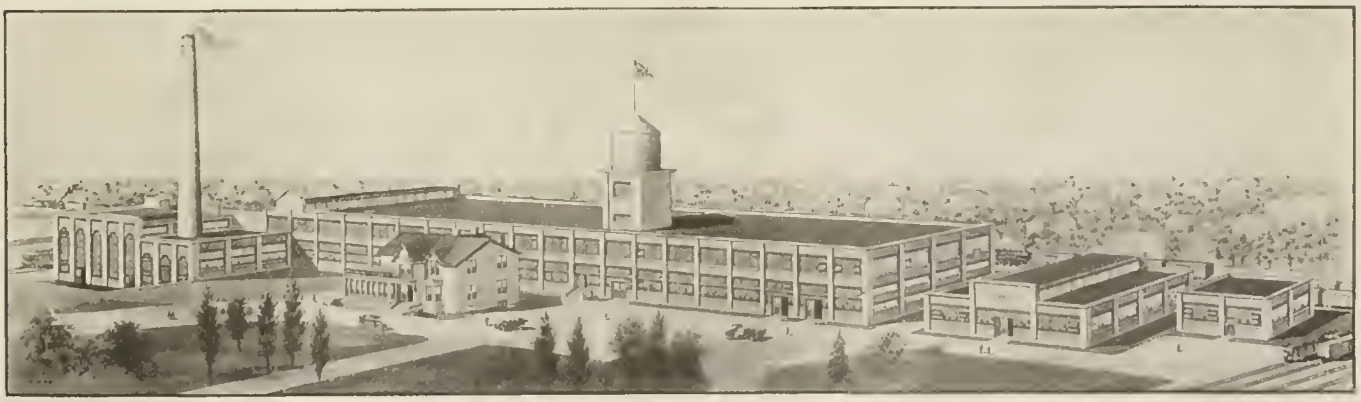
The power house at the south end of the factory is the last word in modern construction and efficient steam production. Hydro power is used as a prime mover throughout the factory.

The plant is well located with regard to railway facilities, the Grand Trunk Railway's main line abutting the property on the northeast, and the Canadian Pacific Railway paralleling the property on the south.

The ample grounds surrounding the plant will allow for considerable expansion. The present buildings when completed to six stories will have a capacity of 3,000 tires a day, and the property as laid out for future development will provide for at least 10,000 tires a day.

Ground was broken for the construction of the factory on July 16, 1919, and the first tire was manufactured on March 10, 1920, eight months and eighteen days from the inception of the work.

The company's product is sold by the Ames Holden McCready System, whose head offices are in Montreal, and which has branch sales warehouses all over Canada from Halifax to Vancouver. The executive and factory staffs of the Ames Holden companies are largely composed of men who were formerly the leading officials and department heads of the Canadian Consolidated Rubber Co., Limited, the Canadian organization of the United States Rubber Co.



Plant of Ames Holden Tire Co., Limited, Kitchener, Ontario, Canada

company's statement shows a net profit before inventory adjustments of $703,525 on a total net business of $16,230,986, which was an increase of approximately $1,242,000 over the business of the previous year for the same territory. From the net profit a

Activities of The Rubber Association of America

MEETINGS

EXECUTIVE COMMITTEE—TIRE MANUFACTURERS' DIVISION

A meeting of the Executive Committee of the Tire Manufacturers' Division was held in New York City, February 16 when important matters of interest to tire manufacturers were considered. The principal subjects related to the support tendered by the association to various roads organizations, and the adoption of a standard schedule of loads, tire carrying capacities, etc., for recommendation to legislatures contemplating the enactment of motor vehicle legislation.

The question of further standardization in the sizes of automobile tires emphasized the need for a technical committee which would have as its primary purpose the consideration of all tire standardization matters. A step in the right direction was taken by the appointment of a committee of five members of the Executive Committee to comprise a Technical Committee of the Tire Manufacturers' Division of the Association through which all standardization projects are to be progressed.

The "returned goods" problem, which is probably one of the most important now confronting the tire manufacturers of the country, was also the subject of a very interesting discussion.

CYCLE TIRE MANUFACTURERS' COMMITTEE

A meeting of the Cycle Tire Manufacturers' Committee of the Tire Manufacturers' Division was also held February 16 at the association offices. The recommended standardization of bicycle tire sizes submitted by the Cycle Trades of America, and the suggestion that statistics of the bicycle and motorcycle tire manufacturing industry be obtained in a similar manner to the Tire Manufacturers' Division of the Association with respect to the inventory, production and shipments, etc., of automobile tires and tubes, served as the main topics of discussion.

EXECUTIVE COMMITTEE—MECHANICAL GOODS DIVISION

A meeting of the Executive Committee of the Mechanical Rubber Goods Manufacturers' Division was held February 15 in New York City. Steps were taken to institute a plan for gathering statistics regarding the mechanical rubber goods manufacturing industry with respect to the inventory, production and shipments of various classes of mechanical rubber goods. Consideration was also given to the suggestion that standard equipment be prepared for repairing conveyor belts and for splicing small endless belts in the field, and as a result a committee, in conjunction with the Specification Committee, was appointed to investigate the possibilities in that drection, and to report later to the Executive Committee.

Another sub-committee was appointed having as its purpose the standardization of pulleys used in connection with rubber belting in so far as their installation, sizes, diameters, etc., are concerned, and with the cooperation of pulley manufacturers very interesting and practical results are anticipated.

EXECUTIVE COMMITTEE—FOREIGN TRADE DIVISION

The Executive Committee of the Foreign Trade Division met with the general manager and P. L. Palmerton, the newly appointed manager of the Association's Foreign Trade Bureau at its offices on February 17. A discussion of the contemplated activities of the bureau consumed practically the entire session.

BOARD OF DIRECTORS

A joint meeting of the Board of Directors and Executive Committee was held at the Union League Club, New York City, February 25. The docket was given over entirely to the recommended expansion of the Association's organization and activities.

TRAFFIC COMMITTEE

The Traffic Committee will meet at the association offices on March 2 and 3.

AN IMPORTANT MATTER—QUESTIONNAIRE NO. 104

New York, February 1, 1921.

To rubber manufacturers and reclaimers:

There is enclosed, in duplicate, Questionnaire No. 104 calling for statistics concerning the operations of your company during the second six months of the year 1920, with respect to the consumption of crude rubber, sales value of finished products, average daily number of employes and the production of reclaimed rubber.

We shall be very grateful for your assistance in the gathering of these data, and wish to direct your attention to the fact that the questionnaire should be returned to the Guaranty Trust Company on or before February 15, 1921.

We wish to mention the fact that it will be very helpful in compiling the totals if you can possibly insert separately the data requested under the specific items shown in Section V of the Questionnaire instead of showing, perhaps, only one or two totals for the whole.

A. L. Viles, General Manager.

CHANGES IN CONSOLIDATED FREIGHT CLASSIFICATION NO. 2

New York, February 7, 1921.

To Firm Members:

The Consolidated Freight Classification Committee has published Consolidated Freight Classification No. 2 effective April 1, 1921. Copies of this publication that contain ratings, descriptions or packages, specifications for containers and other rules governing acceptance of freight for transportation can be secured from R. C. Fyfe, chairman, Consolidated Freight Classification Committee, Transportation Building, Chicago, Illinois, at annual subscription rate of $2 per copy. This publication contains a number of changes in ratings of interest to the members; the nature of these changes follows:

Hose—Cotton, Linen, Leather or Rubber, Separate or Combined, With or Without Wire Reinforcement

The less than carload ratings on this commodity for application to and within western classification territory, when shipped in wrapped bales, bundles, or rolls or in crates, is reduced from first class to second class.

Leather—Artificial or Imitation, Including Coated Auto Top Material

The ratings applicable in western classification territory are reduced on less than carload shipments when in bales, boxes or wrapped bundles from first to second class and when in carloads in the packages named, ratings are reduced from third class to fourth class.

Packing

Ratings on less than carload shipments of asbestos packing compounded or reinforced, in bales, or burlapped rolls, or in barrels, or boxes, is reduced in western classification territory from first class to second class. Packing manufactured from rubber or gummed compound, in bales or burlapped rolls or in barrels, boxes or crates, less than carloads is reduced in western classification territory from first to second class and in carloads from third class to fourth class.

Tires, Rubber, Pneumatic

The most important change in the classification as affecting rubber manufactured products, is the granting of the application of the Traffic Committee of the Association for reduction in the carload ratings of pneumatic tires in carloads to and between points in western classification territory from second class to third class, with minimum carload weight of 20,000 pounds. The establishment of these reduced ratings on pneumatic tires places the ratings on the same basis throughout the United States.

Heretofore the classification provided that in order to secure first class rates on pneumatic tires in crates, in less than carloads, to and within western classification territory, it was necessary to line the crates with strawboard or pulpboard. This requirement has now been removed and on and after April 1, 1921, the first class rates will apply on tires shipped in unlined crates to and

within points in western classification territory, the same as applies in eastern and southern territory.

SOLID TIRES

Less than carload ratings on solid tires, in burlapped bales or burlapped bundles or burlapped reels, or on bundles enclosed in burlap-wrapped fibreboard or pulpboard containers or in boxes or crates, are increased from second class to first class in official classification territory, which is the territory applying east of the Mississippi and north of the Ohio and Potomac rivers.

A. L. VILES, General Manager.

MINNESOTA LEGISLATION REGARDING MARKING OF MERCHANDISE

NEW YORK, February 19, 1921.

To Rubber Manufacturers:

Our attention has been directed to a bill introduced in the Minnesota Legislature by representatives F. E. Miner (Minneapolis) and B. F. Keller (St. Paul) on February 8, to require the marking of merchandise with the manufacturer's cost, price at which sold by him, name and address of each distributor and the retail price of the article.

The impracticability and undesirability of such a condition as would be required by the proposed legislation is obvious, and it is suggested, in order to lend the influence of the rubber industry to the opposition which this bill will meet from other lines of business, that those of our members who are distributing merchandise in Minnesota arrange for the filing of a vigorous objection, by their representatives in that State, to the passage of the bill.

A. L. VILES, General Manager.

EXCISE TAXES REVISED

The Rubber Association of America, Inc., calls the attention of manufacturers of tires and tubes, rubber sundries, and mechanical rubber goods, in legislative bulletin No. 8, to some changes made in December, 1920, in the United States Treasury Department Regulations (47) concerning excise taxes on sales by manufacturers under Section 900 of the Revenue Act of 1918. These changes relate chiefly to sales for export which sales are free of taxes if the article be sold or leased for export and proof of such exportation be furnished by a manufacturer within six months from the time title passes or shipment is made. Articles Nos. 42 and 43 define in detail such tax exemption and describe the new certificates required where delivery of the article for export is to be made to the purchaser or his agent within the United States, as also certain changes in the "Proof of Exportation."

Copies of the revised regulations can be had from the United States Treasury Department, Washington, or from the nearest Federal revenue collector.

The Rubber Trade in Great Britain

By Our Regular Correspondent

THERE IS very little of a cheerful nature to discourse upon this month. Business generally remains in a moribund condition, a remark which applies with more force to many other industries than to rubber manufacture which, though depressed in some departments, continues to show decided activity in others. The sales of commodities of all kinds which were announced for January in order to reduce stocks and obtain much needed cash extended to almost all classes of rubber goods. Mackintoshes and rainproofs are offered at considerable reductions and I am informed by manufacturers that they are in most cases genuine bargains and not defective goods or goods made specially for sales as has sometimes been the practice in the past. It is doubtful, however, if the business done will be considered satisfactory because at a time when snow and frost are about, people are more attracted by the lowered prices of woolen goods, a woolen greatcoat ticketed at half the recently demanded price having a more potent influence upon the prospective purchaser than a mackintosh, however attractive the price.

WORKING HOURS REDUCED

Extended Christmas and New Year holidays have been the rule and even in the middle of January workrooms at factories where proofed cloth is made up into garments have remained closed, with no immediate prospect of reopening. Proofing works are not in such a bad condition and are running for three or four days a week, as a rule. Naturally, the recent wage cuts in America have attracted the attention of both employers and workpeople, though I have it authoritatively that there is immediate prospect of the example being followed in British rubber works. So far, the matter has not been considered but it is understood that reference will be made to the subject at the next meeting of the India Rubber Manufacturercs' Association.

MANUFACTURERS CHEERFUL

In the prevailing trade depression the manufacturer is apt to pull a long face and to indulge in public in gloomy prognostications of impending ruin but probably this is largely a pose. One rubber manufacturer who was working a very short week struck me as being quite cheerful under his afflictions though he was, as he said, losing money. But he went on to say that we all did very well during the war and can stand a period of depression. Among the factors which had served to keep up his spirits was the fact of having bought nine months' supply of raw rubber at 8½*d.* a pound. This was probably not the highest quality but it was the quality he wanted and which he had never expected to get at the price. Naturally with raw rubber at its present level the scrap merchants and reclaimers are finding difficulty in keeping up their sales. Reclaimed rubber, however, has its devotees who will not lightly give up its use, even if new rubber is about the same price and there is the disinclination to alter standard mixings for proved products. As far as I can judge it is the proofers who have ceased their orders for reclaimed rubber rather than the mechanical goods manufacturers, it being recognized that the present is a good time to get a reputation for a sound rubber proof now that rubber is cheap. The momentary loss to the reclaimer is also expected in the business of the substitute manufacturer who perforce has had to make considerable cuts in his prices, somewhat overdue, I may add, seeing the fall in the oil market.

THE DUNLOP COMPANY

At the time of writing the eagerly awaited Dunlop company report has not appeared though it is due in a day or two. The market in the shares has shown fluctuations, the new issued at 30*s.* and 22*s.* 6*d.* paid, having touched 4*s.* During the slump, there have been few issues of new capital, one of these being 250,000 ordinary shares of £1 each offered at 24*s.* by W. T. Henley's Telegraph Works Co., Limited, which holds the whole of £200,000 capital of Henley's Tyre & Rubber Co., Limited. The business both in the cable and rubber works has shown a progressive increase and the new capital is required to finance the increased business and to provide for additions to the works.

RUBBER MACHINISTS

Messrs. Stevensons of Canal Foundry, Preston, are now among those who announce themselves as makers of rubber machinery to the trade. The name of the firm may not be as familiar to many in the trade as it is to me. For well over thirty years they have made certain classes of machinery for a large rubber works and it is understood that similar machinery was not to be made for competing firms. What the present arrangement is I do not know; the old embargo may have been removed or it may still exist with the liberty to make other classes of machinery for all and sundry.

The business of Summerscales, Limited, Phœnix Foundry, Keighley, as far as the rubber machinery section is concerned, has been taken over by The Cherry Tree Machine Co., Limited, Cherry Tree, Blackburn. It is the intention of this company to continue the manufacture of rubber machinery from Summerscales' patterns and to continue to use the same registered names.

NEW FACTORY ACT REGULATIONS FOR THE RUBBER TRADE

Rubber manufacturers have recently received a draft copy of the proposed new regulations relating to the use of the cold cure process which supersede the special rules for the vulcanizing of rubber first established in 1898. In the course of last year legislation was passed entitled "Women and Young Persons (Employment in Lead Processes) Act 1920," and it is now proposed to apply this act to the rubber trade where "lead processes" are in use. The two sets of regulations are issued on the same sheet of paper and no definition is given of what is to be considered a "lead process" in a rubber works beyond that it is the weighing, manipulation, or other treatment of "lead material" which is defined as being any compound of lead or any batch of materials containing any such compound. Presumably, then, the lead process means the handling of litharge, white lead, or red lead in the compound room and the mixing or calendering of a batch of rubber containing any of these. This means that no female or boy under sixteen can be employed in the mixing or spreading department of a rubber works if there is litharge in a batch of rubber and as women are still to be found in these departments it rather looks as if they will have to be dismissed or the use of litharge abandoned.

I am not saying that no precautions ought to be taken in the use of lead compounds, as I have long been of opinion that too much laxity has prevailed in rubber works in this matter. In the covering letter sent out with draft of the new regulation from the Home Office reference is made to the cases of lead poisoning which have occurred from the use of lead compounds in certain processes. It would have been more satisfactory if more definite language had been used. I have no personal knowledge of cases of lead poisoning among rubber workers, but if such are known to the Home Office it would be useful to have them cited and let us know in what particular process of the manufacture they were incurred.

NEW AND OLD REGULATIONS COMPARED

The old regulations for cold cure had reference only to bisulphide of carbon and chloride of sulphur while the new include also benzene, tetrachloride of carbon, trichlorethylene and any other carbon chlorine compound or mixtures containing them. These carbon chlorine compounds, though not widely used as yet in the rubber trade, are now known to be powerful anesthetics. Where any of the above are used the process is known as a "fume process" and no person shall be employed at it for more than five hours a day nor for more than 2½ hours at a time without a rest interval of at least one hour. The scheduling of benzene as a fume process is quite a new thing and not really of much importance, as under ordinary conditions its use is very small. It is satisfactory to note that there is no reference to solvent naphtha as there has been a good deal of talk in Factory Act officialdom about classing it with benzene. The new rules state that where benzene, whether pure or in the form of commercial benzol, is used in the process of spreading in the manufacture of water-proof cloth or in the preparation of the dough for such spreading a mechanical exhaust draught shall not be required if a standard of general ventilation of 30 changes of the air of the room per hour is maintained during working hours. Probably in fear of a prosecution for having only 29 changes of air the management of a works will abjure benzol for tolnol or xylol and be free from care. Where a pressure system is used for the supply of fresh air to a room in which a "fume process" is carried on, the air supplied by such system must not enter the room at a velocity which exceeds 350 feet per minute.

With regard to boxing in the cold cure machines the regulations are much the same as before, while other rules relating to the provision of special mess rooms for workpeople eating on the premises will probably be complied with in the spirit by small firms by forbidding such workpeople to remain on the premises during meal hours. A month's grace has been given to the trade to enter protests against any of these new regulations.

BRITISH DUNLOP SECURES FINANCES

A cable report states that the Dunlop Rubber Co., Limited, has sought assistance from eastern bankers, through the British-Foreign and Colonial Corporation. The necessary credits have been arranged, pending a permanent form of financing. The crisis in the financial world has rendered the financing of the Dunlop American company impossible, so the English company has assumed the responsibility for it and the position of the English company has been safeguarded through the American company's assets.

FIFTH INTERNATIONAL RUBBER EXHIBITION

In connection with the Fifth International Rubber and Other Tropical Products Exhibition, to be held in London from June 3 to 17, 1921, the Rubber Growers' Association announces four competitions, as follows:

COMPETITION NO. 1

For the best commercial sample of plantation rubber taken from a consignment of not less than 50 cases, the consignment to contain the usual estate assortment of three grades as follows:

1. } 75 per cent { No. 1 sheet and/or crêpe.
2. } 25 per cent { Clean light brown crêpe from cup washings, lumps and anything not good enough for No. 1.
3. Light or dark brown crêpe.

Samples are to be about 6 pounds of each grade wharf-drawn in London. Marks will be equally divided between the three grades, and condition and general packing will be considered in making the awards. A separate set of awards will be made for rubber produced in each of the five following countries: Malaya, Ceylon, Netherlands, Indies, South India including Burma, and Borneo. The awards for each of the countries named include:

First Award—Gold medal and cup or prize.

Second Award—Silver medal and £15 cash.

Third Award—Bronze medal and £10 cash.

Additional prizes will be awarded according to the number of entries. Medals and diplomas go to the estate owner, cups and cash prizes to the manager in charge at the time the consignment was made.

In the Malaya section C. E. S. Baxendale offers a special prize for the best sample of scrap rubber, to be awarded to the factory superintendent responsible for its preparation.

COMPETITION NO. 2

For the best commercial sample of plantation rubber produced in countries other than those included in competition No. 1 medals and/or diplomas will be awarded according to the number of entries.

COMPETITION NO. 3

For the best exhibit of rubber flooring prepared either in blocks, tiles, linoleum or such form in which rubber constitutes a large part in its manufacture. Medals and/or diplomas will be awarded according to the number of entries.

COMPETITION NO. 4

For the exhibit composed of the greatest variety of articles made from rubber for commercial purposes, medals and/or diplomas will be awarded according to the number of entries.

Competitions No. 1 and No. 2 are open to proprietors, managers and persons in charge of rubber plantations and entries close April 15, 1921. Competitions No. 3 and No. 4 are open only to exhibitors in the manufacturers' section and entries close May 16, 1921. All entries should be addressed to the Awards Committee, the Rubber Growers' Association, Inc., 38 Eastcheap, London, E. C. 3, England, and marked "Exhibition—Competition—No.—."

In competitions No. 1 and No. 2 all samples, marked for exhibition and bearing the competition number, are to be sent, accompanied by wharf-drawn certificates, to the committee room of the Rubber Trade Association of London, 6 Mincing Lane, London, E.C., with country of origin and name of competitor on the back of the label. All exhibits of rubber must be delivered to H. Greville Montgomery in the competition section of the exhibition, Royal Agricultural Hall, London, N., not later than May 23. Full conditions of the competitions are obtainable of the Rubber Growers' Association.

RUBBER GIFTS FUND

As in 1914, there will be a rubber gifts fund, the proceeds to be used for such purposes as may help public objects and also serve as good propaganda for the industry. In 1914, 50,000 pounds of rubber and numerous cash donations were utilized to present rubber flooring to three hospitals and one church. Similar donations are now solicited. Ceylon planters are being asked for 10 cents per planted acre, the Ceylon Government having promised a grant equivalent to the total private subscription up to 25,000 rupees. A similar course may be taken in Malaya, as in 1914.

The Rubber Trade in Europe

By a Special Correspondent

FRANCE

Our French contemporary, *Le Caoutchouc et la Gutta-Percha*, publishes a letter from the Russian scientist, Professor Kondakow, well known among other things for his works in connection with synthetic rubber 20 years before the Germans did anything in this line. It appears that Russian scientists have suffered severely under the Bolshevist regime, the professor himself being obliged to seek refuge in Elva, Livonia. Their libraries, manuscripts and instruments have been destroyed or confiscated. In the letter mentioned above, Professor Kondakow appeals to publishers to send their journals and works to Russian scientists and scholars as was the custom before the war.

The rubber factory at Oullins, Rhône, belonging to M. Argand, has been sold to M. A. Grammont.

A new factory for rubber, Etablissements Beldam-Latty, has been started at 27, 29, 31 rue Ernest, Puteaux, Seine. It is capitalized at 1,600,000 francs and will manufacture high pressure asbestos packing.

It is reported that M. Rollin, owner of the rubber factory of Steinbach, is rebuilding his factory that had been completely destroyed by the Germans. The new factory is to be larger and up to date.

The Société Indo-Chinoise de Culture et de Commerce is a new corporation formed for the purpose of trading, importing and exporting all kinds of merchandise in Indo-China, particularly rubber. The plantation and preparation of rubber and other products will also be taken up. Headquarters are at Marseilles. The capital has been fixed at 200,000 francs. The first administrators are René Bertin, owner, and Marcel de Gosselin, both of Paris; Albert Bonniel and Gabriel Renoux, both of Marseilles.

Botti, des Michel, Pindilli et Cie is the name of a new firm established at Marseilles to manufacture rubber goods. The capital amounts to 200,000 francs.

The Société Française Industrielle du Caoutchouc, Paris, capital 300,000 francs, has just been dissolved.

BELGIUM

The National Rubber Co. has been formed at Brussels. The object is to manufacture and deal in all kinds of rubber goods. The concern is capitalized at 2,250,000 francs.

Fire broke out in the Brussels factory of the Société Anonyme pour le Commerce et l'Industrie du Caoutchouc. Only the department for seamless nipples was damaged, the rest of the building being quite untouched by the fire. The employes were able to leave the building without panic and only one man who was in the department where the fire broke out was slightly injured.

At Brussels a company named Société Internationale Pirelli has been formed. It has a capital of 400,000 francs and its object is to deal in all kinds of stocks, shares, obligations, to acquire and exploit patents, licenses and concessions; to form and direct companies and syndicates; to make all issues of titles, shares, parts and obligations. Chief consideration will be given to the manufacture and sale of rubber, gutta percha and asbestos articles, electric conductors and accessories. The company can exercise its activities in Belgium and other countries.

Some time ago the Belgian Government had its Hevea planting experiment station at Yangambi, Belgian Congo, inspected by M. Smekens, who had spent ten years in Malaya planting rubber. According to M. Smekens' report the plantation at Yangambi was properly clean weeded. The soil is suitable for *Hevea brasiliensis* and the 7 to 8-year-old trees at Yangambi have the same dimensions as similar trees in Malaya. The trees are planted at a distance of 7 meters, so that thinning is not yet necessary. However, it was advised to keep track of the different kinds of producers for future reference, when thinning out should be necessary. Some changes in tapping and methods of preparation were also advised.

HOLLAND

A rubber planting company known as the Rubber Cultuur Maatschappij "Kawi," has recently been registered at Amsterdam, Holland. The founders are O. van Vloten, Cultuur Maatschappij Waringin, Société Financière de Caoutchouc. It is capitalized at 750,000 guilders ($300,000). The directors are J. Gerritzen, Batavia; J. Pernotte, O. de Rivaud, M. de Rivaud, all of Paris; E. H. Winkelman and S. W. Senerijn, both of Amsterdam.

SPAIN

M. Robert Klein, a well-known rubber manufacturer of Barcelona, is reported to be planning the establishment of a second model factory at Segoria, Spain. It will be thoroughly up-to-date and will also have a chemical laboratory as well as one for physical and mechanical tests.

ITALY

The firm of F. Mencarelli, Rappresentance e Commissioni Commerciali, Turin, Italy, has undertaken the representation of several German concerns of rubber and allied articles for Italy and the Colonies.

GERMANY

A review of the German rubber industry during 1920 shows that the demand for most articles was comparatively strong at the beginning of the year. This demand slackened toward the summer months but in some articles, particularly surgical goods, there was a marked recovery at the end of the year. The chief difficulties were the high cost of raw materials, expensive labor, strikes and the coal shortage. Efforts have been made to bring

the quality of goods up to pre-war perfection and with success, it is reported. Much harm was done by unscrupulous manufacturers who sold the public underpriced goods made of war substitutes. This was particularly noticeable in the belting trade. Reputable business men and manufacturers are anxious about the underselling that is rife and as a protection the asbestos and surgical goods branches have organized with a view to fixing minimum prices and qualities. The general opinion is that the trade must for the present be content with small profits, while maintaining qualities as far as possible. It is of interest to note that many large firms are again sending out representatives to foreign countries in spite of the great expense involved. There is, however, general disappointment over the attitude, not only of erstwhile enemies, but also of some neutrals. Among the latter Sweden seems particularly determined to keep out German rubber manufactures so long as the low rate of the mark continues.

In spite of all difficulties, Germans are determined to recapture their former trade and are working energetically to this end. The *Gummi-Zeitung* says in an article on the importance of the export trade for Germany, "If we take pains to make good deliveries, give people their money's worth and satisfy our customers as we did before the war, then we will find that 'Made in Germany' will not be a hindrance, that rather 'Guaranteed German Make' will follow."

The German Reichstag has accepted trade agreements with Hungary, Czechoslovakia and Austria. The agreements made before the war will be annulled and replaced by reciprocal most-favored-nation covenants.

The local convention regarding tires has been prolonged to September 30, 1921. In October last it had been prolonged to February, 1921. After February, however, individual factories will no longer be bound by fixed prices. The obligation, from then on, will cover only conditions of sales and guaranties.

FOREIGN TARIFFS

SWEDEN

Among the articles of export from Sweden still subject to license are: Rubber, gutta percha and balata, not manufactured, also reclaimed rubber; rubber thread for the manufacture of elastic fabrics, ribbon and cord; rubber tires, solid, even if in lengths; inner tubes and outer covers and parts thereof of rubber, even in combination with other materials, for cycles, motor cycles, and motor cars; rubber boots and shoes; rubber waste and scrap.

GERMANY

According to the *Board of Trade Journal*, London, December 30, 1920, india rubber, gutta percha and balata, raw or purified, and waste, also waste wares of such materials, may be imported into Germany without license.

POLAND

The following articles may be imported into Poland without import permits, as announced in the Polish *Journal of Laws*, September 13, 1920: rubber, gutta percha and balata, crude, india rubber waste; india rubber, prepared soft and hard (ebonite); tissues impregnated with india rubber for card fillets; elastic ribbons and tapes, containing india rubber threads, for garters, braces, etc.; manufactures and half-finished articles of soft india rubber, except boots, webs not specially mentioned, clothing, braces, garters, balls and toys.

HOLLAND

A Ministerial Decision, dated November 29, 1920, permits free importation into the Netherlands of rubber yarns, consisting of very thin quadrilateral rubber strips used for the manufacture of elastic ribbons.

BRITISH HONDURAS

According to the Customs and Excise Duties Ordinance No. 33 of 1920, dated October 12, 1920, imports into British Honduras of india rubber and gutta percha manufactures are subject to 15 per cent tax *ad valorem;* if the goods are of British manufacture, they are admitted under the "British Preferential Tariff" of 10 per cent *ad valorem,* but goods must show such proof of origin as may be prescribed by the Governor-in-Council from time to time.

THE RUBBER TRADE IN THE FAR EAST

By A Special Correspondent

MALAYA

Some months ago it was suggested in certain quarters that the local government should buy up rubber at a certain fixed price in order to save the rubber industry. For a while after nothing was heard of this, but lately people are talking about it again and appear to think that because the Federated Malay States Government has decided to buy tin at a fixed price, it will do the same for rubber.

As the *Malayan Tin & Rubber Journal* rightly points out, a policy that might be successful with regard to tin, would certainly prove a failure in the case of rubber. Rubber cannot be stored indefinitely without deteriorating and the Government would before long have to sell it to avoid heavy loss. The result of this release of large quantities of rubber would be that prices, which in the meantime may have risen, would experience a heavy drop and conditions would be the same as they are now, if not worse.

It has been suggested that a loan to planters would be of more real help and the question is raised, why a committee such as has been formed in Ceylon to represent before the Government the interests of planters, could not be appointed in Malaya to act in a similar capacity.

It is reported that the General Committee of the Singapore Rubber Association is considering a scheme for the establishment of a central godown, to which all rubber that the sellers desire to have awarded will be sent. Samples will be taken by an official and for those worthy of award, a kind of certificate will be given stating the nature of the rubber, the quantity, etc. This certificate will be sold as representing the rubber, payment to be made within a few days of the sale. This certificate can be resold until it reaches the party who wishes to ship the rubber, payment in each case being made within a given time. It seems there will be a limit to the number of buyers of a certificate, probably six. It is felt that such a measure, if actually carried out, would be very useful: first, insuring the last buyer against inferior goods; second, enabling an estate to receive payment quickly; third, cutting out much undesirable speculation.

A certain Dr. Braddon has written a long letter to a local paper in which he unfolds an ingenious scheme for bringing back the good old days of 100 and 200 per cent dividends. His plan is that producers, dealers, and brokers would form a combine with a capital of £30,000,000. This combine would buy up rubber at an agreed on all-in cost of 1*s.* 6*d.* per pound which would then be sold to buyers at 4*s.* 6*d.* per pound. The 3*s.* thus gained over an already exaggerated cost would be equally divided among producers and shareholders. The Government would aid by refusing to alienate further land for rubber and would get the governments of other rubber producing countries to do likewise. Of all the schemes hatched out in these feverish times, this one is certainly best calculated to meet the unanimous approval of the rubber producer and shareholder.

THE NETHERLANDS EAST INDIES

In spite of protests it seems that the new taxes will go through. Export duties on most products are to be levied for a period of three years. In the case of rubber the taxes will be on a sliding scale and levied as follows, on an average market price of:

Gilders 0.82½—0.90	tax ¼%	Gilders 1.10—1.20	tax 3%
Gilders 0.90 —1.00	tax 1%	Over 1.20	tax 4%
Gilders 1.00 —1.10	tax 2%		

So-called slab rubber will be subject to a reduction of 12 per cent.

A more comprehensive extension of the income tax than that already proposed will come into operation.

The tax on the net profits of corporations will be raised from 4 to 6 per cent. An excess profits tax of 6 per cent will be levied on that part of the income that is higher than 10 per cent of the paid up capital.

The Batavia freight conference has fixed the rate for rubber at 60 gilders per cubic meter.

Official reports show that the western division of Dutch Borneo, during the first half of 1920, exported 83,430 kilos of plantation rubber and 1,149,393 kilos of wild rubber. The exports of gutta percha, gutta jelutong and gutta hangkang were respectively 21,445 kilos, 371,216 kilos and 350,156 kilos.

The prices obtained during this period were subject to a good deal of fluctuation. Thus the highest price for gutta merah I, in January was 450 gilders per picul (133⅓ pounds), and the lowest 400 gilders; but in March, the figures were 600 and 250 gilders. Gutta merah II brought 200-150 gilders in January. Gutta jelutong reached as high as 18 gilders a picul in January and March but fell to 7.50 gilders in June. The highest price for rubber was obtained in March and stood at 135 gilders a picul. In January the range had been 130-100 gilders.

MALAYA CANNOT UNDERSTAND AMERICA'S POSITION[1]

It is almost impossible to make even the most enlightened Chinese and native rubber traders of the Malayan Peninsula understand America and the American conditions. They cannot visualize the United States as anything but a land where everyone is rich and prosperous and where financial conditions are always on the top wave. They do not understand, as we do, what is meant by inflation of credits—or deflation. They see no reason why there should be any need of deflation in a land like ours. They imagine the Yankee is depressing the rubber market for artificial reasons rather than for reasons based upon sound economics.

"Rubber is worth more than it is fetching in the market. That proposition cannot seriously be disputed. At a time when profiteering and hard economic facts combined have boosted the prices of most other things, Malaya's chief export is undergoing a period of severe depression," complains the *Straits Echo* of Penang, voicing the general sentiment of the Peninsula. "Many well managed estates are unable to pay reasonable dividends to their shareholders." Forgetting the fact that all industry is now suffering from severe depression from which the United States is by no means exempt, the impression prevails in Malaya that the world has treated it badly; that rubber growers have not learned the art of profiteering while others have, and are practicing it to the limit. Malayans do not wish to be invested with halos, however, and declare themselves willing enough to take big prices for their rubber if they can get them and they think they might, were they not so absorbed in growing it that they are blind to the obvious means of securing redress from their real or fancied grievances.

"However, the price of the commodity may drop," still further complains the *Echo*, "there is no lessening of the retail cost of rubber tires, water-bottles or tennis shoes. But the man who gets most of the consumer's money is not the producer, who is entitled to it if anyone is, but the manufacturer. He waxes wealthy whilst men toil and sweat beneath the tropical sun to provide him with the substance of his wealth. Your manufacturer is a wily bird, especially if he is an American. He collects a few other manufacturers and, after due cogitation, they form a combine of water-tight qualities. In various ways, some devious, others delightfully plain and unabashed, the combine decides what the price of rubber shall be. The producer lashes himself into a fury and cries out to Heaven for help."

The *Echo* is quoted quite extensively because that journal seems to voice the general feeling held in certain quarters thereabouts—a feeling that, because of its manifest unfairness, should be the business of every American to dispel in every possible way. Friction of this kind is not beneficial to good business relations.

THE WAY OUT

When there is a decline in the demand for manufactured goods amounting to a practical cessation of buying on the part of the public, it can hardly be expected that manufacturers will continue to buy the raw product from which their manufactured goods are made. This is a condition existing in America that the Malayan producer should see and recognize. It cannot be expected that the manufacturer will finance the producer by continuing to buy a raw product for which he has no immediate use, even if it is cheap—all the more so if his warehouses are crammed to capacity, not only with a surplus of the raw product, but with his own manufactured goods as well.

The manufacturer has his remedy, which, in part, will reduce his losses to a minimum. He can close down his mills, in whole or in part, and hope for better times, pocketing his "overhead" loss with as good grace as he can muster.

The only logical way in which the producer can get square with the game is to work for better prices and demand through curtailed production, just as the manufacturers do. A similar condition is seen with the cotton producers of the United States who are doing that very thing. Before now the planters of rubber of Malaya, the Netherlands, and Ceylon have been urged to cooperate for the protection of their mutual interests by systematic curtailment of production. Of those who cavalierly declare that the idea of the Rubber Growers' Association is impracticable, it can only be asked, "Has it ever been really tried? Is it not yet too early to condemn it?" With a common understanding and a common policy, a very strong position might be created. Sundry experts estimate that all will be well with rubber in three or four years' time—in fact, that there will be a shortage. But in the meantime it is, with the producer just the same, if he only knew it, as with the manufacturer—a case of the survival of the fittest.

[1]By Richard Hoadley Tingley, New York City.

FOREIGN TRADE FINANCING CORPORATION

Under the provisions of the Federal Reserve Act there has recently been organized the Foreign Trade Financing Corporation, backed by the business men, bankers, manufacturers and other producers of the country, to extend long term credits to foreign buyers of American goods and thus break the threatened paralysis of our international trade. Under the law it may also invest in securities, purchase bills of exchange, engage in foreign banking, and may further, with the approval of the Federal Reserve Board, issue and sell to the investing public its own notes and debentures to an aggregate amount of ten times its paid up capital and surplus. It may not engage in the general business of buying or selling goods or commodities in the United States, nor engage in domestic banking, except such as in the judgment of the Federal Reserve Board may be incidental to its international or foreign business.

The corporation is designed not only to offer a sound investment but also to render a much needed public service. It will seek to keep its loans and investments highly diversified among many countries and in a large variety of enterprises. The corporation will have a fully subscribed capital of $100,000,000 and a surplus of $5,000,000. Subscriptions to the stock are being received at the rate of $105 per share.

The presidency has been tendered to W. P. G. Harding, governor of the Federal Reserve Board. The board of directors of the corporation will consist of not less than thirty-six, nor more than sixty members, and will be representative of the sections of the country as represented by the twelve Federal Reserve Districts. The principal industries of the country, such as agriculture, manufacture and banking, will have places on the board.

Recent Patents Relating to Rubber

THE UNITED STATES

GRANTED JANUARY 4, 1921

No. 1,364,104 Gas mask. W. C. Geer, Akron, O., assignor to The B. F. Goodrich Co., New York City.
1,364,141 Hose nozzle. L. H. Reams, Council Bluffs, Iowa.
1,364,219 Tractor tread with resilient tire for vehicle wheels. L. S. Szumkowski, assignor to Ursus Motor Co.—both of Chicago, Ill.
1,364,226 Shoe ventilator. J. A. Wherry, New Orleans, La.
1,364,250 Outsole of vulcanized fibrous composition. F. H. Clapp, Melrose, Mass.
1,364,275 Inflatable flotation device. V. Guinzburg, assignor to I. B. Kleinert Rubber Co.—both of New York City. (See description elsewhere in this issue.)
1,364,276 Dress Skirt Shield. S. C. Hannaford, Cincinnati, O.
1,364,300 Tire alarm. J. E. Parr, Crystal City, Manitoba, Can.
1,364,429 Abrading element for tire patch containers. J. E. Duffy, Dallas, Tex.
1,364,447 Blow out shoe for inner tubes. L. R. Moore, Dallas, Tex.
1,364,469 Storage battery container with hard rubber jar. J. L. Woodbridge, Philadelphia, Pa.
1,364,515 Demountable rim for tires. C. D. Paxson, Cleveland, O.
1,364,528 Supplemental waterproof and non-slippable tap-sole for shoes. M. Snider, Philadelphia, Pa.
1,364,576 Golf ball structure and method of manufacture. A. J. Musselman, Chicago, Ill.
1,364,583 Revoluble resilient heel-tread. H. W. Rogers, New York City, assignor to the Rogers Rubber Co., Westminster, Md.
1,364,596 Pneumatically reinforced casing for aeronautic carriers. N. B. Wales, assignor to Wales Pneumatic Parachute Corporation—both of New York City.
1,364,646 Air-bag and salvage method for raising sunken vessels and other objects. A. Ryan, Oldham, assignor to Vickers limited, Westminster, London—both in England.
1,364,691 Isolating listening apparatus with pneumatic cushions. Andre Bloch, Paris, France.
1,364,746 Garment supporter. E. F. Goodman, New York City.
1,364,758 Pneumatic and solid tire. F. Hickman, assignor of one-half to Bound Brook Oil-less Bearing Co.—both of Bound Brook, N. J.
1,364,790 Airless tire. F. E. Nelson, Chicago, Ill.
1,364,806 Typewriter eraser attachment. W. D. Reid, Brooklyn, N. Y.
1,364,818 Reinforced waterproof fabric for sanitary garments. G. B. Smith, Philadelphia, Pa.

GRANTED JANUARY 11, 1921

1,364,870 Cord tire. R. Ehle, Council Bluffs, Iowa.
1,364,888 Garter. G. Rottman, New York City.
1,364,928 Reinforcement for tire casings. W. S. Gauntt, St. Louis, and B. B. Morris, Kansas City—both in Mo.
1,364,930 Sectional pneumatic tire. R. W. Goodhart, Pensacola, Fla.
1,364,931 Pneumatic tire. R. W. Goodhart, Pensacola, Fla.
1,364,935 Collapsible rim for tires. E. A. Jones Los Angeles, Calif.
1,364,971 Elastic brush pad comprising two rubber sheets vulcanized into an integral body of flexible rubber, vulcanized to a greater degree on one side than on the other, and bristles embedded in and projecting from the more highly vulcanized side. M. W. Alexander, Albany, assignor by mesne assignments to Henry L. Hughes Co., Inc., New York—both in N. Y.
1,365,057 Vehicle wheel tire. W. H. Northall, assignor of one-fourth each to S. C. James and H. Males—all of Evansville, Ind.
1,365,076 Tire construction. O. H. P. S. Anderson, Los Angeles, Calif.
1,365,131 Fountain pen. H. J. Upton, West Medford, Mass.
1,365,151 Packing joint for tire valve. W. B. Burke, Cleveland, Ohio, assignor to A. Schrader's Son, Inc., Brooklyn, N. Y. (Original application divided.)
1,365,191 Fountain pen. R. E. Perkins, Joplin, Mo.
1,365,243 Tire for motor cars and other vehicles. W. Heggie, Dublin, Ireland.
1,365,280 Tire casing. Abraham Sacks, Brooklyn, N. Y.
1,365,313 Toilet cabinet for syringe bag and fittings. R. S. C. Fow, assignor to C. W. Schaffer, Jr.—both of Philadelphia, Pa.
1,365,350 Reinforced vehicle tire. T. Sloper, Devizes, England.
1,365,366 Calendar cap attachment for fountain pens. C. F. Ashby, Chicago, Ill.
1,365,375 Tire deflation indicator. E. O. Carvin, Alleghany, Calif.
1,365,391 Windshield cleaner. W. M. Folberth, Cleveland, O.
1,365,425 Soundproof shield for telephone receiver. W. A. Skewhart, Brooklyn, assignor to Western Electric Co., Inc., New York—both in N. Y.
1,365,452 Disk wheel for pneumatic tires. T. C. Burns and F. K. Huffman, assignors to Hayes Wheel Co.—all of Jackson, Mich.
1,365,459 Pneumatic blower device. P. Comma, Aptos, Calif.
1,365,460 Exercising apparatus. J. J. Cooper, Stamford, Conn.
1,365,463 Fountain pen with indicator. A. O. Dahlberg, Ann Arbor, Mich., assignor to W. Zeiss, Chicago, Ill.
1,365,539 Vehicle tire. J. W. Pepple, San Antonio, Tex., assignor of one-tenth to J. J. Rowe, Akron, O.
1,365,555 Demountable rim for tires. J. Sieven, Brooklyn, N. Y.
1,365,606 Pneumatic roll comprising a mandrel or core, an air tight flexible envelope, a filling of rubber sponge between the mandrel and envelop and vulcanized to both, an outer covering combined with the envelope and means for admitting a fluid into the interior space to form a resilient cushion. A. Seymour-Jones, Wrexham, Wales, assignor to The Turner Tanning Machinery Co., Peabody, Mass.
1,365,637 Vehicle wheel for solid tires. C. Macbeth, Birmingham, assignor to The Dunlop Rubber Co., Limited, Westminster, London—both in England.

GRANTED JANUARY 18, 1921

1,365,665 Pneumatic teat cup for milking machines. J. H. Davies, Melbourne, Victoria, Australia.
1,365,754 Toggle-joint self-filling fountain pen. John C. Wahl, Chicago, Ill., assignor, to The Wahl Co., Wilmington, Del.
1,365,767 Non-slipping sole pad. J. Contento, Albany, N. Y.
1,365,820 Tire valve. A. A. Dennis, Grand Rapids, Mich.
1,365,859 Dust cap for tire valves. H. L. Silver, Los Angeles, Cal.
1,365,862 Suspenders. W. H. Stevens, New York City. Original application divided.
1,365,879 Printing machine for nuts, having rubber ball printing device. A. S. Wysong, assignor to F. C. York, trustee—both of Los Angeles, Cal.
1,366,009 Shoe dauber with sponge rubber brush. W. E. Lane, Clinton, Iowa
1,366,051 Cushion tire. H. L. Bethel, Millville, assignor of one-third each to J. B. Sharp and C. E. Woodruff, both of Bridgeton—all in New Jersey.
1,366,080 Puncture proof pneumatic tire. S. Kaufman, Boston, Mass.
1,366,121 Inflatable tourniquet. C. F. Dorsey. Iroquois Falls, Ontario, Canada.
1,366,177 Metal heel-protector containing rubber cushion. André Harribey and Edmond Combecave, Bordeaux, France.
1,366,190 Corset with elastic insert. D. Kops, New York City.
1,366,205 Teat cups for milking machine. O. A. Moldenbauer, Watertown, Wis.
1,366,223 Storage battery. R. W. Wales, Auburndale, assignor to A. Hartel, Jr., G. H. Burnett and O. R. Hartel, copartners doing business as Hartel Bros. & Co., Boston—both in Mass.
1,366,320 Sanitary flushing nozzle. M. S. Hufschmidt, San Francisco, Calif.
1,366,335 Rubber bloomers. K. Heitler, New York City.

GRANTED JANUARY 25, 1921

1,366,358 Blow-out patch for pneumatic tires. A. M. Clark, Knoxville borough, Pa.
1,366,388 Cushioned button for garment supporters. H. A. Keller, assignor to Kabo Corset Co.—both of Chicago, Ill.
1,366,392 Respirator. A. B. Lamb, Washington, D. C., and P. W. Carleton, Wilmington, Del.
1,366,437 Gas mask. O. F. Wagenborst, Akron, O.
1,366,469 Tire gage. H. P. Kraft, Ridgewood, N. J.
1,366,493 Automobile horn. J. E. Reynolds, assignor to Clayton-Wright, Limited—both of Birmingham, England.
1,366,501 Tire valve. M. C. Schweinert, West Hoboken, and H. P. Kraft, Ridgewood—both in N. J.
1,366,518 Detachable rubber heel. A. G. Buchman, Kenosha, Wis.
1,366,540 Cushion wheel. F. O. Meyers, assignor to Pacific Automotive Co.—both of Los Angeles, Cal.
1,366,644 Suction device for artificial dentures and manufacture of same. A. W. Fisher, London, England.
1,366,708 Garter. E. Sprague, Jr., Oak Park, Ill.
1,366,727 Nipple and plug attachment for nursing bottles. A. Gerstner, New York City.
1,366,734 Portable shower-bath fixture. G. J. Koehler, Dayton, O.
1,366,797 Rubber heel. A. A. Harris Randolph, assignor to F. Berenstein, Chelsea—both in Mass.
1,366,849 Inner tube for tires. J. B. Tittle, Jefferson, O.

REISSUES

15,033 Hot-water and ice-bag closure or stopper. J. J. Bowes, Jr., Pensacola, Fla. Original No. 1,292,690, dated January 28, 1919.

THE DOMINION OF CANADA

GRANTED JANUARY 4, 1921

207,066 Elastic fabric. L. G. C. Quercu and J. Courbon, coinventors—both of Saint-Etienne (Loire), France.
207,205 Rubber sole for shoes with concave heel-seat. The United Shoe Machinery Co. of Canada, Limited, Maisonneuve, Quebec, Canada, assignee of G. Ferguson, Wollaston, Mass., U. S. A.

GRANTED JANUARY 11, 1921

207,311 Tire filler. R. Ambuhl, Troy, New York, U. S. A.
207,354 Subnormal pressure signal for pneumatic tires. A. G. Ewing, Los Angeles, Calif., U. S. A.
207,361 Tire tread. W. N. Forbes, Dartsmouth, Nova Scotia, Canada.
207,370 Teat cup for milking machines. A. Gillies, Heidelberg, Victoria, Australia.
207,392 Inflatable tube for use in learning to swim. G. Jordhan, Palm Beach, Fla., U. S. A.
207,454 Self-propelling hose nozzle. S. C. Sladden, New York City, U. S. A. (See The India Rubber World, September 1, 1919, page 702.)
207,474 Fountain pen filler. J. L. Yuill, Toronto, Ontario, Canada.
207,511 Reservoir to resist damage from perforations of projectiles, sheets of gutta percha and gum-lac forming the protector layer, a light armature of hard rubber and a sheet of vulcanized rubber between two sheets of non-vulcanized rubber forming the flexible wall. The Dunlop Rubber Co., Limited, assignee of Allan Macbeth—both of Paris, France.
207,512 Vehicle wheel. The Dunlop Rubber Co., Limited, Regent's Park, London, assignee of Colin Macbeth, Birmingham, Warwick, and F. J. Keegan, Coventry, Warwick, coinventors—all in England.
207,513 Metal petrol tank for aerial use, covered with layer of raw rubber adapted to dissolve in contact with petrol and automatically close perforation in case of puncture. The Dunlop Rubber Co., Limited, assignee of Allan Macbeth—both of Paris, France.
207,514 Liquid container or tank provided with a non-metallic composite protective covering, the outer part of which is self-displaceable and adapted to cooperate with a soft or plastic inner part to constitute a self-sealing covering for closing any bullet hole made in the tank. The Dunlop Rubber Co., Limited, assignee of J. V. Worthington—both of Westminster, London, England.

Chemical Patents will be found on page 431. Machinery Patents on pages 434-435.

207,515 An imperforate covering for liquid fuel reservoirs for aerial apparatus, comprising sheets of rubber fabric having sheets of sponge rubber interposed therebetween and adapted for the absorption of the liquid fuel upon the perforation of said reservoir. The Dunlop Rubber Co., Limited, assignee of Allan Macbeth—both of Paris, France.
207,526 Tire bead anchorage. The Goodyear Tire & Rubber Co., assignee of C. G. Hoover—both of Akron, Ohio, U. S. A.
207,532 Hose clamp. The Independent Pneumatic Tool Co., Chicago, assignee of A. Leyedahl, Aurora both in Ill., U. S. A.

GRANTED JANUARY 18, 1921

207,582 Resilient cushion tire. A. Borner, Scheveningen, Holland.
207,583 Demountable rim for tires. W. N. Booth, Detroit, Mich., U. S. A.
207,588 Demountable rim for tires. C. F. Christopher, Asheville, North Carolina, U. S. A.
207,630 Armored tire. A. E. Jennings, Owensboro, Ky., U. S. A.
207,631 Hose coupling. J. P. Johnson, Toronto, Ontario, Canada.
207,636 Spring tire with solid rubber tire surrounding springs. G. C. Lehr, St. Louis, Mo., U. S. A.
207,655 Pneumatic tire. J. W. McElvain, Chicago, Ill., U. S. A.
207,689 Pneumatic tire with sectional metallic casing. J. L. A. Tetrault, Montreal, Quebec, Canada.
207,703 Cushion tire. C. Warwick, Vancouver, B. C., Canada.
207,721 Air-valve hand-hole plate for disk wheel carrying pneumatic tire. The Harvey Rim & Wheel Co., Inc., assignee of L. B. Harvey—both of Buffalo, New York, U. S. A.

GRANTED JANUARY 25, 1921

207,781 Saddle top for cycles. J. Jelly, Coventry, and H. Jelly, Birmingham, coinventors—both in England.
207,831 Hose coupling. H. J. Fitzpatrick, Athens, Ga., U. S. A.
207,858 Ladder safety foot. A. Johnson, Liverpool, Lancaster, England.
207,875 Rubber heel. G. H. Lewis, Elyria, Ohio, U. S. A.
207,889 Football. W. W. Moren, Oldham, Lancaster, England.
207,948 Resilient tubeless tire, having independent air containers of globular form compressed in a series therein and deformed to egg shape. A. H. Young, Oakland, California, U. S. A.
207,993 Cushioned vehicle wheel. S. Johnstone & Co., Inc., assignee of J. E. Thebaud—both of Buffalo, New York, U. S. A.

THE UNITED KINGDOM

PUBLISHED DECEMBER 15, 1920

151,692 Apparatus for molding concrete, using india rubber for surfaces of molds or cores. J. Woolcock and W. J. Stewart, 12 Berkeley street, London.
151,753 Fountain pen. Wyvern Fountain Pen Co., 143 Holborn, London, and G. Davies, Woodboy street, Leicester—both in England.
151,766 Flower holder. J. Levy, 268 Pershore Road, Edgbaston, Birmingham.
151,828 Suspenders. A. Leighton, Midland, Pa., U. S. A.
151,844 Fountain pen. D. Cameron, Waverley Works, Blair street, Edinburgh.
151,878 Resilient cushioned tire. R. Scheu, 21 Besselstrasse, Berlin.
151,914 Driving belt with vulcanized rubber-covered links. I. H. Smith, 15 King street, Baker Street, London; R. H. Brand, Cranbourne Corner, Ascot, Berkshire; and T G. Leith, Petmathen House, Oyne, Aberdeenshire.
151,978 Pneumatic tire. The Goodyear Tire & Rubber Co., 1144 East Market street, assignee of K. B. Kilborn, 315 Oakland Drive, and W. S. Wolfe, 157 Edgerton Road—all of Akron, Ohio, U. S. A. (Not yet accepted.)
152,014 Waterproof hat cover. J. F. Schweizer-Caillaux, 130 rue de Paris, Vincennes, Seine, France. (Not yet accepted.)
152,079 Fountain pen. M. D. Davis, 6 Cardinal Mansions, Carlisle Place, Westminster.

PUBLISHED DECEMBER 22, 1920

152,170 Rubber truss pad. A. Moodie, Buckingham House, Finsbury Park, London, and P. Ellis, 7 Princes street, Westminster.
152,223 Cushioned wheel having pneumatic tire enclosed by rim fitted with solid rubber tread and flanged rings attached to yokes having sliding connection with the wheel felloe. C. F. F. Allen, 123 Castlereagh street, Sydney, Australia.

PUBLISHED DECEMBER 30, 1920

152,453 Bath tub hand grip of metal or gutta percha covered with rubber. A. West, Canandaigua, New York, U. S. A.
152,475 Surgical truss with elastic body-belt. A. Moodie, Buckingham House, Finsbury Park, London, and P. Ellis, 7 Princes street, Westminster.
152,502 Spring wheel with pneumatic cushion. H. C. Baquie, 68 Bowen Crescent, North Carlton, near Melbourne, Australia.
152,575 Belt-gearing pulleys for motor-cycles light motor vehicles, etc., of leather, or rubber with molded ribs. A. J. Postlethwaite, Staffordshire Works, Bell street, West Bromwich.
152,581 Reinforced pneumatic tire. P. Huth, 905 Pacific Building, San Francisco, Calif., U. S. A.
152,589 Game table with pockets at corners and on sides, and having resilient cushions between the pockets. E. Badger, Hill Foot, Breeze Hill, Bootle, Liverpool.
152,599 Automatic balloon valve with flexible gaskets. The Goodyear Tire & Rubber Co., 1144 East Market street, assignee of A. G. Maranville, 103 Russell avenue both of Akron, Ohio, U. S. A. (Not yet accepted.)
152,600 Gasket of rubber-impregnated fabric for securing a valve to a balloon envelope or other flexible gas-container. The Goodyear Tire & Rubber Co., 1144 East Market street, assignee of A. G. Maranville, 103 Russell avenue—both of Akron, Ohio, U. S. A. (Not yet accepted.)
152,601 Balloon valve having soft vulcanized rubber gaskets. The Goodyear Tire & Rubber Co., 1144 East Market street, assignee of A. G. Maranville, 103 Russell avenue—both of Akron, Ohio, U. S. A. (Not yet accepted.)

PUBLISHED DECEMBER 31, 1920

152,786 Leather soles and heels with inset rubber studs. W. B. Wilson, 141 Westgate, Burnley.

TRADE MARKS

THE UNITED STATES

SERIAL NUMBERS PUBLISHED JANUARY 6, 1921*

No. 116,000 The word Samson—rubber bicycle tires. Mead Cycle Co., Chicago, Ill.
130,608 The word Tireheal tire puncture healing liquid. Mundial Trading Co., Inc., New York City.

SERIAL NUMBERS PUBLISHED JANUARY 14, 1921*

129,571 The word Redskin printed in red—inner tubes. Rambler Rubber Corporation, Houston, Texas.
136,467 Representation of a shield bearing picture of a waterfall and the word Falls—tires, tubes, repair material, etc. The Falls Rubber Co., Cuyahoga Falls, Ohio.
137,550 The word Vacuum in outline letters within a double-bordered oval—leather, fiber, textile, rubber and composition belting. Vacuum Belting Co., Indianapolis, Ind.

SERIAL NUMBERS PUBLISHED JANUARY 21, 1921*

127,728 Representation of a Maltese cross bearing the word Kleinert, hanging from a scroll bearing the words The Best—rubber household aprons, baby pants, diapers, bloomers, bathing-caps, etc. I. B. Kleinert Rubber Co., New York City.

SERIAL NUMBERS PUBLISHED JANUARY 28, 1921*

123,620 The word Gem—rubber erasers. Joseph Dixon Crucible Co., Jersey City, N. J.
126,280 The words Savage-Grip—tire patches. D. M. Howard, South Shaftsbury, Vt.
130,681 The word McGraw between two green seals bearing a monogram—tires and tubes. The McGraw Tire & Rubber Co., East Palestine, Ohio.
130,877 Representation of a shield within two concentric circles, above the word "Bally"—footwear of cloth and rubberized fabric, rubber heels and soles, etc. Bally Co., Inc., Wilmington, Del., and New York City.
130,934 Representation of a shield bearing the figures 4810—rubber and fabric hose. United States Rubber Co., New Brunswick, N. J.
130,945 Representation of a butterfly bearing within a superimposed rectangle the word Papillon—footwear of cloth and rubberized fabric, rubber heels and soles, etc. Bally Co., Inc., Wilmington, Del., and New York City.
131,498 Representation of a tire around a bust of Madison accompanied by the words Madison Tires—tires. Madison Tire & Rubber Co., Inc., Buffalo, New York.
131,648 The words Castle Cord—tire casings. New Castle Rubber Co., New Castle, Pa.
134,520 A Greek cross painted in red—tire-mounting adhesives and repair compounds, adhesives for uniting rubber, leather, cloth, etc. National Rubber & Specialties Co., Cincinnati, Ohio.
136,586 The word Rex—hoof pads. The Federal Rubber Co., Cudahy, Wis.
137,088 Representation of a shoe sole with the word PerFecTred superimposed thereon—shoes and oxfords of rubber, leather, fabric and combinations of these. National Cloak & Suit Co., New York City.
138,065 Representation of a black disk bearing a shield outlined in white—raincoats. C. B. Shane Co., Chicago, Ill.
138,760 The word Topaz—rubber sponges and sponge rubber goods. Featheredge Rubber Co., Inc., Chicago, Ill. (See description elsewhere in this issue.)

GRANTED JANUARY 4, 1921

Under Act of February 20, 1905†

138,578 Steam Cured and a spray of thistle—dress shields. J. J. Beyerle Mfg. Co., New York City.
138,579 Irene—dress shields. J. J. Beyerle Mfg. Co., New York City.
138,586 Inandout—dress shields. Brooklyn Shield & Rubber Co., Brooklyn, N. Y.
138,606 Power Plus—patches and inner tubes. Darling, Miller & Co., New York City.
138,607 Steelaire—tires. J. C. Dawson, Lynn, Mass.
138,614 SoxLox—hose supporters. C. W. Egerton, New York City.
138,619 Star—massage shower-bath sprays. The Fitzgerald Manufacturing Co., Torrington, Conn.
138,623 Mi Ladi Dainti—sanitary belts, aprons, etc. M. S. George, St. Louis, Mo.
138,627 KohInooR—rubber belts reinforced with fabric. The B. F. Goodrich Co., New York City.
138,647 A chevron—tires. International India Rubber Corporation, South Bend, Ind.
138,648 A conventional symbol—tires. International India Rubber Corporation, South Bend, Ind.
138,653 "Shirlastic"—dress shields and garters. I. B. Kleinert Rubber Co., New York City.
138,682 Boys Shops—suspenders, garters, arm-bands, etc. New York Boys' Shops, Inc., New York City.
138,684 Gorilla Clinch—tire patches. E. J. O'Connell, Pittsfield, Mass.
138,705 Head of the Lakes—arm-bands, garters and suspenders. Slonim Brothers, Duluth, Minn.
138,712 Dress Saver Supreme—dress shields. Jacob Stein, New York City.
138,715 Star—garters, arm-bands, and children's hose supporters. Sturm & Scheinberg, New York City.
138,744 Wilson's SlaPatch—tire repair shoes and patches. The Wilson Rubber Co., Des Moines, Ia.

Under Act of March 19, 1920, Section 1 (b)†

138,757 The words Red Rapper, the letter R forming the initial of both words—rubber belting. The Combination Rubber Mfg. Co., Bloomfield, N. J.
138,758 The words Double Wear—tires. Dryden Rubber Co., Chicago, Ill.
138,760 The word Foster—rubber soles and heels. Foster Rubber Co., Kennebunk, Me., and Boston, Mass.

*Notice of opposition must be filed with the Commissioner of Patents, Washington, D. C., within thirty days after this date.
†See The India Rubber World, February 1, 1921, page 376, "Two Kinds of Trade Marks Now Being Registered."

GRANTED JANUARY 11, 1921

Under Act of February 20, 1905†

138,771 CHUMS—chewing gum. Automatic Clerk Co., Newark, N. J.
138,808 BECKTON WHITE—lithopone. E. I. du Pont de Nemours & Co., Wilmington, Del.
138,809 PICHER—sulphuric acid. The Eagle-Picher Lead Co., Cincinnati, Ohio.
138,812 SECURO—endless or long-length rubber-coated fabric belts. The Farm Equipment Co., Baltimore, Md.
138,853 PATRICK—hose. F. A. Patrick & Co., Duluth, Minn.

Under Act of March 19, 1920, Section 1 (b)†

138,904 The word MONTEREY—rubber hose and packing. The Goodyear Tire & Rubber Co., Akron, Ohio.
138,906 The words HIGH SPEED—rubber and fabric belting. The Gutta Percha & Rubber Manufacturing Co., New York City.
138,927 The words DRI KURE—stationary vulcanizers. Western Vulcanizer Manufacturing Co., Chicago, Ill.

GRANTED JANUARY 18, 1921

Under Act of February 20, 1905†

139,046 Section of hose—rubber-covered hose. Voorhees Rubber Mfg. Co., Jersey City, N J.

RENEWED

18,788 A cock and human hand surrounded by a band and ribbon—rubber goods. Chas. Macintosh & Co., Limited, Manchester and London, England. Registered January 6, 1891.

GRANTED JANUARY 25, 1921

Under Act of February 20, 1905†

139,178 A castle on a shield within a tire—tires and tubes. New Castle Rubber Co., New Castle, Pa.

RENEWED

19,557 SNAG-PROOF—rubber boots and shoes. Lambertsville Rubber Co., Lambertsville, N. J. Registered May 19, 1891.

THE DOMINION OF CANADA

REGISTERED

27,829 IMPERVO—waterproof sheets and sheeting. E. A. Armstrong Co., Chicago, Ill., U. S. A.
27,831 AXELITE—power transmission belting and brake band linings. Gutta Percha & Rubber, Limited, Toronto, Ont.
27,862 Hood with an arrow therethrough—rubber boots and shoes, overshoes, and rubber-soled canvas shoes. Hood Rubber Co., Boston, Mass., U. S. A.
27,863 OLD COLONY RUBBER COMPANY, BOSTON, enclosed within a rectangle having notched corners and the letters U. S. A. under the rectangle—rubber boots and shoes. Hood Rubber Co., Boston, Mass., U. S. A.
27,883 EPOK—tires, inner tubes, rubber shoes, hot-water bottles, nipples, and rubber furniture. The Premier Tire & Rubber Co., Limited, Toronto, Ont.

THE UNITED KINGDOM

PUBLISHED NOVEMBER 24, 1920

407,547 The word RUBLETH—rubber soles, heels and tips. Dexter Brothers, Pomeroy House, 28A Basinghall street, London, E. C. 2.

PUBLISHED DECEMBER 1, 1920

400,914 Representation of a partridge standing within a tire, accompanied by the words TRADE MARK—all rubber goods included in Class No. 40. The F. E. Partridge Rubber Co., Limited, 1 Metcalfe street, Guelph, Ontario, Canada; address for service in the United Kingdom care of Abel & Imray, 30 Southampton Buildings, London, W. C. 2.
404,302 The word IBONDA—rubber and gutta percha goods not included in classes other than No. 40. Arnold Goodwin & Son, Limited, 56 Sumner street, London, S. E. 1
407,670 The Word DAINITE—rubber and gutta percha goods not included in classes other than No. 40. Harboro' Rubber Co., Rubber Mills, St. Mary's Road, Market Harborough, Leicestershire.

PUBLISHED DECEMBER 15, 1920

408,824 The words SILENT NIGHT—rubber protectors for boots and shoes. Herbert J. Fussell & Co., Locksbrook Rubber Mills, Locksbrook Road, Lower Weston, Bath.

PUBLISHED DECEMBER 22, 1920

403,279 The word FALCON on a ribbon scroll above representation of a falcon, in turn above a second ribbon scroll bearing the words Adam Limited London—rubber motor cloth. Adam, Limited, Falcon Works, Copperfield Road, Mile End, London, E. 3.
B407,509 The word EUREKA—rubber cushions for billiard and like tables. Burroughes and Watts, Limited, Registered Offices, 19 Soho Square, London, W. 1.

PUBLISHED DECEMBER 29, 1920

404,500 The word USKIDE—rubber and fiber soles for boots and shoes. United States Rubber Co., Little Burnett street, New Brunswick, New Jersey, and 1790 Broadway, New York City, both in U. S. A.; address for service in the United Kingdom care of Haseltine, Lake & Co., 28 Southampton Buildings, London, W. C. 2.
405,912 Representation of an airplane flying above an automobile, beneath the word DEKLA, all against a background formed by a conventionalized tire bearing on its edge the words Motor, Motorcycle and Cycle Accessories—rubber and gutta percha motor, motorcycle, cycle and airplane accessories, not included in classes other than No. 40. Robert Milburne Wright, 176 Franklin Road, King's Norton, Birmingham, Warwickshire.
B407,508 The word VACUUM—rubber cushions for billiard and the like tables. Burroughes & Watts, Limited, Registered Offices, 19 Soho Square, London, W. 1.
407,996 Monogram of the letters P and C—rubber tires. The Kempshall Tyre Co. of Europe, Limited, 97-98 Long Acre, London, W. C. 2.

DESIGNS

THE UNITED STATES

No. 56,857 Hot-water bottle. Patented January 4, 1921. Term 7 years. J. H. Cadogan, Chicago, Ill.
56,908 Tire tread. Patented January 18, 1921. Term 14 years. E. O. Blekre, Sioux City, Ia.
56,909 Tire tread. Patented January 18, 1921. Term 14 years. E. O. Blekre, Sioux City, Ia.
56,910 Tire tread. Patented January 18, 1921. Term 14 years. E. O. Blekre, Sioux City, Ia.
56,911 Tire. Patented January 18, 1921. Term 3½ years. D. F. Crow, Omaha, Neb.
56,918 Tire tread. Patented January 18, 1921. Term 14 years. R. B. Gillette and R. W. Hutchins, Eau Claire, Wis.
56,921 Tire. Patented January 18, 1921. Term 14 years. W. E. Greer, assignor to Syracuse Rubber Co., Inc.—both of Syracuse, N. Y.
56,933 Rubber heel. Patented January 18, 1921. Term 14 years. L. E. Meyer, Cuyahoga Falls, assignor to The Firestone Tire & Rubber Co., Akron—both in Ohio.
56,934 Tire tread. Patented January 18, 1921. Term 7 years. H. D. Mitchell, Plainfield, N. J., assignor to D. W. Whipple, New York City.
56,967 Garment shield. Patented January 25, 1921. Term 14 years. V. Guinzburg, assignor to I. B. Kleinert Rubber Co.—both of New York City.
56,969 Garter. Patented January 25, 1921. Term 7 years. M. B. Hammond, Bridgeport, Conn.
56,974 Tire tread. Patented January 25, 1921. Term 14 years. H. L. Kenyon, Setauket, N. Y.
56,975 Tire tread. Patented January 25, 1921. Term 14 years. H. L. Kenyon, Setauket, N. Y.

56,908 56,909 56,910 56,911 56,918 56,921 56,934 56,974 56,975 56,976 56,980 56,981

406,794 Representation of a rectangular label bearing the word THE PARTRIDGE beneath representation of a partridge—all rubber goods included in Class No. 40. The F. E. Partridge Rubber Co., Limited, 1 Metcalfe street, Guelph, Ontario, Canada; address for service in the United Kingdom care of Abel & Imray, 30 Southampton Buildings, London, W. C. 2.
B407,567 The numerals 1001—rubber tapping knives and pruning knives. John Yates & Co., Limited, Exchange Works, Aston Manor, Birmingham.
408,086 The word ROTEX—engine packing, rubber hose and tubing. A. Oppenheimer & Co., 38 Finsbury Square, London, E. C. 2.
408,251 The word ROTEX—rubber and gutta percha goods not included in classes other than No. 40. A. Oppenheimer & Co., 38 Finsbury Square, London, E. C. 2.

PUBLISHED DECEMBER 8, 1920

404,236 Representation of a life preserver and the word REVERSO—life-saving jackets. Speeding's, Limited, 14 Whickham street, Monkwearmouth, Sunderland, Durham.
405,065 The word HOLDFAST—baby soothers, nipples, teething rings and pads. A. S. Cartwright, Limited, West Heath Works, Northfield, near Birmingham.
B407,324 The word ANCHOR—regenerated waste rubber and vulcanized oils used in manufactures as substitutes for rubber. The Anchor Chemical Co., Limited, Clayton Lane, Clayton, Manchester.

56,976 Tire tread. Patented January 25, 1921. Term 14 years. H. L. Kenyon, Setauket, N. Y.
56,980 Tire. Patented January 25, 1921. Term 3½ years. E. L. Lawlor, Youngstown, O.
56,981 Tire. Patented January 25, 1921. Term 3½ years. E. L. Lawlor, Youngstown, O.

CONSIDERABLE INTEREST ATTACHES TO THE PUBLISHED REPORTS that warrants have been issued in Cologne, Germany, for the arrest of several chemical and dye experts formerly employed by Friedrich Bayer & Co., Leverkusen, charging them with breach of contract and betrayal of commercial secrets. Two of these chemists, Dr. Joseph Flackslander and Dr. Otto Runge, have entered the United States and are said to have signed contracts with a leading American chemical and dye concern. Dr. Runge is the inventor of the Runge solution process for rubber reclaiming, described in THE INDIA RUBBER WORLD, December 1, 1919, page 141.

Review of the Crude Rubber Market

NEW YORK

During the past month the market conditions for crude rubber have been uniformly dull and featureless. Practically no manufacturer's business has appeared in the market, indicating that the factory stocks are ample for the reduced scale on which all are operating.

The delay incident to announcement of the Goodyear refinancing plans had a deterrent effect on dealers who even yet are awaiting its adoption as a basis for confident future operations. Under such circumstances price changes have been few and unimportant and sales still fewer, mostly limited to very small tonnage. Sales having come practically to a full stop, dealers are quietly awaiting the longed-for industrial revival. Prices have probably reached their lowest levels for spot but futures will no doubt decline, as they are out of proportion to spot figures at the present time.

Some trading has been reported from London during the month, with covering of shorts and slight advances of the market there. London reports January 22, 1921, indicated 54,902 tons on hand. Large shipments are arriving in New York and it is claimed that stock in storage here, aside from that in factories, totals 250,000 tons, estimated as sufficient to cover American needs for all of 1921.

Imports during January, 1921, were 14,177 tons of all grades, compared with 21,351 tons for the corresponding month of last year. Arrivals of plantation rubber for January, 1921, were 12,782 at Atlantic ports and 37 tons at Pacific ports, making a total of 12,819 tons.

Spot and future quotations on standard plantations and Brazilian sorts were as follows:

Plantations. February 5, first latex crêpe, 19½ to 20 cents; February-March, 20 cents; April-June, 22½ to 23 cents; July-December, 26½ to 27 cents.

February 23, first latex crêpe, 20 to 20½ cents; February-March, 20½ cents; April-June, 22 to 23 cents; July-December, 25½ to 26½ cents.

February 5, ribbed smoked sheets, 17½ to 18 cents; February-March, 18 cents; April-June, 20½ to 21 cents; July-December, 25 cents.

February 23, ribbed smoked sheets, 18½ to 19 cents; February-March, 20 cents; April-June, 21½ cents; July-December, 24½ cents.

February 5, No. 1, amber crêpe, 16½ cents.

February 23, No. 1, amber crêpe, 16½ cents.

February 5, No. 1, rolled brown crêpe, 12½ cents.

February 23, No. 1, rolled brown crêpe, 12½ to 13 cents.

South American Parás and Caucho. February 5, upriver fine, 17¼ cents; islands fine, 17 cents; upriver coarse, 13¼ cents; islands coarse, 11 cents; Cametá coarse, 11 cents; caucho ball, 12 to 14 cents.

February 23, upriver fine, 17½ to 18 cents; islands fine, 17½ to 18 cents; upriver coarse, 12½ to 13½ cents; islands coarse, 11 cents; Cametá coarse, 11½ to 12 cents; caucho ball, 12½ to 15 cents.

NEW YORK QUOTATIONS

Following are the New York spot quotations, for one year ago, one month ago, and February 23, the current date:

	March 1, 1920	February 1, 1921	February 23, 1921
PLANTATION HEVEA—			
First latex crêpe.........	$0.47 @	$0.20 @	$0.20 @.20½
Amber crêpe No. 1.......	.46 @	.17 @	.16¼ @.16½
Amber crêpe No. 2.......	.45 @	.16 @	.15¼ @.15½
Amber crêpe No. 3.......	.44 @	.15 @	.14¼ @.14½
Amber crêpe No. 4.......	.43 @	.13 @	.13½ @.14
Brown crêpe, thick and thin	.44 @	.15 @	.13 @.13½
Brown crêpe, specky......	.41 @	.13 @	.11 @.12
Brown crêpe, rolled.......	.40 @	.13 @	.12½ @.13
Smoked sheet, ribbed, std.	.46 @	.19¾ @	.18½ @.19
PLANTATION HEVEA—			
Smoked sheet, plain, std..	.41 @	.18½ @	.17½ @
Unsmoked sheet, standard.	@	.17½ @	.16½ @
Colombo scrap No. 1.....	@	.15 @	.12 @
Colombo scrap No. 2.....	@	.14 @	.10 @
EAST INDIAN—			
Assam crêpe	@	@	@
Assam onions	@	@	@
Penang black scrap.......	@	*.08 @	@
PONTIANAK—			
Banjermassin	.13 @	.07 @.08	.07 @.08
Palembang	@	.09½ @	@
Pressed block	.27 @	.12 @.13	.11¾ @.12¼
Sarawak	@	.07 @	.06½ @
SOUTH AMERICAN—			
PARAS—			
Upriver, fine	.42 @	.18½ @.19½	.17½ @.18
Upriver, medium	@	.15 @.16	.15 @
Upriver, coarse	.31½ @	.13 @.14	.12½ @.13½
Upriver, weak, fine.....	@	*.14 @	.12 @.13
Islands, fine	.42 @	*.17½ @.18	.17½ @.18
Islands, medium	@	.13 @	.15 @
Islands, coarse	.20 @	.11 @.11½	.11 @
Cametá, coarse.........	.21 @	.11 @.11½	.11½ @.12
Madeira, fine	@	.21 @.22	.18½ @.20
Acre Bolivian, fine......	@	.19 @.22	.18 @.18½
Peruvian, fine	@	.17 @.17½	.16 @.17
Tapajos, fine	@	.17 @.17½	.16½ @.17
CAUCHO—			
Upper caucho ball......	@	.14 @.15	.14½ @.15
Lower caucho ball......	.32 @	.12½ @	.12½ @.13
MANICOBAS—			
Ceará negro heads......	.36 @	*.12 @	*.13 @
Ceará scrap	.30 @	*.07 @	*.10 @
Maniçoba, 30% guarantee	.32 @	.10 @	*.12½ @
Margebeira thin sheet...	.30 @	.09 @	*.15 @
CENTRALS—			
Corinto scrap	.29 @	.11 @.12	.12 @
Esmeralda sausage	.29 @	.11 @.12	.12 @
Central scrap	.30 @	.11 @.12	.12 @
Central scrap and strip...	.27 @	.09 @.10	.10 @.11
Central wet sheet.........	.24 @	.04 @.05	.06 @.07
Guayule, 20% guarantee..	.27 @	*.20 @	@
Guayule, washed and dried	.38 @	*.28 @	*.26 @
AFRICANS—			
Niger flake, prime........	.17½ @	.17 @	*.17 @
Benguela, extra No. 1, 28%	@	@	@
Benguela, No. 2, 32½%..	@	@	.07 @
Conakry niggers	.36 @	@	@
Congo, prime, black upper.	.38 @	.15 @	*.15 @
Congo, prime, red upper..	.35 @	.12 @	*.12 @
Kassai, black	.39 @	.15 @	*.15 @
red	@	@	@
Massai sheets and strings.	@	@	@
Rio Nunez ball..........	@	@	@
Rio Nunez sheets, strings.	.37 @	@	@
GUTTA PERCHA—			
Gutta Siak	.31 @	.14 @.16	.17 @
Red Macassar	2.65 @	2.25 @2.60	2.10 @3.00
BALATA—			
Block, Ciudad Bolivar....	.52 @	.57 @.58	.60 @.61
Colombia	.46 @	.36 @.37	.45 @.46
Panama	.40 @	.24 @.30	.45 @.46
Surinam sheet	.75 @	67 @.68	.69 @.70
amber	.78 @	.70 @.71	.84 @

*Nominal.

RECLAIMED RUBBER

In the Akron district the outlook for resumption of tire manufacturing is brightening with the approach of spring, by which time the best informed authorities in the tire trade predict an actual shortage of automobile tires and consequent resumption of manufacturing on something like full time. Among the Eastern rubber plants in lines other than tires, the prospects are less advanced. Under this condition and the continued low prices still ruling for plantation Parás the reclaimers with one accord have ceased to function as trade factors and their plants are closed till business again is active in all rubber manufacturing lines.

NEW YORK QUOTATIONS

FEBRUARY 23, 1921

Prices subject to change without notice

STANDARD RECLAIMS:

Floating	*$0.15	@	$0.18
Friction	* .15	@	.18
Mechanical	* .09	@	.11
Shoe	* .12½	@	.13½
Tires, auto	* .12	@	.13½
truck	* .09	@	.11
White	* .15	@	.18

*Nominal.

COMPARATIVE HIGH AND LOW NEW YORK SPOT RUBBER PRICES

	February 1921*			February 1920			February 1919		
PLANTATIONS									
First latex crêpe	$0.20	@	$0.19½	$0.51½	@	$0.46¼	$0.58	@	$0.55½
Smoked sheet ribbed	.19	@	.17½	.51½	@	.46	.57½	@	.54
PARAS									
Upriver, fine	.17½	@	.17	.46	@	.42½	.59½	@	.58½
Upriver, coarse	14	@	.13¼	.34	@	.31½	.35	@	.34
Islands, fine	.17½	@	.17	.44¾	@	.42	.49½	@	.49
Islands, coarse	.11½	@	.11	.21	@	.20¼	.22¾	@	.22½
Cametá	.12	@	.11	.23½	@	.21½	.23	@	—

*Figured to February 24, 1921.

SINGAPORE RUBBER MARKET

GUTHRIE & CO., LIMITED, Singapore, report [December 31, 1920]: There is no change to record in the rubber market. Demand continues small and values show little or no fluctuation. A slightly more active tone was in evidence at the weekly auctions, held yesterday, due to a small amount of covering by certain buyers. No sales of standard fine pale crêpe were effected and only one lot of standard sheet was sold at 30½ cents per pound. Off quality sheet sold from 16 to 30 cents, and off quality crêpe from 17 to 29 cents. Fine brown crêpe was in more demand and advanced slightly on the week. Dark and barky crêpes remained steady. Of 676 tons catalogued, 381 tons were sold.

The following is the course of values:

	In Singapore per pound[1]			Sterling Equivalent per pound in London		
Sheet, fine ribbed smoked	30½c	@	—	—/10⅞	@	—
Sheet, good ribbed smoked	16	@	30c	—/ 6¾	@	—/10¾
Sheet, plain smoked	—	@	—	—	@	—
Sheet, ribbed unsmoked	—	@	—	—	@	—
Sheet, plain unsmoked	—	@	—	—	@	—
Crêpe, fine pale	—	@	—	—	@	—
Crêpe, good pale	17	@	29	—/ 7½	@	—/11
Crêpe, fine brown	15½	@	20½	—/ 7⅛	@	—/ 8½
Crêpe, good brown	12½	@	15	—/ 6¼	@	—/ 7
Crêpe, dark	11½	@	14½	—/ 6	@	—/ 6⅞
Crêpe, bark	9	@	13	—/ 5¼	@	—/ 6⅜

[1]Quoted in Straits Settlements currency, $1 = $0.567 United States currency.

AMSTERDAM RUBBER MARKET

JOOSTEN & JANSSEN, Amsterdam, report, under date of February 11, 1921:

The market remained extremely quiet, there being little business and prices hardly fluctuating. Finally, however, prices suddenly advanced and a fair business resulted in crêpe and sheets, spot and forward deliveries. The market soon quieted down, however, closing at:

Hevea crêpe, Fl. 68. Sheets, Fl. 58 spot.

Hevea crêpe, Fl. 71. Sheets, Fl. 60 April-June.

Hevea crêpe, Fl. 76. Sheets, Fl. 68 July-September.

Hevea crêpe, Fl. 80. Sheets, Fl. 72 October-December.

HAMBURG RUBBER MARKET

EFFEKTIV-ROHGUMMIMAKLER-VEREIN, Hamburg, report, under date of January 22, 1921:

The week ended January 22 was quiet, as consumers held back in the expectation that the mark would rise in value. Limited quantities of Pará, medium, and plantation grades changed hands. Offers of best crêpe are fairly small and holders are firm. The Oriental markets were firm, owing to change in the rupee rate and there were sellers at increased prices only. Arrivals were normal and mostly disposed of so that there was no increase in stocks worth mentioning.

Prices moved between:

	Marks		
No. 1 first latex crêpe	29	@	31
No. 1 ribbed smoked sheets	26	@	27.50
Smoked sheet, lower grade	23	@	25
Brown crêpe, clean	22	@	25
Brown crêpe, slightly barky	18	@	21
Dark crêpe	17	@	20
Hard fine Pará	29	@	33
Caucho ball	19	@	22
Congo No. 1	19	@	24
Mozambique No. 1	21	@	28
Panama and Colombia block Balata	55	@	85
No. 1 balata sheet	105	@	125
Jelutong	13	@	18

ANTWERP RUBBER MARKET

GRISAR & CO., Antwerp, report, under date of January 28, 1921:

Reduced business at prices without notable change. There was rather a marked difference in the prices for sheet as compared with those for crêpe. The closing prices were: Spot, February-March, 1*s*. 1*d*; April-June, 1*s*, 1½*d*; July-December, 1*s*, 3¾*d*, (buyers). Fine Pará, 1*s*, 0¼*d*.

Statistics for the week were as follows: Arrivals, 1,883 tons; sales, 566 tons; stock, 54,902 tons against 21,701 in 1920.

Local sales: 471 kilos red Congo at 5 francs.

Stock on hand this day, about 1,738 tons.

The weakness noted in the futures market last week has become still more marked during the week under review, mainly owing to the drop in the pound sterling.

Closing quotations were: February, 5.95; March, 6.00; April-June, 6.05; July, 6.30; August, 6.35; September, 6.40; October-November, 6.50; December, 6.60.

STRAITS SETTLEMENTS RUBBER EXPORTS

It is reported by official report from Singapore that the exports of rubber from Straits Settlements ports in December last amounted to 10,044 tons, which compares with 7,509 tons in November and 14,244 tons in the corresponding month of 1919. The total exports for the past year amounted to 128,155 tons, as against 145,960 tons in 1919 and 62,376 tons in 1918. Transhipments in December amounted to 1,474 tons, making a total for 1920 of 20,156 tons, against 17,903 tons in 1919 and 4,447 tons in 1918. Appended are the comparative statistics:

	1918	1919	1920
January *tons*	4,302	14,404	13,125
February	2,334	15,661	17,379
March	8,858	20,908	5,931
April	6,584	10,848	9,768
May	13,587	15,845	15,617
June	6,515	5,059	11,663
July	1,978	7,818	10,773
August	1,249	8,933	6,673
September	6,209	10,476	9,791
October	3,260	8,338	9,882
November	2,661	13,426	7,509
December	4,839	14,244	10,044
Totals *tons*	62,376	145,960	128,155

These figures include transhipments of rubber from various places in the neighborhood of the Straits Settlements such as Borneo, Java, Sumatra and the non-Federated Malay States, as well as rubber actually exported from the Colony, but do *not* include rubber exports from the Federated Malay States.

FEDERATED MALAY STATES RUBBER EXPORTS

An official report from Kuala Lumpur gives the exports of rubber from the Federated Malay States in the month of December last as 6,090 tons, compared with 6,650 tons in November and 10,340 tons in the corresponding month in the previous year. The total exports for last year from these States were 101,326 tons, as against 108,393 tons in 1919 and 78,283 tons in 1918. Appended are the comparative statistics:

	1918	1919	1920
January *tons*	7,588	7,163	11,119
February	6,820	10,809	9,781
March	7,709	10,679	9,524
April	7,428	7,664	8,375
May	5,851	7,308	7,627
June	5,161	7,094	9,049
July	5,706	8,640	8,043
August	5,291	10,626	9,140
September	6,588	9,841	7,605
October	5,901	8,381	8,323
November	7,097	9,848	6,650
December	7,085	10,340	6,090
Totals *tons*	78,283	108,393	101,326

NOTE.—The statistics given above correct former statements.

CRUDE RUBBER ARRIVALS AT ATLANTIC AND PACIFIC PORTS AS STATED BY SHIPS' MANIFESTS

PARAS AND CAUCHO AT NEW YORK

	Fine	Medium	Coarse	Caucho	Totals Pounds
JANUARY 23. By the S. S. "Manchurian Prince," from Pará.					
Various	....	....	....	....	15,680
JANUARY 23. By the S. S. "Manchurian Prince," from Manáos.					
H. A. Astlett & Co.	....	....	....	....	22,932
JANUARY 28. By the S. S. "Denis," from Pará.					
Poel & Kelly	49,483	....	22,366	75,680	147,529
General Rubber Co.	....	....	....	....	6,860
Meyer & Brown, Inc.	284,480	....	....	....	284,480
Paul Bertuch	70,689	5,331	40,477	1,384	117,881
JANUARY 28. By the S. S. "Denis," from Manáos.					
General Rubber Co.	....	....	....	....	7,056
H. A. Astlett & Co.	....	....	....	....	1,078
Various	....	....	....	....	201,684
FEBRUARY 14. By the S. S. "Camoens," from Pará.					
Various	....	....	....	....	15,776
FEBRUARY 14. By the S. S. "Uberaba," from Pará.					
Poel & Kelly	....	....	....	....	39,298
Paul Bertuch	23,340	28,452	15,170	13,534	80,496

PARAS AND CAUCHO—Continued

	Fine	Medium	Coarse	Caucho	Totals Pounds
February 14. By the S. S. "Justin," from Manáos.					
General Rubber Co.	....	....	....	....	53,998
Poel & Kelly	....	....	....	....	60,074
Meyer & Brown, Inc.	....	17,920	....	....	17,920
Various	....	....	....	....	20,692
February 14 By the S. S. "Justin," from Pará.					
Poel & Kelly	....	....	....	....	10,290

PLANTATIONS

(Figured 180 pounds to the bale or case)

	Shipment from:	Shipped to:	Pounds.	Totals.
January 20. By the S. S. "Kumeric," at New York.				
Hood Rubber Co.	Colombo	Watertown	29,640	
J. H. Rossbach & Bros.	Colombo	New York	28,800	
J. H. Rayner & Co.	Colombo	New York	54,900	
L. Littlejohn & Co., Inc.	Colombo	New York	56,100	
Various	Colombo	New York	311,640	481,080
January 23. By the S. S. "Tusuyama Maru," at New York.				
L. Littlejohn & Co., Inc.	Singapore	New York	72,000	
W. R. Grace & Co.	Singapore	New York	61,200	
Raw Products Co.	Singapore	New York	90,000	
Thornett & Fehr, Inc.	Singapore	New York	100,800	
Mitsui & Co., Limited	Singapore	New York	60,660	384,660
January 26. By the S. S. "Santa Malta," at New York.				
Baring Bros.	Colombo	New York	100,800	
Meyer & Brown, Inc.	Colombo	New York	112,000	
Charles T. Wilson Co., Inc.	Colombo	New York	11,220	
Various	Colombo	New York	137,860	361,880
January 27. By the S. S. "Montauk," at New York.				
Various	London	New York	49,860	49,860
January 27. By the S. S. "Hague Maru," at New York.				
L. Littlejohn & Co., Inc.	Singapore	New York	56,100	
Eastern Rubber Co.	Singapore	New York	280,260	
Thornett & Fehr, Inc.	Singapore	New York	196,380	
Fred Stern & Co.	Singapore	New York	33,600	
Various	Singapore	New York	130,740	697,080
January 30 By the S. S. "Intan," at New York.				
F. R. Henderson & Co.	Batavia	New York	67,500	
New York Oversea Co.	Batavia	New York	79,200	
Fred Stern & Co.	Batavia	New York	112,000	
Meyer & Brown, Inc.	Batavia	New York	156,800	
Thos. A. Desmond & Co.	Soerabaya	New York	58,680	
East Asiatic Co., Inc.	Soerabaya	New York	89,460	
Meyer & Brown, Inc.	Colombo	New York	112,000	
Various	Soerabaya	New York	30,060	
The Goodyear Tire & Rubber Co.	Singapore	Akron	577,800	1,283,500
January 30. By the S. S. "Katuna," at New York.				
Adolph Hirsch & Co., Inc.	Singapore	New York	44,800	
Rubber Importers' & Dealers' Co.	Singapore	New York	88,560	
William H. Stiles & Co.	Singapore	New York	148,500	
L. Littlejohn & Co., Inc.	Singapore	New York	473,900	
Hood Rubber Co.	Singapore	Watertown	533,242	
Chas. T. Wilson Co., Inc.	Singapore	New York	74,950	
Eastern Rubber Co.	Singapore	New York	47,880	
Poel & Kelly	Singapore	New York	347,040	
American Trading Co.	Singapore	New York	25,740	
E. F. Leland & Co.	Singapore	New York	12,600	
Rogers-Pyatt Shellac Co.	Singapore	New York	171,360	
F. R. Henderson & Co.	Singapore	New York	79,380	
Meyer & Brown, Inc.	Singapore	New York	224,000	
Thornett & Fehr, Inc.	Singapore	New York	45,900	
Aldens' Successors, Inc.	Singapore	New York	2,160	
The Goodyear Tire & Rubber Co.	Singapore	New York	37,800	
Winter, Ross & Co.	Singapore	New York	50,400	
General Rubber Co.	Singapore	New York	616,860	
Firestone Tire & Rubber Co.	Singapore	New York	142,200	
Fred Stern & Co.	Singapore	New York	22,400	
The Fisk Rubber Co.	Colombo	Chicopee Falls	33,600	
Various	Telok Anson	New York	17,100	
Various	Penang	New York	75,600	
Various	Port Dickson	New York	19,260	
Various	Singapore	New York	1,020,800	4,356,032
February 3. By the S. S. "Woonsocket," at New York.				
Winter, Ross & Co.	Singapore	New York	51,020	
F. R. Henderson & Co.	Singapore	New York	156,420	
Raw Products Co.	Singapore	New York	45,000	
Baird Rubber & Trading Co.	Singapore	New York	13,500	
L. Littlejohn & Co., Inc.	Singapore	New York	45,800	
Meyer & Brown, Inc.	Singapore	New York	100,800	
William H. Stiles & Co.	Singapore	New York	106,920	
General Rubber Co.	Singapore	New York	1,634,580	
Various	Singapore	New York	548,680	
Firestone Tire & Rubber Co.	Penang	Akron	100,980	
Various	Penang	New York	97,020	
F. R. Henderson & Co.	Batavia	New York	43,740	
Fred Stern & Co.	Batavia	New York	94,080	
Various	Batavia	New York	45,240	3,083,780
February 5. By the S. S. "Urbino," at New York.				
L. Littlejohn & Co., Inc.	Colombo	New York	112,000	
Fred Stern & Co.	Colombo	New York	11,200	
Hood Rubber Co.	Colombo	Watertown	125,000	
Various	Colombo	New York	187,660	435,860
February 6. By the S. S. "Ryndam," at New York.				
Charles T. Wilson Co., Inc.	Rotterdam	New York	11,143	
Various	Rotterdam	New York	15,317	26,460
February 8. By the S. S. "Quillota," at New York.				
G. Amsinck & Co., Inc.	Guayaquil	New York	2,880	
American Trading Co.	Guayaquil	New York	4,140	7,020
February 8. By the S. S. "City of Brisbane," at Boston.				
Various	Colombo	Boston	43,920	43,920
February 9. By the S. S. "Saugerties," at New York.				
Firestone Tire & Rubber Co.	Singapore	Akron	111,934	
Poel & Kelly	Singapore	New York	128,152	
The Goodyear Tire & Rubber Co.	Singapore	Akron	2,407	
The Fisk Rubber Co.	Singapore	Chicopee Falls	44,974	
Baring Brothers	Colombo	New York	280,000	
East Asiatic Co., Inc.	Soerabaya	New York	130,860	
Various	Soerabaya	New York	47,700	
Netherlands Corporation for Oversea Trade	Batavia	New York	7,920	
Meyer & Brown, Inc.	Colombo	New York	280,000	
Thornett & Fehr, Inc.	Belawan Deli	New York	137,520	
Various	Singapore	New York	440,090	1,611,557
February 9. By the S. S. "City of Brisbane," at New York.				
Meyer & Brown, Inc.	Colombo	New York	593,600	
Baring Brothers	Colombo	New York	592,200	
Aldens' Successors, Inc.	Colombo	New York	9,000	
W. R. Grace & Co.	Colombo	New York	96,120	
L. Littlejohn & Co., Inc.	Colombo	New York	179,600	
Charles T. Wilson Co., Inc.	Singapore	New York	44,800	1,515,320
February 11. By the S. S. "Clan Machrogue," at New York.				
Various	Cochin	New York	128,160	128,160
February 11 By the S. S. "Melville Dollar," at New York.				
Hood Rubber Co.	Singapore	Watertown	112,000	112,000
February 14. By the S. S. "Valacia," at New York.				
Poel & Kelly	London	New York	17,100	17,100
February 14. By the S. S. "West Mingo," at New York.				
Various	Singapore	New York	22,500	22,500
February 14. By the S. S. "Welshman," at New York.				
Various	London	New York	20,340	20,340
February 14. By the S. S. "Muncaster Castle," at New York.				
Hood Rubber Co.	Singapore	Watertown	465,024	
Huth & Co.	Singapore	New York	112,000	
Poel & Kelly	Singapore	New York	655,872	
Fred Stern & Co.	Singapore	New York	38,080	
F. R. Henderson & Co.	Singapore	New York	117,376	
Aldens' Successors, Inc.	Singapore	New York	19,712	
L. Littlejohn & Co., Inc.	Singapore	New York	246,800	
Charles T. Wilson Co., Inc.	Singapore	New York	47,100	
General Rubber Co.	Singapore	New York	84,224	
Pacific Trading Co.	Singapore	New York	672	
Meyer & Brown, Inc.	Singapore	New York	168,000	
Various	Singapore	New York	670,176	2,625,036
February 15. By the S. S. "Nieuw Amsterdam," at New York.				
Various	Rotterdam	New York	70,560	70,560

BALATA

	Shipment from:	Shipped to:	Pounds.	Totals.
January 22. By the S. S. "Uranus," at New York.				
Wm. Schall & Co.	Haiti	New York	2,700	2,700
January 28 By the S. S. "Matura," at New York.				
South & Central America Commercial Co.	Trinidad	New York	1,680	1,680
January 29. By the S. S. "Tivives," at New York.				
Ultramares Corp.	Cartegena	New York	750	750
January 30. By the S. S. "Ariadc," at New York.				
Wm. Schall & Co.	Cuba	New York	1,200	1,200
February 11. By the S. S. "Mayaro," at New York.				
South & Central America Commercial Co.	Trinidad	New York	4,950	4,950
February 14. By the S. S. "Maracaibo," at New York.				
Various	La Guayra	New York	12,000	12,000

CENTRALS

	Shipment from:	Shipped to:	Pounds.	Totals.
February 6. By the S. S. "General G. W. Goethals," at New York.				
Various	Cristobal	New York	900	900

JELUTONG

	Shipment from:	Shipped to:	Pounds.	Totals.
January 30. By the S. S. "Katuna," at New York.				
Various	Singapore	New York	58,800	58,800
February 3. By the S. S. "Harold Dollar," at New York.				
Various	Singapore	New York	69,900	69,900

GUTTA PERCHA

January 27 By the S. S. "Hague Maru," at New York.				
L. Littlejohn & Co., Inc.	Singapore	New York	120,000	120,000

GUTTA SIAK

February 3. By the S. S. "Harold Dollar," at New York.				
F. R. Henderson & Co..	Singapore	New York	63,000	63,000

GUAYULE

February 2. By rail at Eagle Pass, Texas.				
Continental-Mexican Rubber Co.	Mexico	New York	55,000	55,000

AFRICANS

January 23. By the S. S. "West Caruth," at New York.				
Various	West Africa	New York	35,840	35,840
February 14. By the S. S. "Lake Gazette," at New York.				
Various	Natal	New York	5,520	5,520
February 16. By the S. S. "Asia," at New York.				
Various	Marseilles	New York	609,615	609,615

CUSTOM HOUSE STATISTICS

PORT OF NEW YORK

IMPORTS

	December			
	1919		1920	
	Pounds	Value	Pounds	Value
Unmanufactured—*free*:				
Crude rubber:				
From Belgium	603,506	$251,212	13,650	$2,048
France	706,733	191,652	22,469	8,825
Netherlands	1,480,555	731,657	211,832	90,525
England	11,530,204	5,366,150	398,403	98,312
Philippine Islands	....	....	41,060	10,150
Canada	6,179	2,510	....	....
Honduras	2,209	950	....	....
Costa Rica	627	265	....	....
Panama	9,153	3,257	130	32
Nicaragua	....	....	1,013	152
Mexico	3,230	1,099	....	....
Brazil	4,842,438	1,721,916	1,533,355	297,574
Colombia	61,785	26,514	7,518	2,403
Ecuador	80,956	17,771	4,800	1,495
Argentina	32,903	16,855	....	....
Peru	485,652	91,489	137,138	28,133
Chile	56,000	28,000	....	....
Uruguay	13,892	3,850	96,534	35,866
Venezuela	25,722	14,436	....	....
British India	95,340	46,694	253,470	89,677
Straits Settlements	15,187,762	6,166,750	15,460,373	4,938,588
British East Indies	5,548,294	2,311,090	3,067,478	738,292
Dutch East Indies	6,106,336	2,803,892	1,828,966	585,100
British W. Africa	5,530	664	....	....
French W. Africa	218,306	30,492	....	....
Totals	47,103,312	$19,829,175	23,078,189	$6,927,172
Jelutong (Pontianak):				
From Straits Settlements	1,015,410	$121,247	....	....
Dutch East Indies	173,906	18,255	....	....
Totals	1,189,316	$139,502	....	....
Gutta percha:				
From England	284	$221	....	....
Straits Settlements	497,406	82,665	116,441	$29,380
Dutch East Indies	242	335	....	....
British W. Africa	2,939	411	....	....
Totals	500,871	$83,632	116,441	$29,380
Balata:				
From England	28,913	$24,094	....	....
Panama	15,323	6,164	1,872	$600
Haiti	24,354	22,295	....	....
Colombia	18,911	7,429	1,495	781
British Guiana	43,799	35,075	....	....
Dutch Guiana	15,433	11,909	....	....
Venezuela	71,795	49,304	43,850	28,523
Nicaragua	....	....	2,995	1,500
Totals	218,528	$156,270	50,212	$31,404
Guayule:				
From Mexico	15,820	$3,638	....	....
Totals	15,820	$3,638	....	....
Reclaimed and scrap rubber.	726,725	$63,683	390,996	$46,765
Totals, unmanufactured.	49,754,572	$20,275,900	23,635,838	$7,034,721
Manufactures of rubber and gutta percha	....	$45,405	....	$31,005
Rubber substitutes	12,880	2,139	....	....
Chicle .... *dutiable*	300,134	221,407	583,479	352,254

EXPORTS

	December			
	1919		1920	
	Pounds	Value	Pounds	Value
Manufactured:				
Automobile tires	....	$1,986,988	....	$2,766,003
Inner tubes	....	....	....	243,232
Solid tires	....	....	....	194,826
All other tires	....	72,717	....	23,691
Belting	....	249,436	....	331,411
Hose	....	....	....	350,913
Packing	....	....	....	127,729
Rubber boots .... *pairs*	9,898	24,715	4,674	16,852
Rubber shoes .... *pairs*	644,367	526,127	741,826	819,649
Soles and heels	....	....	....	73,826
Druggists' sundries	....	60,224	....	143,433
Other rubber manufactures	....	351,661	....	587,641
Totals, manufactured	....	$3,270,866	....	$5,679,206
Insulated wire	....	$425,884	....	$1,168,329
Fountain pens .... *number*	19,715	21,087	54,586	64,188
Suspenders and garters	....	128,628	....	334,667
Chewing gum	....	135,305	....	367,649
Totals	....	$710,904	....	$1,934,833
Unmanufactured—*free*:				
Reclaimed and scrap rubber.	900	$180	672,869	$48,403

FOREIGN EXPORTS

Crude rubber	75,132	$41,177	343,216	$91,602
Balata	27,179	16,434	52,059	34,807
Guayule	2,206	620	....	....
Chicle	....	....	4,392	1,899
Rubber substitutes	....	....	86,183	9,742
Rubber manufactures	....	....	....	4,344

PORT OF BOSTON

IMPORTS

Unmanufactured—*free*:				
Crude rubber:				
From Straits Settlements	......	......	4,600	$1,130
British East Indies	......	......	273,400	55,108
Totals	......	......	278,000	$56,238
Rubber manufactures, *dutiable*	......	$5,212	......	$4,397

EXPORTS

Manufactured:				
Automobile tires	......	$20,226	......	......
Belting	......	1,993	......	$21
Hose	......	......	......	3,728
Packing	......	......	......	11
Rubber boots .... *pairs*	9,888	26,494	3,910	11,357
Rubber shoes .... *pairs*	138,015	112,444	63,399	70,443
Soles and heels	......	......	......	4,266
Druggists' sundries	......	2,417	......	2,042
Other rubber manufactures	......	69,915	......	29,074
Totals	......	$233,489	......	$120,931
Insulated wire	......	$20,778	......	$192
Suspenders and garters	......	16,357	......	......
Rubber scrap and reclaimed.	225	40	......	......
Fountain pens	43	51	......	......

PORT OF NEW ORLEANS

IMPORTS

From Costa Rica	....	....	957	$89
Nicaragua	9,282	$2,448	....	....
Totals	9,282	$2,448	957	$89

EXPORTS

Manufactured:				
Automobile tires	....	$8,341	....	$18,950
Inner tubes	....	....	....	2,783
Solid tires	....	....	....	1,428
All other tires	....	793	....	766
Belting	....	5,284	....	10,619
Hose	....	....	....	13,262
Packing	....	....	....	571
Rubber boots .... *pairs*	12	78	7	28
Rubber shoes .... *pairs*	9,482	8,376	36,667	45,040
Soles and heels	....	....	....	43
Druggists' sundries	....	898	....	2,247
Other rubber manufactures	....	3,777	....	5,061
Totals	....	$27,547	....	$100,798
Insulated wire	....	$5,043	....	....
Fountain pens .... *number*	108	99	....	....
Suspenders	....	4,273	....	$3,023
Chewing gum	....	2,649	....	1,840
Rubber scrap and reclaimed.	45	11	....	....

PORT OF SEATTLE

IMPORTS

	December 1919 Pounds	Value	December 1920 Pounds	Value
Unmanufactured—*free:*				
Crude rubber:				
From Straits Settlements..	1,896,337	$841,077	....	....
Dutch East Indies..	185,878	72,731	....	....
Hongkong	118,650	55,293	....	....
Japan	67,200	32,041	....	....
Totals	2,268,065	$1,001,142	....	....
Rubber scrap and reclaimed.	3,805	$114	625	$125
Rubber manufactures	....	532	....	30

EXPORTS

	December 1919 Pounds	Value	December 1920 Pounds	Value
Manufactured:				
Automobile tires	....	$7,158	....	$4,052
Solid tires	....	....	....	752
All other tires	....	3,624	....	....
Belting	....	2,447	....	....
Hose	....	....	....	314
Packing	....	....	....	235
Rubber boots ....*pairs*	351	1,251	658	2,605
Rubber shoes ....*pairs*	1,375	2,190	454	916
Druggists' sundries	....	438	....	67
Other rubber manufactures..	....	3,614	....	1,455
Totals	....	$20,722	....	$10,396
Insulated wire	....	$538	....	$924
Fountain pens ......*number*	3,015	1,631	12	24
Suspenders	....	2,029	....	464
Chewing gum	....	....	....	45
Rubber scrap and reclaimed.	375,825	20,745	11,878	291

FOREIGN EXPORTS

	December 1919 Pounds	Value	December 1920 Pounds	Value
Crude rubber	....	....	20,112	$4,517

PORT OF SAN FRANCISCO

IMPORTS

	December 1919 Pounds	Value	December 1920 Pounds	Value
Unmanufactured—*free:*				
Crude rubber:				
From Straits Settlements..	3,099,672	$1,386,997	89,310	$20,603
Dutch East Indies..	1,287,847	468,770	....	....
Colombo	....	....	3,200	800
Hongkong	50,400	18,144	....	....
British India	2,860	2,002	....	....
Totals	4,440,779	$1,875,913	92,510	$21,403
Balata	....	....	463	$185
Chicle	....	....	28,276	15,608
Rubber manufactures	....	$2,661	....	119

EXPORTS

	December 1919 Pounds	Value	December 1920 Pounds	Value
Manufactured:				
Automobile tires	....	$219,076	....	$67,516
Inner tubes	....	....	....	18,809
Solid tires	....	....	....	10,134
All other tires..........	....	6,302	....	3,181
Belting	....	43,066	....	90,067
Hose	....	....	....	19,544
Packing	....	....	....	11,682
Rubber boots ....*pairs*	420	2,088	....	....
Rubber shoes ....*pairs*	3,229	3,759	1,368	1,583
Soles and heels..........	....	....	....	5,404
Druggists' sundries	....	2,215	....	2,782
Other rubber manufactures..	....	20,345	....	7,388
Totals	....	$296,851	....	$238,090
Insulated wire	....	$2,853	....	$10,274
Fountain pens ......*number*	165	395	111	505
Suspenders	....	9,251	....	2,182
Chewing gum	....	3,692	....	432
Unmanufactured—*free:*				
Reclaimed and scrap rubber.	207,405	$8,357	60,430	$604

EXPORTS OF INDIA RUBBER AND CAUCHO FROM MANOS AND IQUITOS DURING DECEMBER, 1920

Exporters	Europe Fine	Medium	Coarse	Caucho	Total	New York Fine	Medium	Coarse	Caucho	Total	Grand Totals
General Rubber Co. of Brazil...*kilos*	25,077	21,623	17,266	48,034	112,000	290,368	29,185	1,351	96	321,000	433,000
Stowell & Co..........	27,126	16,971	6,400	26,932	77,429	200,194	16,611	22,901	383	240,089	317,518
Tancredo, Porto & Co..........	......	......	......	......	......	70,655	2,233	31,588	30,970	135,446	135,446
B. Lévy & Co..........	......	......	2,520	......	2,520	45,868	7,013	9,408	2,210	64,499	67,019
Semper & Co..........	15,180	785	9,079	16,942	41,986	......	......	......	......	......	41,986
Ohliger & Co..........	24,110	160	1,709	546	26,525	7,360	......	......	......	7,360	33,885
Companhia Fluvial	1,672	178	26	22,444	24,320	......	......	......	......	......	24,320
J. Carneiro da Motta..........	......	......	......	......	......	1,700	......	......	......	1,700	1,700
J. Adonias & Co..........	......	......	......	......	......	......	1,116	......	......	1,116	1,116
Herminio de Carvalho..........	......	......	......	......	......	160	......	......	......	160	160
Totals from Manáos.....*kilos*	93,165	39,717	37,000	114,898	284,780	616,305	56,158	75,248	33,659	771,370	1,056,150
In transit from Iquitos..........	7,124	1,293	1,208	7,487	17,112	37,582	36,805	9,429	4,293	88,109	105,221
Totals ....*kilos*	100,289	41,010	38,208	122,385	301,892	653,887	92,963	84,677	37,952	859,479	1,161,371

Compiled by Stowell & Co., Manáos, Brazil.

EXPORTS OF INDIA RUBBER AND CAUCHO FROM MANAOS AND IQUITOS DURING THE YEAR 1920

Exporters	Europe Fine	Medium	Coarse	Caucho	Total	New York Fine	Medium	Coarse	Caucho	Total	Grand Totals
General Rubber Co. of Brazil..*kilos*	1,164,405	156,182	97,445	87,588	1,505,620	1,940,044	212,987	329,368	579,981	3,062,380	4,568,000
Tancredo, Porto & Co..........	1,031,743	73,218	85,859	83,163	1,273,983	483,650	154,147	352,982	752,017	1,742,796	3,016,779
Stowell & Co..........	947,146	89,800	98,362	535,241	1,670,549	525,388	137,240	252,609	349,970	1,265,207	2,935,756
Obliger & Co..........	264,430	5,455	24,073	22,716	316,674	333,096	49,732	50,865	321,774	755,467	1,072,141
Adelbert H. Alden, Limited.......	167,638	6,758	1,121	579	176,096	340	5,041	35,160	14,110	54,651	230,747
B. Lévy & Co..........	47,498	6,077	55,764	....	109,339	74,709	8,765	13,580	9,794	106,848	216,187
Higson & Fall..........	47,858	3,602	10,628	3,861	65,949	49,143	6,287	5,160	42,720	103,310	169,259
A. Souza	....	....	....	....	....	2,914	245	97,616	58,569	159,344	159,344
J. A. Mendes & Co..........	71,075	98	....	....	71,173	....	13,692	20,225	50,165	84,082	155,255
Semper & Co..........	83,589	6,944	29,546	25,697	145,776	3,345	640	1,080	420	5,485	151,261
Companhia Fluvial	41,849	178	1,166	27,332	70,525	....	....	....	....	....	70,525
Moraes Carneiro & Co..........	14,436	2,291	2,228	2,198	21,153	32,086	4,798	1,965	....	38,849	60,002
Amorim Irmãos	20,000	....	....	....	20,000	6,240	8,575	14,608	574	29,997	49,997
J. G. Araujo..........	17,523	6,311	5,126	10,418	39,378	....	....	....	....	....	39,378
Gomes & Co..........	32,470	660	750	....	33,880	....	....	....	....	....	33,880
G. Deffner & Co..........	....	....	....	....	....	9,333	....	2,245	3,156	14,734	14,734
Essabbá & Lévy..........	13,100	533	302	....	13,935	....	....	....	....	....	13,935
Various	17,606	438	5,576	477	24,097	9,657	2,232	4,768	46	16,703	40,800
Totals from Manáos......*kilos*	3,982,366	358,545	417,946	799,270	5,558,127	3,469,945	604,381	1,182,231	2,183,296	7,439,853	12,997,980
In transit from Iquitos..........	30,538	11,358	9,211	21,480	72,587	272,266	594,008	113,999	332,514	1,312,787	1,385,374
Totals ....*kilos*	4,012,904	369,903	427,157	820,750	5,630,714	3,742,211	1,198,389	1,296,230	2,515,810	8,752,640	14,383,354

Compiled by Stowell & Co., Manáos, Brazil.

RUBBER STATISTICS FOR THE DOMINION OF CANADA

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	November			
	1919		1920	
UNMANUFACTURED—*free:*	Pounds	Value	Pounds	Value
Rubber, gutta percha, etc.:				
From United Kingdom.....	779,359	$410,096	4,480	$2,088
United States........	197,309	86,237	592,385	125,934
Brazil	28,600	20,413	22,000	7,269
British East Indies:				
Straits Settlements.	1,048,723	457,147	528,658	226,966
Other countries	....	....	4,497	1,860
Balata	....	....	28	51
Totals	2,053,991	$973,893	1,152,048	$364,168
Rubber, recovered..........	347,521	$59,178	124,509	$22,585
Rubber, powdered, and rubber or gutta percha scrap.......	364,672	44,468	142,396	10,192
Rubber substitutes..........	135,236	15,512	170,065	18,977
Totals, unmanufactured..	2,901,420	$1,093,051	1,589,018	$415,922
PARTLY MANUFACTURED—				
Hard rubber sheets and rods..	12,844	$3,579	95,109	$51,857
Hard rubber tubes...........	....	1,666	....	4,374
Rubber thread, not covered...	2,659	3,879	785	1,168
Totals, partly manufactured	15,503	$9,124	95,894	$57,399
MANUFACTURED—				
Belting	....	$17,277	....	$24,244
Hose	....	13,598	....	17,003
Packing	....	6,218	....	6,338
Boots and shoes..........	....	36,561	....	36,313
Clothing, including waterproofed	....	17,290	....	22,885
Gloves	....	998	....	1,358
Hot water bottles..........	....	3,022	....	2,984
Tires, solid..............	....	7,515	....	10,906
Tires, pneumatic...........	....	28,620	....	236,564
Tires, inner tubes..........	....	2,449	....	28,068
Other manufactures..........	....	227,950	....	191,551
Totals, manufactured.....	....	$361,498	....	$578,214
Totals, rubber imports...	2,916,923	$1,463,673	1,684,912	$1,051,535
Insulated wire and cables:				
Wire and cables covered with cotton, linen, silk, rubber, etc............	....	$14,475	....	$17,641
Copper wire and cables, covered as above........	....	9,779	....	24,222
Chicle	151,203	$94,767	510	230

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS

	November			
	1919		1920	
	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
UNMANUFACTURED—				
Crude and waste rubber.....	$30,273	$16,373	$2,574	....
MANUFACTURED—				
Belting	$245	....	$9,791	....
Hose	17,295	....	27,271	....
Boots and shoes..........	214,658	$131	206,426	$491
Clothing, including waterproofed	9,488	27	3,808	....
Tires	907	2,046	8,804	930
Tires, pneumatic...........	231,367	....	851,561	....
Other manufactures..........	13,625	2,236	54,574	5,370
Totals, manufactured....	$577,585	$4,440	$1,162,235	$6,791
Totals, rubber exports....	$607,858	$20,813	$1,164,809	$6,791
Insulated wire and cable:				
Copper wire and cable.....	$956	....	$88,084	....
Chicle	37,985	....	75,106	....

SINGAPORE RUBBER AND GUTTA EXPORTS, 1918-1919

Declared exports of guttas and Pará rubber from Singapore to the United States in 1918 and 1919 are given below:

	1918		1919	
Articles	Quantity	Value	Quantity	Value
Gutta, Hongkong.*pounds*	67,469	$14,647	....	....
Gutta, Jankar..........	1,598	9,861	....	....
Gutta, jelutong..........	4,043,625	338,916	15,288,586	$1,824,001
Gutta percha...........	848,506	173,446	267,903	59,542
Gutta, reboiled.........	19,661	4,648	....	....
Gutta Siak............	1,429,397	201,919	2,957,172	364,404
Gutta, all others.......	12,037	898	427,053	46,768
Rubber, Pará..........	173,968,167	62,372,809	235,045,720	130,292,358
Totals	180,390,460	$63,117,144	253,986,434	$132,587,073

OFFICIAL INDIA RUBBER STATISTICS FOR THE UNITED STATES

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	Twelve Months Ended December 31			
	1919		1920	
UNMANUFACTURED—*free:*	Pounds	Value	Pounds	Value
India rubber:				
From France..........	2,410,319	$752,579	3,588,662	$1,117,089
Netherlands	2,637,665	1,276,060	8,859,178	3,898,785
Portugal	87,422	24,470	2,188,747	587,881
United Kingdom	60,251,894	28,687,500	75,297,018	34,405,278
Canada	5,320,540	2,530,295	371,334	344,344
Central America.	448,827	152,146	200,583	61,800
Mexico	963,242	306,307	900,411	267,860
Brazil	58,845,384	20,828,269	36,981,973	10,533,541
Peru	4,567,002	1,501,854	4,097,701	1,284,589
Other South Am.	2,398,750	1,000,962	2,117,456	669,722
British E. Indies.	329,624,236	131,652,143	351,924,439	155,329,837
Dutch E. Indies.	61,260,330	24,600,493	72,374,169	31,147,774
Other countries..	7,124,810	2,507,035	7,644,465	3,147,273
Totals	535,940,421	$215,820,113	566,546,136	$242,795,773
Balata	1,628,134	$937,038	2,384,114	$1,260,043
Guayule	3,204,224	760,690	1,698,859	345,985
Jelutong (Pontianak)....	18,662,702	2,213,964	12,705,923	2,068,501
Gutta percha...........	6,495,818	1,068,698	7,129,127	1,520,309
Rubber scrap...........	10,775,225	825,619	12,663,747	909,606
Totals, unmanufactured	576,706,524	$221,626,122	603,127,906	$248,900,217
Chicle (dutiable)........	9,445,538	$6,216,987	9,859,788	$6,748,955
India rubber and gutta percha	......	956,085	......	1,433,957
India rubber substitutes..	392,092	47,966	76,234	13,946

EXPORTS OF DOMESTIC MERCHANDISE

	1919		1920	
	Pounds	Value	Pounds	Value
MANUFACTURED—				
India rubber:				
Scrap and old.........	8,292,053	$808,993	10,468,538	$788,097
Reclaimed	5,070,632	839,938	4,924,668	832,873
Belting[1]	......	......	6,100,460	3,532,277
Hose[1]	......	......		3,340,882
Packing[1]	......	......		1,525,242
Boots[1] ....*pairs*	261,110	714,713	302,852	1,012,099
Shoes[1] ....*pairs*	5,794,488	4,551,386	10,088,511	9,738,390
Soles and heels[1].......	......	......	......	984,235
Tires:				
For automobiles[1]......	......	28,924,659	......	......
Casings[1]	......	......	......	43,899,502
Inner tubes[1]..........	......	......	......	4,813,052
Solid tires[1]...........	......	......	......	3,331,789
All other tires[1]........	......	1,557,227	......	1,029,672
Druggists' rubber sundries[1]	......	1,270,506	......	1,890,957
Suspenders and garters..	......	2,551,858	......	4,143,487
Other rubber manufactures[1]	......	9,097,773	......	8,717,830
Totals, manufactured.	......	$50,317,053	......	$89,580,384
Fountain pens....*number*	423,906	$409,517	465,300	$518,410
Insulated wire and cables.	......	8,815,212	......	8,208,539

EXPORTS OF FOREIGN MERCHANDISE

	Twelve Months Ended December 31			
	1919		1920	
	Pounds	Value	Pounds	Value
UNMANUFACTURED—				
India rubber............	5,111,786	$2,205,629	9,246,725	$2,882,996
Gutta percha...........	12,655	3,611	14,561	6,862
Guayule	2,210	621	1,716	1,126
Balata	351,477	206,118	782,919	433,096
Jelutong (Pontianak)....	163,034	26,873	433,455	71,560
Rubber scrap............	1,870	206	60,278	11,129
Totals, unmanufactured	5,643,032	$2,443,058	10,539,654	$3,406,769
MANUFACTURED—				
Gutta percha and India rubber	......	$39,743	......	$23,779
India rubber substitutes..	375	357	150,607	37,416
Totals, manufactured.	....	$40,100	....	$61,195

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES

	1919		1920	
	Pounds	Value	Pounds	Value
MANUFACTURED—				
To Alaska:				
Belting, hose, and packing	......	$114,711	......	$140,927
Boots and shoes..*pairs*	76,995	200,344	75,850	233,358
Other rubber goods....	......	50,997	......	70,144
Totals	......	$366,052	......	$444,429
To Hawaii:				
Belting, hose and packing	......	$119,189	......	$223,131
Automobile tires.......	......	1,135,412	......	1,306,980
Other tires	......	38,450	......	72,186
Other rubber..........	......	159,886	......	212,973
Totals	......	$1,452,937	......	$1,815,270
To Porto Rico:				
Belting, hose and packing	......	$57,212	......	$120,972
Automobile tires.......	......	867,457	......	1,396,912
Other tires	......	33,742	......	85,650
Other rubber goods....	......	196,721	......	483,427
Totals	......	$1,155,132	......	$2,086,961

To Philippine Islands—Treated as foreign commerce.

[1]Details of exports of domestic merchandise by countries for the twelve months ended December 31, will be given in a later issue.

EXPORTS OF INDIA RUBBER MANUFACTURES AND INSULATED WI RE AND CABLE FROM THE UNITED STATES BY COUNTRIES, DURING THE MONTH OF NOVEMBER, 1920

EXPORTED TO—	Belting Value	Hose Value	Packing Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Soles and Heels Value	Automobile Tires Casings Value	Automobile Tires Inner Tubes Value	Automobile Tires Solid Tires Value	Automobile Tires All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
Europe:																
Belgium	$628	$477	$860	......	......	17,303	$18,015	......	$83,433	$14,884	......	......	$28,427	$87	$2,773	$149,584
Bulgaria	......	......	......	......	......	1,728	2,189	......	1,525	449	......	......	......	......	482	4,645
Denmark	1,577	......	747	......	......	16,736	18,167	13,300	16,893	120	......	......	4,747	296	3,515	59,362
Finland	3,454	357	1,200	......	......	10,550	12,100	......	13,768	650	......	2,371	3,090	......	3,329	40,319
France	9,491	726	1,781	......	......	7,587	14,561	......	171,414	2,261	......	18,200	13,531	239	59,723	291,927
Germany	1,162	......	......	......	......	......	......	......	17,212	6,532	......	20	......	......	......	24,926
Gibraltar	......	1	......	......	......	......	......	......	......	......	......	......	4	......	49	54
Greece	......	682	......	2	$15	2,736	3,207	......	12,250	916	372	......	1,738	110	2,572	21,862
Iceland and Faroe Islands	......	......	......	3,312	11,259	......	......	......	......	......	......	......	......	......	......	11,259
Italy	2,348	......	......	168	238	9,536	9,282	265	148,784	21,785	......	2,902	7,045	3,236	4,445	200,330
Malta, Gozo and Cyprus Islands	......	......	......	1	5	......	......	......	895	80	......	......	......	......	......	980
Netherlands	......	8,668	......	......	......	1,320	1,228	......	104,520	19,463	......	40	18,847	1,761	4,839	159,366
Norway	3,319	10,565	2,050	474	1,945	190,049	189,278	720	77,563	4,923	2,191	1,171	7,859	10,544	5,470	308,598
Poland and Danzig	......	......	......	......	......	19,080	19,000	......	9,362	1,530	......	......	15,608	......	......	45,500
Portugal	3,269	......	......	947	2,044	4,400	2,377	......	8,102	6,000	213	26	......	135	51	22,217
Roumania	......	......	......	......	......	6,120	7,475	......	19,805	4,657	4,867	......	1,864	......	495	39,163
Russia in Europe	......	......	......	......	......	1,104	1,500	......	......	......	......	......	......	......	......	1,500
Spain	1,444	......	3,000	......	......	2,979	2,621	......	100,815	7,243	......	305	3,854	3,615	17,978	140,875
Sweden	6,091	8,493	537	280	1,115	7,227	7,874	235	22,855	8,109	900	4,879	22,817	2,490	10,565	96,960
Switzerland	......	......	......	......	......	4,296	4,064	27	12,960	499	......	......	11,645	......	2,581	31,776
Turkey in Europe	......	682	......	......	......	42,675	48,147	......	11,766	6,566	......	......	......	......	985	68,146
England	4,754	42,868	23,008	264	1,020	22,254	14,317	6,057	249,591	42,116	......	298	50,391	27,149	106,577	568,146
Scotland	16,175	......	1,172	72	216	3,528	2,407	......	4,829	1,679	......	......	61	......	3,362	29,901
Ireland	......	......	......	......	......	......	......	11,123	......	......	......	......	......	......	2,465	13,588
Yugoslavia, Albania, etc	......	......	......	......	......	......	......	584	5,456	......	......	......	......	......	250	6,290
Totals, Europe	$53,712	$73,519	$34,355	5,520	$17,857	371,208	$368,809	$32,311	$1,093,798	$150,462	$8,543	$30,212	$191,528	$49,662	$232,506	$2,337,274
North America:																
Bermuda	......	$669	$35	41	$128	632	$640	$236	......	$72	......	......	......	$616	$1,551	$3,947
British Honduras	......	......	180	......	......	745	1,331	......	$115	......	......	......	......	60	12	1,698
Canada	$16,685	10,281	3,840	5,058	17,493	9,530	10,552	133	171,767	18,076	$6,811	$3,406	$26,051	22,097	165,352	472,544
Costa Rica	1,182	203	187	......	......	......	......	516	593	......	1,680	4	3,415	108	1,133	9,021
Guatemala	1,237	417	146	......	......	1,551	2,217	601	2,779	114	......	371	181	772	937	9,772
Honduras	599	1,541	158	......	......	684	997	115	611	62	......	......	2,028	490	1,470	8,071
Nicaragua	1,032	421	268	......	......	665	1,000	428	......	38	297	505	563	64	1,672	6,288
Panama	6	21,142	316	30	91	1,118	1,261	348	5,435	2,418	2,191	422	26,347	1,313	1,832	63,122
Salvador	19	90	470	......	......	504	658	3,355	10,413	1,378	4,500	443	734	31	830	22,921
Mexico	79,778	47,996	15,348	1	11	15,660	20,877	3,872	204,487	41,997	10,887	......	76,212	9,460	51,303	562,228
Miquelon, Langley, etc	......	......	......	38	127	168	120	......	......	......	......	......	......	......	......	247
Newfoundland and Labrador	4,263	1,128	21	4,383	16,073	548	548	738	......	......	253	750	1,286	1,512	1,435	28,007
Barbados	360	......	......	......	......	802	1,144	63	2,366	214	......	67	27	......	314	4,555
Jamaica	20	792	143	18	75	4,903	6,378	890	4,257	1,010	2,349	507	1,950	54	950	19,375
Trinidad and Tobago	......	609	259	......	......	816	1,011	......	1,749	504	1,061	......	1,261	78	169	6,701
Other British West Indies	......	34	......	......	......	1,279	2,156	58	1,212	132	......	1,232	2,025	58	1,514	8,421
Cuba	13,532	50,024	40,351	2,305	2,889	367,838	382,243	16,007	312,614	33,867	97,292	5,023	252,200	26,860	85,431	1,318,333
Virgin Islands of United States	......	1,236	290	......	......	857	1,582	12	2,934	331	......	21	......	21	22	6,449
Dutch West Indies	......	438	8	......	......	1,649	1,891	121	2,305	207	......	......	742	14	61	5,787
French West Indies	212	......	......	......	......	24	16	......	2,219	234	1,305	595	64	......	303	4,948
Haiti	......	243	......	......	......	222	309	1,005	7,857	918	......	76	742	3	483	11,636
Dominican Republic	199	3,467	1,832	......	......	2,712	4,258	658	22,948	2,751	1,307	142	4,058	921	2,316	44,857
Totals, North America	$119,124	$140,731	$63,852	11,874	$36,887	412,907	$441,189	$29,156	$756,661	$104,323	$129,933	$13,564	$399,886	$64,532	$319,090	$2,618,928
Oceania:																
Australia	$68,909	$6,515	$949	36	$90	3,476	$3,570	......	$113,197	$55,268	$5,500	$1,210	$3,180	$1,294	$25,799	$285,481
New Zealand	4,730	2,124	657	672	2,554	648	606	$2,366	117,661	7,982	19,825	......	2,671	1,247	5,716	168,139
Other British Oceania	......	......	......	......	......	35	177	......	1,848	210	573	......	289	......	18	3,115
French Oceania	185	......	......	......	......	400	697	......	......	97	697	14	197	10	141	2,038
Other Oceania	......	......	......	......	......	516	684	......	975	......	372	......	25	......	......	2,056
Philippine Islands	35,600	7,503	3,519	144	579	59,723	75,261	7,889	134,339	25,159	20,474	25,152	54,011	3,683	35,035	428,204
Totals, Oceania	$109,424	$16,142	$5,125	852	$3,223	64,798	$80,995	$10,255	$368,020	$88,716	$47,441	$26,376	$60,373	$6,234	$66,709	$889,033
South America:																
Argentina	$29,227	$23,593	$2,502	......	......	19,965	$17,796	$1,305	$406,823	$63,925	$2,475	$380	$39,621	$15,843	$101,303	$704,793
Bolivia	902	1,238	45	210	$1,642	......	......	......	1,952	......	388	......	6,608	......	49	12,824
Brazil	13,399	15,097	1,818	10	50	5,133	5,591	26,686	99,976	17,312	3,502	320	127,892	9,670	28,941	350,254
Chile	50,800	14,418	3,574	512	4,004	3,589	4,532	344	12,341	2,327	2,383	415	10,193	2,726	9,941	117,998
Colombia	168	2,976	445	12	36	987	1,045	2,470	18,419	3,043	300	205	16,659	5,079	10,783	61,628
Ecuador	......	1,041	......	......	......	144	195	......	8,120	1,322	......	59	5,601	780	725	17,843
British Guiana	385	231	283	......	......	3,488	4,239	......	2,705	466	370	......	129	......	852	9,660
Dutch Guiana	......	633	22	......	......	......	......	81	1,905	350	......	......	......	......	211	3,202
French Guiana	......	......	30	......	......	48	29	......	......	......	......	......	......	......	18	77
Paraguay	......	......	......	......	......	......	......	......	932	......	......	......	......	170	......	1,102
Peru	2,116	2,178	2,825	24	200	523	1,075	137	23,036	2,995	2,429	......	27,978	793	4,207	69,969
Uruguay	2,444	13,666	1,254	......	......	10,940	11,793	5,164	49,367	4,617	284	......	6,821	5,083	12,424	112,917
Venezuela	402	934	439	......	......	86	120	345	26,602	1,955	215	101	2,111	3,605	2,996	39,825
Totals, South America	$99,843	$76,005	$13,237	768	$5,932	44,903	$46,415	$36,532	$652,178	$98,312	$12,346	$1,480	$243,613	$43,749	$172,450	$1,502,092

EXPORTED TO—	Belting Value	Hose Value	Packing Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Soles and Heels Value	Automobile Tires: Casings Value	Automobile Tires: Inner Tubes Value	Automobile Tires: Solid Tires Value	Automobile Tires: All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
ASIA:																
Aden	......	......	......	......	......	......	......	......	$125	......	......	......	......	......	......	$125
China	$4,065	$4,422	$5,485	......	......	1,120	$1,537	......	28,356	$20,244	$50	$99	$62,090	$3,023	$5,758	133,129
Kwantung, leased territory	......	300	......	......	......	......	......	......	......	......	......	......	......	......	......	300
Chosen	......	37	121	......	......	30	38	......	......	......	......	......	......	......	34	230
British India	5,665	6,487	1,398	......	......	2,305	4,022	$3	58,001	8,227	16,730	1,135	45,422	1,699	6,717	155,506
Straits Settlements	1,403	......	......	......	......	2,781	3,014	......	83,316	8,150	1,948	......	815	100	2,943	101,689
Other British East Indies	1,165	258	......	......	......	504	827	48	4,095	611	......	......	......	......	......	7,004
Dutch East Indies	......	739	261	......	......	1,200	1,137	38	216,857	7,384	57,703	3,469	27,401	81	2,083	317,153
French Indo China	5,127	......	......	......	......	......	......	......	......	......	......	......	45	......	......	5,172
Hongkong	......	50	369	......	......	68	149	72	341	54	1,905	......	......	45	1,480	4,465
Japan	4,320	1,537	18,571	2,155	$6,293	12,988	12,947	......	17,815	1,671	5,876	682	1,108	486	9,717	81,023
Persia	......	......	......	......	......	36	52	......	......	......	......	......	......	......	......	52
Siam	414	......	......	......	......	396	173	......	879	......	261	......	......	42	......	1,769
Turkey in Asia	......	13	......	100	203	2,019	2,242	......	1,585	273	98	722	......	......	1,859	6,995
TOTAL, ASIA	$22,159	$13,843	$24,205	2,255	$6,496	23,447	$26,138	$161	$411,370	$46,614	$84,571	$6,107	$136,881	$5,476	$30,591	$814,612
AFRICA:																
Belgian Kongo	......	......	......	......	......	2	$5	......	......	......	......	......	......	......	$15	$20
British West Africa	......	......	......	......	......	37	83	......	$43,559	$7,595	$632	$73	......	......	45	51,987
British South Africa	$32,854	$26,628	$5,630	76	$288	1,532	1,709	$7,642	76,256	11,201	......	358	$1,385	$4,607	16,041	184,599
British East Africa	......	......	......	......	......	......	......	......	20,916	3.666	......	......	......	......	262	24,844
Canary Islands	......	......	......	......	......	......	......	......	1,258	13	800	......	......	......	1,482	3,553
French Africa	......	135	......	......	......	59	135	......	904	200	2,000	350	100	......	......	3,824
Morocco	......	......	......	......	......	......	......	......	5,835	......	......	......	......	......	......	5,835
Portuguese Africa	3,912	......	222	......	......	......	......	......	......	......	......	......	......	......	171	4,305
Egypt	......	131	......	......	......	7	14	......	12,373	117	......	......	132	44	1,940	14,751
TOTALS, AFRICA	$36,766	$26,894	$5,852	76	$288	1,637	$1,946	$7,642	$161,110	$22,792	$3,432	$781	$1,617	$4,651	$19,956	$293,718
GRAND TOTALS	$441,028	$347,134	$146,626	21,345	$70,683	918,900	$965,492	$116,057	$3,443,128	$511,219	$286,266	$78,520	$1,033,898	$174,304	$841,302	$8,455,657

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORY OF UNITED STATES

	Belting, Hose and Packing Value	Boots and Shoes Pairs	Boots and Shoes Value	Tires: Automobile Value	Tires: All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
Hawaii	$27,613	......	......	$107,866	$1,390	......	......	$21,593	$158,462
Porto Rico	13,385	......	......	166,757	1,988	......	......	74,015	256,145
TOTALS	$40,998	......	......	$274,623	$3,378	......	......	$95,608	$414,607

Compiled by the Bureau of Foreign Commerce, Department of Commerce, Washington, D. C.

OFFICIAL INDIA RUBBER STATISTICS FOR THE UNITED STATES

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	December 1919 Pounds	1919 Value	1920 Pounds	1920 Value
UNMANUFACTURED—*free:*				
India rubber:				
From France	706,733	$191,662	22,469	$8,825
Netherlands	1,480,555	731,657	211,832	90,525
United Kingdom	11,902,804	5,557,579	398,403	98,312
Canada	6,179	2,510	209	209
Central America	21,271	6,920	2,275	373
Mexico	55,179	16,684	....	....
Brazil	4,842,438	1,721,916	1,533,355	297,574
Peru	485,652	91,489	137,138	28,133
Other South Am.	271,258	107,426	112,052	40,564
British E. Indies	26,736,394	11,119,560	19,249,506	5,895,233
Dutch E. Indies	7,871,435	3,466,083	1,828,966	585,100
Other countries	1,063,592	387,846	665,556	269,790
Totals	55,443,490	$23,401,332	24,161,761	$7,314,638
Balata	218,528	$156,270	50,675	$31,589
Guayule	15,820	3,638	....	....
Jelutong (Pontianak)	1,189,316	139,502	....	....
Gutta percha	500,871	83,632	116,441	29,380
Rubber scrap	1,102,706	85,243	468,040	49,985
Totals, unmanufactured	58,470,731	$23,869,617	24,796,917	$7,425,592
Chicle (dutiable)	854,968	$610,161	1,250,881	$692,338
India rubber and gutta percha	....	63,419	....	53,656
India rubber substitutes	12,880	2,139	....	....

EXPORTS OF DOMESTIC MERCHANDISE

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
MANUFACTURED—				
India rubber:				
Scrap and old	1,086,786	$81,451	785,279	$51,380
Reclaimed	456,009	73,821	220,177	32,407
Belting[1]	....	436,016	....	491,525
Hose[1]	....		....	443,610
Packing[1]	....		....	164,613
Boots[1] ...pairs	21,778	57,993	10,928	38,799
Shoes[1] ...pairs	812,069	669,084	854,372	950,304
Soles and heels[1]	....	....	....	85,918
Tires:				
For automobiles[1]	....	2,763,579	....	....
Casings[1]	....	....	....	3,264,711
Inner tubes[1]	....	....	....	366,468
Solid tires[1]	....	....	....	244,527
All other tires[1]	....	148,057	....	30,945
Druggists' rubber sundries[1]	....	103,772	....	182,898
Suspenders and garters	....	189,885	....	364,406
Other rubber manufactures[1]	....	762,013	....	743,977
Totals, manufactured	....	$5,285,671	....	$7,456,488
Fountain pens ...number	29,955	$27,196	56,305	$67,361
Insulated wire and cables	....	499,315	....	1,301,307

EXPORTS OF FOREIGN MERCHANDISE

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
UNMANUFACTURED—				
India rubber	945,582	$388,795	1,545,903	$316,966
Guayule	2,206	620	....	....
Balata	27,179	16,434	52,059	34,807
Jelutong (Pontianak)	70,819	11,300	....	....
Rubber scrap	900	180	....	....
Totals, unmanufactured	1,046,686	$417,329	1,597,962	$351,773
MANUFACTURED—				
Gutta percha and India rubber	....	$994	....	$6,048
India rubber substitutes	20	71	86,183	9,742
Totals, manufactured	....	1,065	....	15,790

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
MANUFACTURED—				
To Alaska:				
Belting, hose and packing	....	$3,724	....	$14,326
Boots and shoes ...pairs	2,432	5,498	2,216	6,241
Other rubber goods	....	2,320	....	1,996
Totals	....	$11,542	....	$22,563
To Hawaii:				
Belting, hose and packing	....	$16,760	....	$25,510
Automobile tires	....	169,075	....	60,325
Other tires	....	1,590	....	1,856
Other rubber	....	21,092	....	15,634
Totals	....	$208,517	....	$103,325
To Porto Rico:				
Belting, hose and packing	....	$3,086	....	$13,045
Automobile tires	....	51,840	....	165,862
Other tires	....	1,172	....	1,026
Other rubber goods	....	13,061	....	85,373
Totals	....	$69,159	....	$265,306

To Philippine Islands treated as foreign commerce.

[1] Details of exports of domestic merchandise by countries during December, 1920, will apear in our April issue.

UNITED KINGDOM RUBBER STATISTICS

IMPORTS

	Year Ended December 31			
	1919		1920	
UNMANUFACTURED— Crude rubber: From—	Pounds	Value	Pounds	Value
Straits Settlements	67,351,100	£7,107,882	66,516,400	£6,499,413
Federated Malay States	62,862,200	6,628,845	67,151,200	6,860,824
British India	11,301,200	1,240,460	12,286,800	1,308,035
Ceylon and dependencies	33,498,100	3,605,033	47,991,900	4,657,041
Other Dutch possessions in Indian Seas	12,283,200	1,286,691	8,608,600	870,634
Dutch East Indies (except other Dutch possessions in Indian Seas)	13,372,200	1,381,220	17,769,400	1,667,780
Other countries in the East Indies and Pacific not elsewhere specified	2,843,800	309,696	2,607,600	268,840
Brazil	18,121,400	1,997,385	18,354,400	1,793,766
Peru	1,184,200	1[illegible]0,349	216,700	20,261
South and Central America (except Brazil and Peru)	478,200	46,201	386,900	36,482
West Africa:				
French West Africa	63,900	5,538	666,800	58,502
Gold Coast	315,200	29,953	231,100	22,239
Other parts of West Africa	1,821,700	172,040	1,210,100	104,379
East Africa (including Madagascar)	943,600	93,330	1,370,000	128,771
Other countries	1,797,700	187,263	3,000,200	259,161
Totals	228,237,700	£24,211,886	248,368,100	£24,556,128
Waste and reclaimed rubber	4,992,400	135,661	8,401,700	165,905
Totals, unmanufactured	233,230,100	£24,347,547	256,769,800	£24,722,033
Gutta percha and balata	12,408,500	£2,142,354	10,190,000	£1,999,058
*Rubber substitutes	....	....	1,026,900	47,722
MANUFACTURED—				
Boots and shoes..*dozen pairs*	170,610	£294,338	280,481	£714,685
Waterproof clothing	....	15,585	....	13,174
Insulated wire	....	7,446	....	33,054
Submarine cables	....	38	....	50
Tires and tubes	....	2,148,989	....	5,577,078
Other rubber manufactures	....	557,640	....	810,747

EXPORTS

UNMANUFACTURED—				
Waste and reclaimed rubber	106,366	£240,849	152,475	£397,763
*Rubber substitutes	....	....	28,703	123,346
MANUFACTURED—				
Boots and shoes..*dozen pairs*	15,167	£34,504	12,979	£27,329
Waterproof clothing	......	247,702	......	137,437
Insulated wire	......	97,487	......	166,072
Submarine cables	......	78,070	......	326,295
Tires and tubes	......	400,482	......	417,639
Other rubber manufactures	......	292,851	......	330,669

EXPORTS—COLONIAL AND FOREIGN

UNMANUFACTURED—				
Crude rubber:				
To Russia	10,100	£820	11,400	£856
Sweden, Norway and Denmark	376,800	40,951	385,400	23,020
Germany	429,400	42,250	1,011,800	54,351
Belgium	727,400	77,126	196,700	12,378
France	1,971,000	226,305	719,800	44,097
Spain	41,600	5,222	53,900	3,539
Italy	514,900	53,787	270,900	20,169
Austria-Hungary	......	......	22,400	1,190
Other European countries	302,000	30,617	267,000	15,800
United States	14,132,000	1,707,452	78,500	9,573
Canada	537,600	74,752	248,000	16,645
Other countries	173,900	22,248	22,300	1,280
Totals, rubber	19,216,700	£2,281,530	3,288,100	£202,898
Waste and reclaimed rubber	87,900	£3,222	......	......
Gutta percha and balata	321,300	51,207	32,300	£6,396
MANUFACTURED—				
Boots and shoes..*dozen pairs*	143	£414	1,169	£4,112
Waterproof clothing	......	34	......	296
Tires and tubes	......	1,743	......	82,192
Other manufactures	......	3,043	......	2,785
Totals, manufactured	......	£5,234	......	£89,385

*Included in "Other Articles," Class III, T., prior to 1920.

THE MARKET FOR RUBBER SCRAP

NEW YORK

Like that for reclaimed rubber, the demand for rubber scrap is and has been for months practically non-existent. Prices are nominal without purchases, because the reclaiming plants have all gone out of business temporarily. Rubber scrap and reclaimed rubbers are absolutely dependent on a revival of rubber goods manufacturing in all lines rather than upon tire production alone.

QUOTATIONS FOR CARLOAD LOTS DELIVERED

Prices subject to change without notice

February 23, 1921

BOOTS AND SHOES:				
Arctic tops	*lb*	*$0.075	@	
Boots and shoes	*lb.*	*.05½	@	.05¾
Trimmed arctics	*lb.*	*.04¾	@	.05¾
Untrimmed arctics	*lb.*	*.03¾	@	.04¾
HARD RUBBER:				
Battery jars, black compound	*lb.*	*.01	@	.01¼
No. 1, bright fracture	*lb.*	*.23	@	.24
INNER TUBES:				
No. 1	*lb.*	*.09½	@	.10½
Compounded	*lb.*	*.05½	@	.06½
Red	*lb.*	*.05	@	.06
MECHANICALS:				
Black scrap, mixed, No. 1	*lb.*	*.03½	@	.04
No. 2	*lb.*	*.02½	@	.02¾
Car springs	*lb.*	*.03½	@	.04
Heels	*lb.*	*.03	@	.03½
Horse-shoe pads	*lb.*	*.03	@	.03½
Hose, air brake	*lb.*	*.03½	@	.03¾
fire, cotton lined	*lb.*	*.01½	@	.01¾
garden	*lb.*	*.01½	@	.01¾
Insulated wire stripping, free from fiber	*lb.*	*.03½	@	.04
Matting	*lb.*	*.01¼	@	.01½
Red packing	*lb.*	*.05½	@	.06
Red scrap, No. 1	*lb.*	*.09	@	.10
No. 2	*lb.*	*.06¾	@	.07¼
White scrap, No. 2	*lb.*	*.08	@	.09
No. 1	*lb.*	*.10	@	.11
TIRES:				
PNEUMATIC—				
Auto peelings	*lb.*	*.03¾	@	.04¼
Bicycle	*lb.*	*.02¼	@	.02¾
Standard white auto	*lb.*	*.02½	@	.03½
Mixed auto	*lb.*	*.01¼	@	.02¼
Stripped, unguaranteed	*lb.*	*.01	@	.02½
White, G. & G., M. & W., and U. S.	*lb.*	*.03	@	.03¾
SOLID—				
Carriage	*lb.*	*.03	@	.03¼
Irony	*lb.*		@	
Truck	*lb.*	*.02½	@	.02¾

*Nominal.

THE MARKET FOR COTTON AND OTHER FABRICS

NEW YORK

The spot market for middling upland cotton has fluctuated during February from between 14.30 cents on the first of the month to 13.20 cents on the 23rd, mostly downward, however. A leading authority states that staple cottons are depressed to about the lowest point touched thus far. Absence of demand and desire to sell are the controlling features.

Egyptian and Arizona Cottons. In Egyptians good grade uppers can be bought today for 17 cents and medium Sakellarides is worth about 23 cents. Arizona high grades are offered at 32 cents and can probably be bought at 30 cents.

While it is yet early to say anything regarding the coming crop, unless there is a material advance in prices between now and June, the acreage of staples will be very heavily reduced. It is known already that there will be curtailment in this respect in Egypt and Arizona. Mississippi and the Carolinas will probably lead the Southern States in acreage reduction.

UNITED STATES CRUDE RUBBER IMPORTS FOR 1921 (BY MONTHS)

1921	Plantations	Parás	Africans	Centrals	Guayule	Manicoba and Matto Grosso	Balata	Miscellaneous Gum	Waste	Totals 1921	Totals 1920
January	12,819	1,312	43	3	.....	.....	41	173	1,071	15,462	.....
Totals, 1 month, 1921	12,819	1,312	43	3	.....	.....	41	173	1,071	15,462	.....
Totals, 1 month, 1920	17,799	2,620	821	111	.....	.....	65	634	351	.....	22,401

Compiled by The Rubber Association of America, Inc.

Raincoat Fabrics. Raincoat concerns are continuing liquidation of their stocks, which holds the market in essentially the same condition, as reported last month. They have yet to place orders for the season's requirements.

Ducks and Drills. The demand for hose and belting ducks shows a steady improvement and a better market is expected early in March. Due to duck mills having operated on less than half capacity all winter, no large stocks of duck have accumulated. A normal demand would at once develop a shortage of duck. Present rate of duck consumption is in excess of the rate of current production. There is an excess stock of raw cotton on hand but the same is not true of manufactured goods. Mills decline to make up goods until it becomes known what weights will be wanted.

Sheetings. The sheeting market is rather quiet, evincing little interest. Where orders are placed price concessions are usually made. Mills are anxious for business and ready to listen to offers. The outlook is for spasmodic buying. With the big cotton crop in hand and small buying activity, prices are tending to lower levels. Such business as is being placed is confined to small lots for spot shipment. Contracts for later delivery are rare.

Tire Fabrics. Tire manufacturers are stocked up and are out of the market. The fabric manufacturers are withholding quotations in the absence of demand. It is reported that certain southern tire fabric mills are willing to accept 65 cents per pound on contract for standard 17¼-ounce builder fabric.

NEW YORK QUOTATIONS

February 23, 1921

Prices subject to change without notice

ASBESTOS CLOTH				
Brake lining, 2½ lbs. sq. yd., brass or copper insertion	lb.		@	
2¼ lbs. sq. yd., brass or copper insertion	lb.		@	
BURLAPS				
32—7-ounce	100 yards	$4.50	@	
32—8-ounce		4.65	@	
40—7½-ounce		5.00	@	
40—8-ounce		5.15	@	
40—10-ounce		5.50	@	
40—10½-ounce		5.75	@	
45—7½-ounce		5.50	@	
45—8-ounce		5.75	@	
48—10-ounce		9.00	@	
DRILLS				
38-inch 2.00-yard	yard	.16½	@	
40-inch 2.47-yard		.14¼	@	
52-inch 1.90-yard		.21⅛	@	
52-inch 1.95-yard		.20½	@	
60-inch 1.52-yard		.27	@	
DUCK				
CARRIAGE CLOTH				
38-inch 2.00 yard enameling duck	yard	.18	@	
48-inch 1.74-yard		.21⅞	@	
72-inch 16.66-ounce		.46⅞	@	
72-inch 17.21-ounce		.48½	@	
MECHANICAL				
Hose	pound	.32	@	
Belting		.32	@	
HOLLANDS, 40-INCH				
Acme	yard	.24	@	
Endurance		.26	@	
Penn		.34	@	
OSNABURGS				
40-inch 2.35-yard	yard		@	
40-inch 2.48-yard			@	
37½-inch 2.42 yard			@	
RAINCOAT FABRICS				
COTTON				
Bombazine 64 x 60	yard	.12½	@	
60 x 48		.11½	@	
Cashmeres, cotton and wool, 36-inch, tan		.75	@	
Twills 64 x 72		.20	@	
60 x 102		.22	@	
Twill, mercerized, 36-inch, blue and black		.29½	@	
tan and olive		.27	@	
Tweed		.40	@	1.00
printed		.22½	@	
Plaids 60 x 48		.12½	@	
56 x 44		.12	@	
Repp		.30	@	.35
Prints 60 x 48		.13	@	
64 x 60		.14	@	
IMPORTED WOOLEN FABRICS SPECIALLY PREPARED FOR RUBBERIZING—PLAIN AND FANCIES				
63-inch, 3½ to 7½ ounces	yard	$0.81	@	$2.22
36-inch, 2¾ to 5 ounces		.63	@	1.62
IMPORTED PLAID LINING (UNION AND COTTON)				
63-inch, 2 to 4 ounces	yard	.71	@	1.57
36-inch, 2 to 4 ounces		.44	@	.84
SHEETINGS, 40-INCH				
48 x 48, 2.35-yard	yard	.12¾	@	
48 x 48, 2.50-yard		.12¼	@	
48 x 48, 2.85-yard		.11	@	
64 x 68, 3.15-yard		.12	@	
56 x 60, 3.60-yard		.09¾	@	
48 x 44, 3.75-yard		.08¼	@	
SILKS				
Canton, 38-inch	yard	.29½	@	
Schappe, 36-inch		.50	@	
STOCKINETTES				
SINGLE THREAD				
3½ Peeler, carded	pound		@	
4½ Peeler, carded		*.55	@	
6½ Peeler, combed		*.85	@	
DOUBLE THREAD				
Zero Peeler, carded	pound	*.45	@	
3½ Peeler, carded		*.52½	@	
6½ Peeler, combed			@	
TIRE FABRICS				
BUILDING				
17¼-ounce Sakellarides, combed	pound		@	
17¼-ounce Egyptian, combed			@	
17¼-ounce Egyptian, carded			@	
17¼-ounce Peeler, combed			@	
17¼-ounce Peeler, carded			@	

TIRE FABRICS—Continued

CORD		
15-ounce Egyptian	pound	@
BICYCLE		
8-ounce American	pound	@
10-ounce American		@
CHAFER		
9¼-ounce Sea Island	pound	@
9¼-ounce Egyptian, carded		@
9¼-ounce Peeler, carded		@

*Nominal.

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS

NEW YORK

During the past month the market conditions for chemicals and compounding ingredients have been generally quiet in practically all lines. In the rubber trade the demand has been not much more than routine except for litharge and zinc oxide, attributed to some renewal of automobile tire manufacturing activity, which is stated to be operating at about 50 per cent capacity.

Aniline Oil. The market has been unsettled. Demand rather light. Prices ranging for spot from 23½ to 27 cents per pound.

Barytes. There has been an oversupply of material. Shipments have not been active and the dullness is reflected in a range of nominal prices.

Benzol. The demand early in the month was fair and increased somewhat toward the end of the period. Prices were 27 cents for 90 per cent and 30 cents for pure grade.

Blanc Fixe. Practically the same conditions prevail regarding this item as with barytes, with no new developments to be anticipated at present.

Blue Lead. Trade has ruled from routine to very quiet. Early in the month the price was 7¼ cents a pound stiffening to 7½ cents at the close.

Carbon Black. The demand for carbon black has been small, however, prices are strong with marked upward revision in prospect.

Carbon Tetrachloride. The market has varied from dull to fairly active demand with prices firm at 12 to 12½ cents.

Dry Colors. A waiting market with prices fixed and steady awaiting industrial developments.

Litharge. Improvement in the automobile and tire industries has been reflected in an improved interest in litharge. The demand, however, has not reached normal due to large stocks held over by tire and other rubber goods manufacturers.

Lithopone. As in the case of litharge, and governed by the same causes, there has been a marked and increasing demand. Prices early in the month reached the lowest level and are holding there at 7 cents per pound.

Solvent Naphtha. The market is quiet and below the average at 28 to 34 cents a gallon.

Sublimed Lead. The trade has been slow and steady with prices stable.

Sulphur. Price reduction took place some weeks ago but buying has not responded in marked degree.

Talc. Increased inquiries, and light demand.

Whiting. Rubber makers are out of the market, although the tone is one of improvement and the outlook favorable for good spring trade.

Zinc Oxide. The last of January there was a price reduction in zinc oxide, all grades were marked down from ½ to ¾ cents for a period of 90 days. Trade demand began at that time to pick up. Further possible reductions in price are looked for although prices now are stable.

NEW YORK QUOTATIONS

February 23, 1921

Prices subject to change without notice

ACCELERATORS, ORGANIC		
Accelerene (f. o. b. English port)	lb.	13s. 6d.
Accelemal	lb.	$0.65 @
Adco	lb.	.60 @
Aldehyde ammonia crystals	lb.	1.15 @ 1.20
Aniline oil	lb.	.23½ @ .27
Excellerex	lb.	.85 @
Hexamethylene tetramine (powdered)	lb.	1.15 @ 1.20
N. C. C.	lb.	@
No. 999	lb.	14½ @
Paraphenylene diamine	lb.	@
Thiocarbanilide	lb.	.60 @ .70
Velosan	lb.	@
Vul-Ko-Cene	lb.	@
Virol	lb.	.60 @
ACCELERATORS, INORGANIC		
Lead, dry red (bbls.)	lb.	.09¼ @
sublimed blue (bbls.)	lb.	.08¼ @
sublimed white (bbls.)	lb.	.08¼ @
white, basic carbonate (bbls.)	lb.	.08 @
Lime, flour	lb.	.02½ @ .03
Superfine, "Cream of Lime"	lb.	.03 @
Litharge, domestic	lb.	.10 @
imported	lb.	*.17 @
sublimed	lb.	@
Magnesium, carbonate, light	lb.	.09½ @ .12
calcined extra light	lb.	.55 @
calcined light	lb.	.30 @
calcined medium light	lb.	.20 @ .25
calcined heavy	lb.	.06 @ .07
calcined commercial (magnesite)	lb.	.05 @
oxide, extra light	lb.	.65 @
light, technical	lb.	@
light, imported	lb.	@
imported	lb.	@
light, commercial	lb.	@
ACIDS		
Acetic 28 per cent	cwt.	2.75 @ 3.25
glacial, 99 per cent	cwt.	9.00 @ 13.58
Cresylic (97% straw color) (bbl.)	gal.	.95 @ 1.02
(95% dark) (bbl.)	gal.	.90 @ .97
Muriatic, 20 degrees	cwt.	1.70 @ 2.50
Nitric, 36 degrees	cwt.	6.28 @
Sulphuric, 66 degrees	ton	19.00 @ 21.00
ALKALIES		
Caustic soda, 76% (bbls.)	lb.	.04½ @ .05
Soda ash, 58%	cwt.	2.10 @ 2.25
COLORS		
Black		
Bone, powdered	lb.	.06½ @ .14
granulated	lb.	.10 @ .15
Carbon black (sacks, factory)	lb.	.11 @ .20
pressed	lb.	.16 @
Dipped goods	lb.	1.00 @
Drop	lb.	.07½ @ .15
Ivory black	lb.	.18 @ .40
Lampblack	lb.	.18 @ .45
Oil soluble aniline	lb.	1.00 @
Rubber black	lb.	@
Rubber makers' black	lb.	.40 @
Blue		
Cobalt	lb.	.27 @ .30
Dipped goods	lb.	1.00 @
Prussian	lb.	.60 @
Ultramarine	lb.	.18 @ .35
Rubber makers' blue	lb.	3.50 @
Brown		
Iron oxide	lb.	.03 @
Sienna, Italian, raw and burnt	lb.	.06½ @ .15
Umber, Turkey, raw and burnt	lb.	.05 @ .06
Vandyke	lb.	.03½ @
Maroon oxide	lb.	.13½ @
Green		
Chrome, light	lb.	.38 @ .42
medium	lb.	.42 @ .55
dark	lb.	.46 @ .60
commercial	lb.	.13½ @
tile	lb.	.08 @ .12
Dipped goods	lb.	1.00 @
Oxide I. R.	lb.	.65 @
Oxide of chromium (casks)	lb.	.60 @
Rubber makers' green	lb.	3.50 @
Red		
Antimony, crimson, sulphuret of (casks)	lb.	.45 @
crimson, "R. M. P."	lb.	.55 @
Antimony, golden sulphuret of (casks)	lb.	.29 @
golden, "R. M. P."	lb.	.25 @
7-A	lb.	.42 @
vermilion sulphuret	lb.	.65 @
red sulphuret	lb.	.25 @
Arsenic, red sulphide	lb.	.13 @
Dipped goods, red	lb.	1.25 @
purple	lb.	1.00 @
orange	lb.	1.25 @
Indian	lb.	.13½ @
Para toner	lb.	1.75 @
Red excelsior	lb.	@
Toluidine toner	lb.	3.25 @ 3.50
Iron oxide, reduced grades	lb.	.06½ @ .12
pure bright	lb.	.14½ @ .16½
Spanish neutral	lb.	.05¾ @
Venetian	lb.	.02½ @ .06

COLORS—continued

Red				
Oil soluble aniline, red	lb.	$1.75	@	
orange	lb.	1.65	@	
Oximony	lb.	.17½	@	
Vermilion, American	lb.	.25	@	.30
permanent	lb.	.34	@	
English quicksilver	lb.	1.05	@	
Rubber makers' red	lb.	3.50	@	4.00
purple	lb.	2.50	@	3.50
White				
Albalith	lb.	.07	@	.07½
Aluminum bronze, extra brilliant	lb.		@	
extra fine	lb.		@	
Lithopone, Beckton white	lb.	.07	@	.07½
Lithopone	lb.	.07	@	.07½
Ponolith (carloads, factory)	lb.		@	
Rubber-makers' white	lb.		@	
Zinc oxide. American Horse Head brand (factory):		C.L.		L.C.L.
Special	lb.	.09¼	@	.09¾
XX red	lb.	.08¾	@	.09¼
French process, Florence brand (factory):				
White seal	lb.	.13	@	.13¼
Green seal	lb.	.11	@	.11½
Red seal	lb.	.10	@	.10½
White seal, imported	lb.	.12¼	@	.12½
Azn factory:				
ZZZ (lead free)	lb.	.08¾	@	.09¼
ZZ (under 5% leaded)	lb.	.08	@	.08½
Z (8-10% leaded)	lb.	.07⅝	@	.08⅛
Standard AA	lb.	.09	@	
Yellow				
Cadmium, sulphide, yellow, light, orange	lb.		@	
red	lb.		@	
Chrome, light and medium	lb.	.25	@	
Dipped goods	lb.	1.25	@	
Ochre, domestic	lb.	.02½	@	
imported	lb.	.04	@	
Rubber makers' yellow	lb.	2.50	@	3.50
Zinc chromate	lb.	.40	@	.45
Oil soluble aniline	lb.	1.75	@	

COMPOUNDING INGREDIENTS

Aluminum flake (carload)	ton	33.00	@	45.00
hydrate	lb.	.22	@	
silicate	ton	28.00	@	35.00
Ammonium carbonate (powdered)	lb.	.15¾	@	.16
Asbestine (carloads)	ton	20.00	@	35.00
Barium, carbonate, precipitated	ton	85.00	@	
dust	ton	110.00	@	
Barytes, pure white (f. o. b. works)	ton	28.00	@	
off color	ton	20.00	@	
uniform floated	ton	28.00	@	
German "Cream"	ton		@	
Basofor	lb.	.05	@	
Blanc fixe (dry, bbls.)	lb.	.05	@	
Bone ash	lb.	.10	@	
Carrara filler	ton	24.00	@	
Chalk, precipitated, extra light	lb.		@	
heavy	lb.		@	
China, clay, Dixie	ton		@	
Blue Ridge	ton		@	
domestic	ton	10.00	@	12.00
imported	ton	16.00	@	25.00
Cotton linters, clean mill run, f. o. b. factory	lb.	.02½	@	.02¾
Fossil flour (powdered)	ton	60.00	@	
(bolted)	ton	65.00	@	
Diatomite	lb.	.03	@	
Glue, high grade	lb.	.35	@	.45
medium	lb.	.28	@	.33
low grade	lb.	.20	@	.22
Graphite, flake (400-pounds bbl.)	lb.	.10	@	.25
amorphous	lb.	.04	@	.08
Ground glass FF. (bbls.)	lb.		@	
Infusorial earth (powdered)	ton	60.00	@	
(bolted)	ton	65.00	@	
Liquid rubber	lb.		@	
Mica, powdered	lb.	.15	@	
Pumice stone, powdered (bbl.)	lb.	.03	@	.08
Rotten stone, powdered	lb.	.02½	@	.04½
Rubber paste	lb.		@	
Silica, gold bond	ton		@	
silver bond	ton		@	
Soap bark, crushed	lb.	.14½	@	.15
Soapstone, powdered gray (carload)	ton	12.00	@	
Starch, powdered corn	cwt.	2.68	@	
Talc, powdered soapstone	ton	25.00	@	
Terra blanche	ton	25.00	@	
Tripoli flour, air-floated, cream or rose (factory)	ton	35.00	@	
white (factory)	ton	37.00	@	
Tyre-lith	ton	100.00	@	
Whiting, Alba (carloads)	cwt.		@	
Columbia	cwt.		@	
commercial	cwt.	.75	@	1.50
Danish	ton		@	
English cliffstone	cwt.	1.30	@	1.75
gilders	cwt.	1.45	@	1.90
Paris, white, American	cwt.	1.60	@	
Quaker	ton		@	
Super	ton		@	
Wood pulp, imported	lb.		@	
XXX	ton	45.00	@	
X	ton	40.00	@	
Wood flour, American	ton		@	

MINERAL RUBBER

Elateron (c. l. factory)	ton		@	
(l. c. l. factory)	ton		@	
Gilsonite	ton	70.00	@	
Genasco (c. l. factory)	ton	62.50	@	
(l. c. l. factory)	ton	64.50	@	
Hard hydrocarbon	ton		@	
Soft hydrocarbon	ton		@	
K-X	ton		@	

MINERAL RUBBER—continued

K. M. R	ton		@	
M. R. X	ton		@	
Pioneer (c. l. factory)	ton	$55.00	@	
(l. c. l. factory)	ton	60.00	@	
Raven M. R	ton		@	
Refined Elaterite	ton		@	
318/320 M. P. hydrocarbon (c. l. factory)	ton	50.00	@	55.00
(l. c. l. factory)	ton	57.50	@	
300/310 M. P. hydrocarbon (c. l. factory)	ton	40.00	@	
(l. c. l. factory)	ton	45.00	@	
States "A" (c. l. factory)	ton	55.00	@	
No. 1 (c. l. factory)	ton	45.00	@	
Robertson, M. R. pulverized (c. l. factory)	ton	95.00	@	
M. R pulverized (l. c. l. factory)	ton	97.50	@	
M. R. (c. l. factory)	ton	72.50	@	
M. R (l. c. l. factory)	ton	75.00	@	
Rubrax (factory)	ton	50.00	@	
Synpro, granulated	ton		@	
Walpole rubber flux (factory)	lb.		@	

OILS

Avoilas compound	lb.	.16	@	
Castor, No. 1, U. S. P	lb.	.12	@	
No. 3, U. S. P	lb.	.11	@	
Corn	lb.	.10½	@	
Cotton	lb.	.07	@	
Glycerine (98 per cent)	lb.	.23	@	
Linseed, raw (carloads)	gal.	.62	@	
Linseed compound	gal.		@	
Palmoline	lb.	.15	@	
Palm niger	lb.	.09	@	
Palm "Lagos"	lb.	.06½	@	
Palm special	lb.		@	
Peanut	lb.	.12¼	@	
Petrolatum	lb.	.06½	@	
Petrolatum, sticky	lb.		@	
Petroleum grease	lb.		@	
Pine, steam distilled	gal.	1.30	@	1.45
Rapeseed, refined	gal.	1.05	@	
blown	gal.	1.14	@	
Rosin	gal.	.42	@	.59
Synpro	gal.		@	
Soya bean	lb	.08¼	@	
Tar	gal.	.36	@	

RESINS AND PITCHES

Balsam, fir	gal.	2.00	@	
Cantella gum	lb.	.50	@	
Cumar resin, hard	lb.	.12	@	.16
soft	lb.	.09	@	.13
Tar, retort	bbl.	14.00	@	15.00
kiln	bbl.	14.00	@	14.50
Pitch, Burgundy	lb.	.05	@	.06
coal tar	lb.	.01½	@	
pine tar	lb.	.03½	@	
ponto	lb.	.12	@	
Rosin, K	280 lbs.	7.50	@	
strained	280 lbs.	7.00	@	
Shellac, fine orange	lb.	1.20	@	

SOLVENTS

Acetone (98.99 per cent drums)	lb.	.13½	@	.14
methyl (drums)	gal.		@	
Benzol (water white, 90%)	gal.	.25	@	.34
Beta-naphthol	lb.	.35	@	
Carbon bisulphide (drums)	lb.	.08	@	
tetrachloride (drums)	lb.	.11½	@	.13
Naphtha, motor gasoline (steel bbls.)	gal.	.28½	@	
73@76 degrees (steel bbls.)	gal.	.36½	@	
70@72 (steel bbls.)	gal.	.34½	@	
68@70 degrees (steel bbls.)	gal.	.33½	@	
V. M. & P. (steel bbls.)	gal.	.25½	@	
solvent	gal.	.28	@	
Toluol, pure	gal.	.30	@	.36
Turpentine, spirits	gal.	.59	@	
wood	gal.	.57	@	
Osmaco reducer	gal.		@	
Xylol, pure	gal.	.45	@	.50½
commercial	gal.	.31	@	.34

SUBSTITUTES

Black	lb.	.09	@	.17
White	lb.	.10	@	.19
Brown	lb.	.13	@	.18
Brown factice	lb.	.08	@	.15
White factice	lb.	.10	@	.16
Paragol, soft and medium (carloads)	cwt.	10.81	@	
hard	cwt.	10.81	@	

VULCANIZING INGREDIENTS

Lead, black hyposulphite (Black Hypo)	lb.		@	
Orange mineral, domestic	lb.	.12½	@	
Sulphur chloride (jugs)	lb.	.20	@	
(drums)	lb.	.07½	@	.08
Sulphur, flour, Brooklyn brand (carloads)	cwt.	2.65	@	2.90
Brooklyn brand (l. c. l.)	cwt.	2.35	@	3.15
Bergenport, soft (c. l. factory)	cwt.	2.55	@	
superfine (carloads, factory)	cwt.	2.00	@	2.90
(See also Colors—Antimony.)				

WAXES

Wax, beeswax, white	lb.	.67	@	
ceresin, white	lb.	.16	@	
carnauba	lb.	.20	@	
Montan	lb.	.09	@	
ozokerite, black	lb.	.30	@	
green	lb.	.30	@	
paraffine, 115° m. p	lb.		@	
120° m. p	lb.		@	
125° m. p	lb.		@	
130° m. p	lb.		@	
Phenanthrene	lb.	.08	@	.10
Sweet wax	lb.		@	

*Nominal.

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CAOUTCHOUC GUTTA-PERCHA

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THE RUBBER ASSOCIATION'S EDUCATIONAL PLAN

The Rubber Association today represents not only the majority of American rubber manufacturers but their wealth, experience, enterprise and brains. From the very nature of the industry that supports or supplements all other great industries rubber executives have the broadest of all outlooks. They have perforce a knowledge of general manufacture and markets such as no other line demands. This concentration of experience and knowledge through association is in the line not only of efficiency and economy but should be a direct powerful aid to progress. That such a concrete, vital force should be voiceless is unthinkable. Mimeographed letters, circulars and printed leaflets are not sufficient. Educational articles, informing paragraphs, pictures, statistical facts, historical sketches published in newspapers, in magazines or issued in books or bulletins would be of great value. The field is a broad one and so far its surface only has been scratched. What other associations have done The Rubber Association can do and do better.

FORTY-THREE MILLION TIRES?

The persistent pessimist, intoning jeremiads on the outlook, of trade generally, will find but little material for lamentations in the recent national review of the automobile industry. According to the official figures compiled by the American Automobile Association, the motor car registrations for 1920 reached the surprising total of 9,180,316. Nor does this total include a twelfth month in either California or New York. With those figures added, the total might well reach the figure of 9,300,000. Evidently automobile buyers did not worry much about adverse business conditions last year when they thus overtopped 1919's total of 7,065,446. Of the whole number registered, approximately 8,234,490 were classed as passenger cars, 945,826 as commercial; and 271,230 in addition as motorcycles.

To the rubber trade such a showing has considerable interest. It means a large item of business. If 1921 should witness a similar 23 per cent increase, this year's output of cars would be 2,111,472, or a possible total registry of 11,411,472 cars for the year. Assuming that four tires and a spare would be needed for initial equipment for each car, a total of 10,557,360 tires would have to be produced for the new automobiles. An average of three tires apiece, it is figured, would be required for the 9,180,316 cars already in use, thus making a total estimated demand for tires in 1921 in the United States of approximately 38,000,000, not to mention even more tubes.

Despite the always conflicting reports, trade conditions abroad are slowly but surely returning to normal; and it is reasonable to expect that enterprising American tire manufacturers will follow up closely every advantage gained by them during and since the war, and press the sales of perhaps 5,000,000 more tires beyond the seas. Forecasts as to tire sales and manufacture can have as large a percentage of error as those in any other industrial line, but it is fair to claim that the foregoing figures are quite conservative and that they afford a fair index of the trend of trade in automobile tires.

BRITISH RUBBER MEN VERY MUCH AWAKE

That very able and interesting journal, *The Rubber Age,* of London, asks the question: "Are British rubber manufacturers asleep?" The article that follows it would indicate, by suggestion at least, that the Editor of our esteemed contemporary thinks that they are. Personally, we do not think so.

In speaking of British rubber manufacturers, one naturally thinks of the Dunlop company, with their one hundred millions capital and their tremendous output. Certainly if they are asleep, their great factories in Eng-

land, the United States, Canada, Australia, Italy, Denmark, Norway, Sweden, Spain, Portugal, Holland, Belgium, South America, India and Japan, would argue that dreams may sometimes come true. For the comfort of the manufacturers in the United States, one could also hope that the Dunlops would not wake up, for if they can do so much sleeping, the whole tire business of the world would be in their hands waking. No, British rubber manufacturers are not asleep. They are not even nodding.

RUBBER AND FIREPROOF LUMBER

The use of solutions of soluble glass, alum, soda, borax, and the like for impregnating wood to render it less inflammable dates back many years. So also are heat-resisting rubber compounds in which asbestos is the heat-resisting material. Of these are, "Vulcabeston," the "It" products and the more modern brake lining. There was also "Intonaco," made of gluten, albumen, oil, sulphate of lime and india rubber. This was used as a covering for wooden shelves as a preservative from fire, and for wainscoting, tiles, etc. All of these suggested the practicability of fireproof lumber.

It is not of course claimed that such products are actually indestructible. Great heat will fuse anything. That these products are not inflammable, that they will char but not burn, argues a vast superiority over ordinary wood with its inflammable resin varnish covering.

HOW ABOUT IDLE AMERICAN SPINDLES?

America is making a serious mistake, so say economists, in not making extraordinary efforts to put Europe "on its feet" so that it may quickly resume large-scale buying of our surplus products. Unless our export trade is soon expanded it will be impossible for the United States to maintain its present high standard of living. In order to keep Europeans employed so that they may produce a surplus to be exchanged for American articles, it is claimed that we should supply them with our raw materials on the easiest terms. The present method of "trusteeing" cotton to one of the new southern European republics, for instance, is mean, cumbersome, and expensive, one expert says. Instead, he would keep the cotton mills abroad going by supplying them with our cotton and taking as the sole security, mortgages on their mills, against which long-term bonds or debentures would be issued and sold to Americans.

This is in line with the appeal made lately to the long-staple cotton growers of the Southwest that they ignore the home market and ship their product to southern Europe, where they would get a much better price in goods than they would get in cash in the United States. But the cotton growers hesitate to enter such a scheme of barter, doubtless realizing that in the long run they will serve their own interests best, not by helping other nations to forge ahead, but by favoring their own country that has with great irrigation systems and other aids made their fruitful plantations possible. To them the motto, "Charity begins at home," has both a personal and a patriotic significance.

Helpful as we may like to be—and surely American liberality is well evidenced in the billions loaned to Europe, we can hardly be expected to extend our debt hazards still further in order that the spindles of Europe may hum while our own may be idle. Self-protection does not necessarily imply selfishness. Indeed, many of the nations craving our aid are even now planning tariff and other barriers to shut out American products and thus lessen employment for American labor.

The simple fact is, Europe will find itself. And if America takes too seriously some of the suggestions of well-meaning, but deluded altruists it may before long have some keen regrets. The world has emerged badly bent, it is true, but not broken from the most violent upheaval and exhaustive strain to which it was ever subjected. The probabilities are that, just as it contrived to pass successfully through trying reconstruction periods in the past, it will do so again in the near future. But in the great readjustment it will not be the dilettante doctrinaires nor the professional politicians who will do the real work, but the men who always rehabilitate national and international trade, the practical, broad-minded, enterprising captains of industry and the fair-spirited, far sighted financiers, of whom America has fortunately some of the finest types.

FRENCH PROGRESS

That France is coming back fast in the matter of production, as well as in expanding its foreign trade, is graphically illustrated in recent commercial bulletins. These show, among other things, that the nation improved its adverse trade balance by 9,000,000,000 francs, or almost 50 per cent, from January 1 to October 31, 1920, as compared with the first ten months of 1919. In 1918 French export trade totalled 4,750,000,000 francs; in 1919 it almost doubled; and in the first ten months of 1920 it amounted to four times the value of the 1918 export trade. It is true that France has been a large importer meanwhile, merchandise brought from overseas in 1919 totalling some 29,750,000,000 francs, and reaching 27,250,000,000 during the first ten months of 1920; but the imports, which have been largely of raw material for conversion into goods for export, have been declining since last April.

No complete figures are available regarding the recovery of the French rubber trade, but it has kept pace with the forward march of other industries. Thus the French exports of automobiles and accessories for the first seven months of 1918 were valued at 74,000,000 francs; for the same period in 1919, 147,000,000, and for the same period of 1920, 848,000,000.

Repairing Rubber Footwear—II[1]

A New and Fast Growing Industry

Borrowing from the Cobbler—Footwear Repair Prices—Stock for Patching—Drying Before Patching—Applying Rubber Heels—Details of the New Miller Vulcanizer—Dilks Rubber Boot Repairer—Arthur Sole and Heel Mold Former—Arthur Plural Part Mold Vulcanizer—The Ferguson Vulcanizer—The Bast Shoe Vulcanizing Device

BORROWING FROM THE COBBLER

Rubber boot and shoe repair is today in its infancy. It stands where tire repair did fifteen years ago and its progress will probably be along similar lines. That is, the present tools, machines and appliances will be superseded or added to until the best and most effective remain. So too, instead of the repair section for footwear occupying a dark congested corner, a light, orderly department will be evolved.

As the work has to do with shapes almost identical with leather shoes there are doubtless many appliances used by the cobbler that will be taken over. Take for example, the "jack" which is used as a sort of anvil by the leather shoe repairer and for working on rubber boots and shoes, and certainly has its value. There are many types, they are simple and great time savers.

And not only the cobbler suggests added equipment but the leather shoe manufacturers as well. They are large users of rubber cement for channel and inseam work. For this there is a very effective channel cementing machine. Possibly it would need some changing for rubber shoe repair work, and quite a volume of business to keep it busy, but it would be clean, compact and safe.

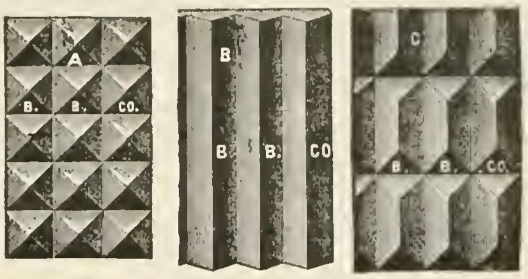
The "Jack"

FOOTWEAR REPAIR PRICES

While much complaint has been made in the large cities of the United States of profiteering in the repairing of leather shoes (the charge for resoling and reheeling of which has ranged from $2.50 to $4 a pair according to quality of job and service) little or no fault seems to have been found with the prices charged by repairmen who specialize in mending rubber footwear. Despite the general advancement in overhead and other expenses, the cost of repairing rubber boots and shoes has increased relatively little above the pre-war prices.

The very best job in half-soling rubber boots is now from $1.50 to $1.75, and full soles with heels are put on arctics and rubber boots for $2.25 to $2.75, the charge depending upon whether the boots are children's or adults'. Tennis and other athletic shoes with rubber soles worn down can be "retreaded" completely and made to look like new (resoled and reheeled), for $1.50 to $1.75 a pair, according to the size of the shoe. Light-weight rubbers are seldom brought in for repair. Repairmen say that the prices quoted yield them a fair margin of profit and that it is always higher in shops having up-to-date repair equipment.

While the business of repairing leather shoes was given a great impetus during and after the war, owing to the high price of leather, etc., in the past year the rubber footwear repairing industry has also been steadily forging ahead. While its growth may not have been as swift as that of leather shoe repairing, men who mend rubber footwear are confident that the development of this line has been more substantial. They are inclined to think that as leather shoe prices recede, as is now generally forecast, there will be a slackened demand for the services of the men who mend such shoes, whereas no such slump is expected in the rubber shoe repair line. This in part is because the prices of rubber footwear have not been unduly inflated and there is



Tennis Soling

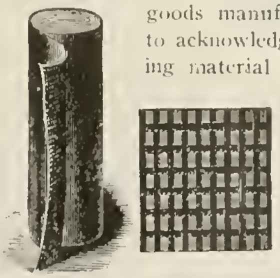
a steady improving demand for footwear made wholly or partly of rubber, most of which will sooner or later be overhauled by the rubber repair shop. Nor do the latter have to compete with the very numerous home-repairers, who, reluctant about paying the high prices charged by most leather shoe cobblers, mend their own shoes.

Speaking again of prices, it is interesting to consider the cost of resoling leather shoes with rubber taps and cut soles and heels, and the prices obtained for such work, as well as the conditions that insure a good job. An average price on rubber fiber half-soles of a nationally advertised brand is $1.25 or $2.50 for full soles with rubber heels. The latter are furnished and applied for 35, 50, 65 and in a few cases for 75 cents.

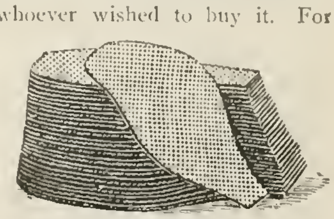
Repairmen emphasize the fact that there is no economy in putting a rubber sole on a cheap leather shoe. They contend that such a sole, no matter how high its quality, is doomed from the start if it be applied to a papery composition insole. The latter soon begins to disintegrate and chafe the rubber sole so that it will split or burst across its center within three or four weeks. Properly cemented, however, to an insole of good "siding" leather such as is found in the better class shoes, the rubber sole often gives excellent wear for a year. The manufacturers do not guarantee their soles for this reason.

STOCK FOR PATCHING

It is only fair to the big rubber shoe companies, the mechanical goods manufacturers, and the shoe-findings men to acknowledge that for years they offered patching material to whoever wished to buy it. For



Boot and Shoe Soling



Soling Cut to Size

example, the makers of the Snag-Proof rubbers long had a line that they called repair sundries. These consisted of corrugated soles for boots and shoes, cut to size, thus saving waste. There was also patching for upper repairs, plain soles and heels. With

[1]Copyrighted by Henry C. Pearson. Continued from The India Rubber World, March 1, 1921, pages 397-403.

this went a strong cement in bottles, or screw top pint or quart cans.

The oldest company in the United States, the Boston Belting Co., for years advertised rubber soling for boots and shoes, either smooth or rough finish. It was sold in rolls 60 feet long and 34 inches wide. The rough or corrugated type was from 1/16 to 3/16 of an inch thick. They also furnished tennis soling in three patterns, diamond point, corrugated and oblong. This was finished in strips 32½ inches long and 12½ inches wide. For attaching they furnished a strong cement in pints, quarts and gallons. As to general patching stock they made a dull finished stock in three weights, light, medium and heavy. This was furnished in pieces 12 inches square, 24 pieces to a box.

King's Soles

Canadian manufacturers also placed before their trade "ready to apply" soles. J. D. King & Co. furnished soles that were exact duplicates of those on the Maltese Cross rubbers and gave for sticking purposes the Stub Proof cement.

One of the most complete sole and heel repair products brought out by the Canadian Rubber Co. was the Roedding repair sole and heel. This had an extension edge all around the sole or

King Method—Before and After Repairing

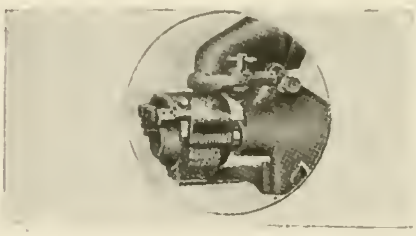
heel and was particularly designed for lumbermen's heavy overs and leg boots. They were made in regular sizes, No. 6 to No. 12, and were attached by a special cement sold in cans, big and little.

In England, gutta percha soles were sold for repairs for years. They were excellent, could be attached firmly by heating, and outwore leather. The scarcity of gutta percha and its costliness, however, drove them from the market.

DRYING BEFORE PATCHING

The question of drying comes up again and again so that its importance cannot be overemphasized. To be sure, goods may stick if a little moisture is sealed up inside of the repair. Nor does it always show in surface blisters. It will, however, prove a damage. Damp fabric securely sealed by patching starts to rot at once and as much of the strength of footwear lies in the fabric, weakness and often disintegration results. It really does not matter how the boot or shoe is dried provided it is not baked dry and thus damaged. Hanging high over the presses in a warm current of air only long enough to dry is good. Or a wire rack high up where it is warm is also good practice. Sunning is very bad. Quick removal of moisture is best for the rubber. Thus, one repairer for the sake of speed ran a pipe from his air compresser, had a gas jet turned low under the pipe and sent a gentle current of hot air into the wet boot. According to his story it worked quickly and perfectly. Another, who at one time worked in a stocking factory, secured some aluminum stocking forms, rigged them up with steam and dried boots, shoes and arctics upon them. Hot sand will do as a dryer and so will warm shot but they are troublesome to handle as the grit gets into the work, and they are makeshifts at best.

Roedding Repair Sole and Heel



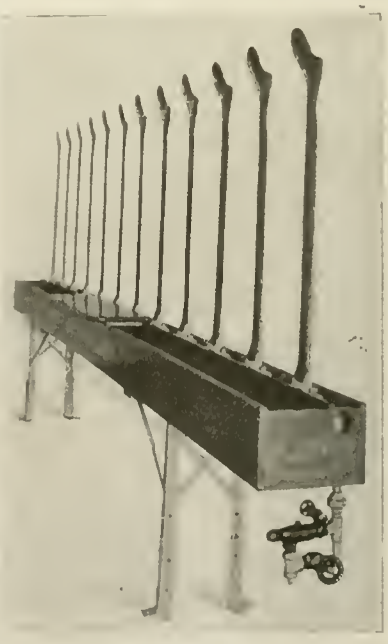
Sole Cementing Brush

APPLYING RUBBER HEELS

The rubber shoe repairer will perforce be obliged to put many rubber heels upon rubber footwear. In some cases he may simply add a thick patch but in some he may add solid heels. Indeed, it is possible that he may buy ready-made heels, burr the upper side, cement and attach. If he can fasten by a few nails all the better. In this work he may be interested to know that for years rubber boot heels were vulcanized in molds, the upper surface roughened by burring, coated with a strong litharge and rubber cement, stuck in place and vulcanized a second time with the whole boot. Today, the heels are built with the top layer of stock being so compounded that it only semi-cures while the rest of the heel cures thoroughly. The semi-cured upper part cemented and applied to the boot sticks forever and a day. Possibly in the near future heels prepared in just this way will be a part of the stock kept by the rubber boot repairer. Speaking of heels, is it not possible that the rubber shoe repairman may take on also the work of attaching rubber heels to leather shoes as well?

GROWTH OF THE RUBBER HEEL INDUSTRY

Twenty years ago the rubber heel was still a novelty at which the public looked askance. It is true that there was a limited demand for nurses' shoes with solid rubber heels attached and a few manufacturers were timidly offering walking boots with rubber heels but usually the shoe buyer who was won over to rubber heels had to get them as extras and while willing to have them put on after he had worn down his leather heels, was very reluctant about buying them as original equipment of shoes. A mistaken notion of thrift and fewer concrete sidewalks, hardwood floors and tiled hallways doubtless accounted for such an attitude. Then, too, there was the prejudice against rubber heels as being too slippery on wet surfaces and the objection that walking with such heels gave one a "sneaky" gait. But the rubber heel in itself had so much to commend it to pedestrians, that in time it attained world-wide popularity.



Drying Forms

Many enterprising manufacturers realizing that it was "due," strove not only to anticipate the demand, but also to create it, but most of the early products had so many shortcomings that the public proved very unresponsive. The common failing was

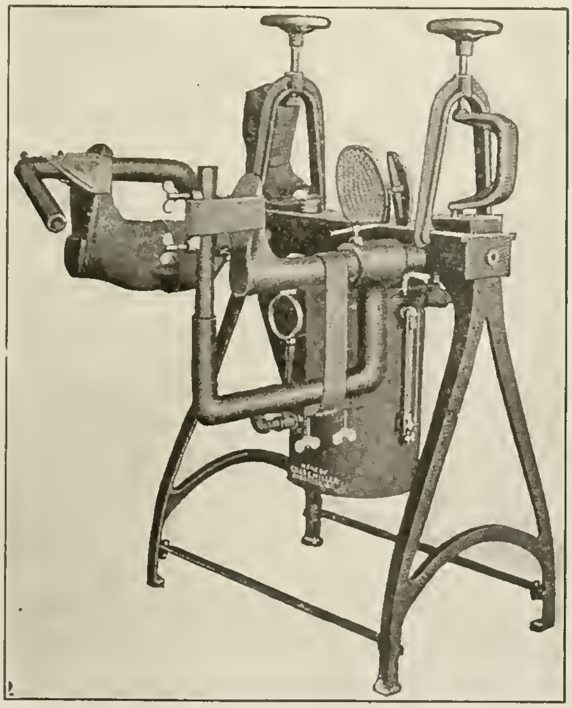
sameness in style, no dominating feature to commend them to buyers. The very uniformity of pattern invited the unscrupulous to flood the market with crude imitations of the good products that discredited the latter and ultimately harmed the entire trade. The remedy for such a condition was to make heels of such distinctive merit and originality that substitution could not be easily attempted by the makers of spurious goods. This proved the turning point in the industry. Since that it has grown by leaps and bounds.

While there is, and is always likely to be, a great output of the plain type heels of inferior compounds to meet the demands of the buyers of the commonest types of leather footwear, the public is steadily showing a keener appreciation of the rubber heel that is "tailored to the shoe," that has a real non-slip feature—a safety cushion or suction grip, or a heel that imparts a marked springiness to the step. Particularly have buyers learned that durability and resilience can be obtained only with high-grade compounds and manufacturers have found that the public is willing to pay for an article of real merit.

As indicating the rapid growth of the rubber heel industry, it is stated that some manufacturers are turning out nearly 100,000 pairs a day, several others about 50,000 and dozens making 5,000 to 10,000 a day, making the total daily production about 500,000 pairs. The daily output of leather shoes is given at 2,059,000 pairs. Thus it would appear that practically 25 per cent of the leather shoes made now either have rubber heels as original equipment or will be fitted with them directly after purchase or when the leather heels are worn down.

DETAILS OF THE MILLER VULCANIZER

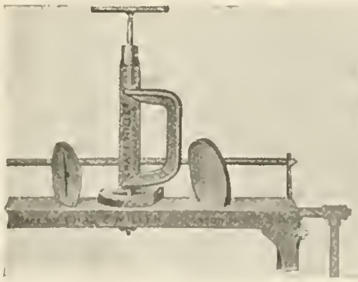
In our last issue was shown the original Miller machine as a whole. Here is given the latest model and the two important elements, the sole and heel repair table, and the part for accomplishing other repairs. For sole repairs a type of hot plate or hollow, steam-heated table is employed. Sole plates with extra high sidewalls, or upcurled edges, and with the inner surfaces



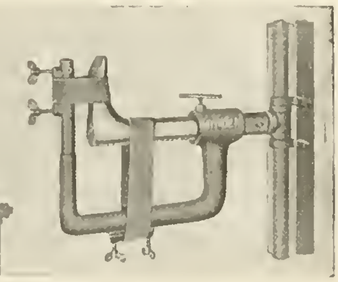
The New Miller Footwear Vulcanizer

deeply indented to give a serrated or rough configuration in molding are provided. These are placed upon the hot-plate and upon them are set the boots or shoes to be repaired. Into the foot or shoe is thrust an inside sole last upon which is fitted a *C*-shaped clamp with set screw and with it a powerful pressure is obtained. The clamp frame is arranged to be bolted to the hot-plate of the vulcanizer.

The essential features of the Miller inside boot vulcanizer unit



Miller Sole Repair Unit

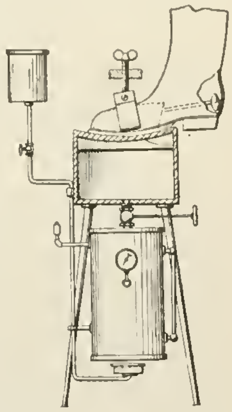


Miller Patching Unit

are the hollow boot form and the device for applying tension. In making a repair to any part of a boot or shoe other than the sole, the article is placed over the foot-like form, and the revolvable, adjustable outside arm is brought to a point opposite the part of the boot or shoe to be repaired. A cloth or other band is then stretched over the repair spot on the footwear and the desired pull, or pressure, is given by tightening either the side or the underneath tension screws on the swinging arm.

DILKS RUBBER BOOT REPAIRER

A self-contained, steam-heated repair vulcanizer for rubber boots and shoes, invented by Charles F. Dilks, provides a very good means for economically and efficiently mending rubber footwear. It consists of a hollow metal mold concaved on top, supported on a metal stand, and heated by steam from a boiler underneath, a liquid fuel being supplied by gravity from a tank attached to the apparatus. In sole repair vulcanizing a two-section, wedge-shaped pressure last is inserted in the toe of the shoe or boot and spread by means of a screw having a knob at one end; this last fits in the shoe tightly above the heel. The outer side of the forward part of the shoe is gripped with a two-section clamp, adjustably joined with screws or bolts; and, by means of a thumb-screw held in place by a cross-bar, supported by two upright bolts, the clamped shoe is forced against the hot-plate beneath.



The Dilks Boot and Shoe Repairer

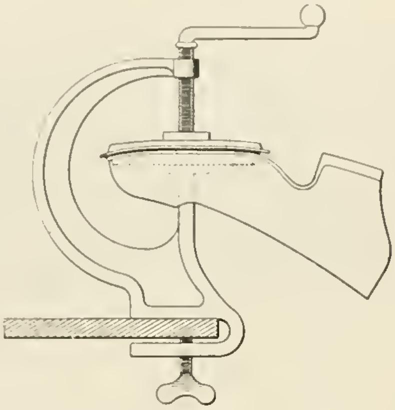
When the heel of a shoe is to be repaired, the sections of the pressure last may be extended so that they will fill the heel part of the shoe. As the mold has twin concavities, with pressure screws, etc., two shoes or boots may be vulcanized at the same time.

ARTHUR SOLE AND HEEL MOLD FORMER

An early device for making metal former blanks for soles and heels and adaptable to various sizes and styles of rubber footwear is the Arthur. The apparatus consists of a *C*-shaped clamp fastened to a work bench, upon the horizontal anvil plate of which clamp is placed, with upturned sole, the article of footwear to be repaired. A piece of rubber to be vulcanized to the sole or heel, and conforming in outline to the sole or heel, is then placed on the upturned shoe. Over this is placed a piece of sheet lead somewhat larger than the piece of repair rubber, which may be serrated or indented to give either heel or sole on molding a roughened surface.

By means of the handle at the top of the clamp the set screw compresses the three articles tightly together, and the edge of the lead sheet is then beaten with a hammer until it hangs or over-

laps about evenly over the repair rubber and the sole beneath it. The articles are then released from the vise and, clamped in any suitable device, are placed in a vulcanizing apparatus, the effect obtained with the lead-former device being a repair rubber sole with a neatly turned and rolled edge much like that of new goods. The method for making former blanks for heels varies but little from that used for soles.

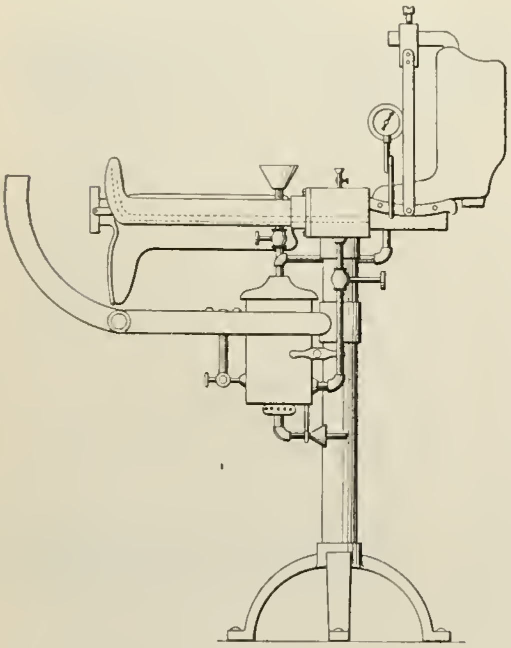


Arthur Mold-Making Press

This to a degree has been superseded by providing the lead molds complete to shoe repair men. To this end a full set of aluminum molds in which the lead molds are cast, can be obtained. These, of course, have a better finish and save a lot of bother for the user.

ARTHUR PLURAL-PART MOLD VULCANIZER

One of the newest and most complete rubber boot and shoe repair vulcanizers, adapted for practically all classes of work and which can withstand hard service, is the Arthur self-contained, steam-heated, plural-part mold apparatus. The device consists of a hollow, heavy standard in which liquid fuel may be stored to be supplied by compressed air to the burner beneath the boiler furnishing the steam to heat the hollow vulcanizing members. A large funnel over the boiler is used for replenishing it with water, and a small funnel over the standard is used for conveying liquid fuel to its reservoir.



Arthur Plural Part Mold Vulcanizer

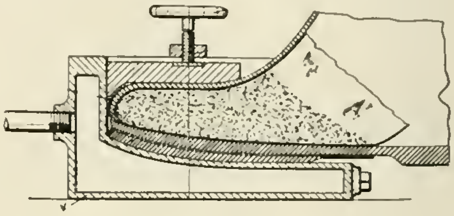
A dome, or box-like compartment, at the top of the standard and piped to the steam boiler, carries one or more hollow, revolvable, and adjustable boot forms or horns on one side and a soling plate or table on the other side. Other openings can be provided on the dome for other repair work. A unique mode of applying pressure while vulcanizing, is provided by a pair of parallel, transversely-joined arms projecting from the standard, and which in turn carry "goose-necked" curved, revolvable, adjustable devices which fit over the shoe forms and against which suitable pressure can be applied by tightening, with a pawl and ratchet, tension bands fastened on the inner side of the hook-shaped holders.

Sole repair is effected on a hollow curing table with a concave surface fastened to the dome above the standard but having its steam supplied directly from the boiler. A metal leg, last-shaped to project into the toe of a boot, is placed in the latter, the upper end of last passing through a member which contains a set-screw acting on tension bands fastened at their lower ends in the molded foot-plate on which the boot rests during a sole cure, and with which ample pressure is obtained.

A novelty, too, is a set of superimposed, springy plates of graduated size which can be fastened to the base of the last and which plates under tension give greater and more uniform internal pressure resistance on the sole of the boot. For smaller footwear, fewer plates are used. The apparatus can also be braced against a wall with a lateral arm extending from the dome.

THE FERGUSON VULCANIZER

One of the simplest of shoe repair vulcanizers is the Ferguson. It is simply a vulcanizing mold and is adapted particularly for resoling, as the steam chamber runs under the sole portion. The foot of the boot or shoe is filled by a sack holding sand while a top plate, cold, acts as a clamp and by means of a screw exerts sufficient pressure to secure proper molding and adherence. Not to criticise the appliance nor to prove the writer's inventive ability, but for the sake of light, we ask, Why not an air bag for the inside instead of a sand bag?

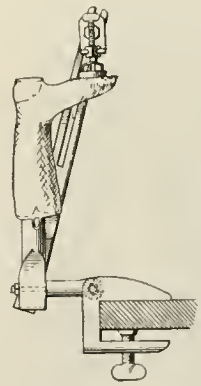


The Ferguson Vulcanizer

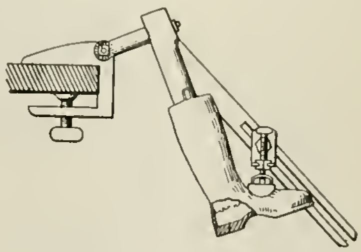
BAST SHOE VULCANIZING DEVICE

A simple and low-cost rubber boot and shoe vulcanizing device which dispenses with steam is the Bast vulcanizer. It has some ingenious features that will be appreciated by repair men with small shops. With it any part of a sole, heel, or upper can be easily and quickly given a repair cure without other heat than is afforded by gasoline. The apparatus is readily adjusted at any angle so that pressure can be applied at and where needed on the footwear to be mended. The device consists essentially of a jack or standard carrying a boot or shoe last, the lower end of the standard being pivotally adjustable to an arm which, in turn, is pivotally adjustable to a clamp fastened to a work bench. The last at the top of the standard can be revolved and, by means of a countersunk screw in the heel, can be set at any point.

Another feature is a flat arm pivotally adjustable to the lower end of the standard and carrying in a slot at the farther end a revolvable, slidable, adjustable metal former-block which, with a thumb-screw, can be forced against footwear in vulcanizing. The heat needed for curing is obtained by burning gasoline in a recess in the top of the former block, which in operation must be kept right side up. Teeth in various bearings insure positive clamping with the adjusting bolts.



Vulcanizing Boot Sole Repair



Vulcanizing Repair on Upper Part of Boot

A Glossary of Words and Terms Used in the Rubber Industry—IV[1]

By Henry C. Pearson

EAST INDIAN RUBBER—WILD

Old time standard grades and also new, as they relate to wild rubber from the Far East, are fast disappearing. This is in part due to the plentiful supply of low cost plantation rubber and partly because jungle produced rubber is washed and sheeted at plantation factories, thus taking on the form of plantation products. It is chiefly as a matter of record, therefore, that the following are listed.

Asiatic. Crude wild and plantation rubber from Malaya, India, the Dutch East Indies, Borneo and the Philippines.

Assam. The best known Asiatic wild rubber, the product of the *Ficus elastica*. The term applies generally to all Indian Ficus rubbers but specifically to the product of that tree from Burma, Annam, Straits Settlements, Federated Malay States and Sumatra. It is known also as Rangoon, Penang, Rambong, Sumatra and Java rubber. The latex is coagulated either by boiling, forming slab, or by air drying from which mat rubber and balls are made. It is marketed in oblong slabs or balls (onions). The rubber comes in four grades, No. 1 to No. 4, the best grade showing a glossy pinkish surface in cross sections. Lower grades are soft and dirty. Shrinkage 15 per cent to 40 per cent.

Borneo. Rubber produced in Borneo, the Straits Settlements, the Celebes, Sumatra, Moluccas and the Philippine Islands. The principal ports of shipment are Macassar and Singapore. It ranks below other Asiatic sorts, is much lower in price and with a high rate of shrinkage. It comes in sheets and balls, more or less bulky, like pieces of liver and is soft and porous. The pores are filled with salt water or whey for the reason that salt is used to coagulate the rubber, and a saline incrustation is left in the cells when the water evaporates. Borneo rubber comes in three grades, the first of which is good while the lowest grade when cut is almost as soft as putty and is worth but little.

Bresk. See Pontianak.

Bandjermassin. See Pontianak.

Beni Kalen. A grade of Java. See Assam.

Cochin-China. Rubber from the native vines and trees as the Parameira. Come in lumps, dark brown in color.

Dyera. See Pontianak.

Dead Borneo. See Borneo.

East Indian. See Assam and Plantation Rubber

French Indo-China. Rubber from the Parameira, Bleecrodia and other sources.

Fluvia. See Pontianak.

Gambia. See Pontianak.

Gutta Jelutong. See Pontianak.

India Gum Resin. A resin extracted from jelutong or Pontianak.

Indragiri. A native rubber machined in Singapore. The product appears on the market as dry and wet sheet. On crêping a fairly strong blanket crêpe is produced.

Java. See Assam.

Jelutong. See Pontianak.

Lampong. A grade of Java. See Assam.

Machined Rubber. Wild rubber of native gathering, that is put through the process of washing, sheeting or crêping.

Mat Rubber. Ficus rubber, air coagulated on bamboo mats. See Assam.

Manungan Pulan. Singapore native name for Borneo rubber. See Borneo.

[1]Continued from The India Rubber World, March 1, 1921, pages 404-405.

Malaysian Rubber. Deresinated jelutong from Goebilt, Sarawak, Borneo. Graded as light brown crêpe, dark brown crêpe and block.

New Caledonia. A product of a variety of trees and vines shipped from Port Villa in cakes weighing from 13 to 23 pounds. It is brown inclining to black in appearance and of a fair quality. Shrinkage 18 to 20 per cent.

Pontianak. A low grade rubber also known as jelutong, gutta jelutong, gambria, bresk and fluvia produced chiefly in Borneo from the latex of the *Dyera costulata*. Contains kerosene as a preservative and earthy matter as an adulterant. Yellowish brown surface, cuts white with a moist sour smell. Hard on the outside but softens like putty with slight warmth. Shrinkage 60 to 80 per cent. Although often classed with low grade guttas it is not a gutta but a very resinous rubber, the rubber content being about 10 per cent. The several grades are named from the districts in which the gum is produced as Palembang, Pontianak, Sarawak, Bandjermassin.

Pontianak Resin. See India Gum Resin.

Pressed Pontianak. Jelutong rubber containing no kerosene or earthy matter. See Pontianak.

Palembang. See Pontianak.

Pamanoekan Balls. A name for Java rubber. See Assam.

Philippine. Rubber which is the product of a vine, the *Chonemorpha elastica* found in Tawi-Tawi, Basilan and Mindanao. The latex is coagulated by adding sea water. The rubber is tacky and grades the same as No. 1. Borneo.

Rangoon. Ficus rubber shipped from Rangoon. See Assam.

Rambong. The native name for Ficus rubber from the Straits Settlements and Federated Malay States. See Assam.

Sumatra. See Assam.

Sarawak. See Pontianak.

Tawi-Tawi. See Philippine Rubber.

White Assam. See Borneo.

PLANTATION RUBBER

Grades of plantation rubber which could be counted on the fingers of one hand a few years ago are now numbered by the score. Theoretically there should be but a half dozen from planted Hevea and about three each from cultivated Manihot, Castilloa and Ficus. Differences in gathering and in coagulation, the careless work of small native planters, the mixing of wild rubbers with cultivated, and the arbitrary creation of new grades all add to the confusion.

The segregation of plantation rubber into grades is done in part at the plantation and finished by the exporters and importers at rubber centers such as Singapore, Batavia, London and New York. The basis of grading is color, dryness, cleanness, hardness and freedom from blemishes of any sort.

The general sorts are crêpe and sheet. Crêpe comes in eleven grades with names that very nearly coincide in the principal markets. Sheet, smoked and unsmoked, comes in three principal grades from the big plantations, but in a great variety of grades from the small native plantations.

The following arrangement is an attempt to give to most of the existing grades some sort of coherence. The sources of information are various growers and importers of rubber, United States commerce reports, British and Dutch government reports, together with the work of John A. Fowler and Dr. P. Arens. Unless otherwise specified all of the grades mentioned below consist of Hevea plantation rubbers.

Anti-Coagulants. Chemicals employed to prevent coagulation in the field or before the addition of the proper coagulant. As formaline, sodium sulphite, etc.

Acid-Cured Rubber. Latex which has been coagulated by means of acetic or other acid. Not to be confused with the acid-cure of vulcanizing.

Amber Crêpe. New York rubber market term for rough, thick, light-colored crêpe graded as No. 1 amber; No. 2 amber; No. 3 amber (medium color) and No. 4 amber (dark and often mottled). See Crêpe.

Barky or Bark. Singapore term for low grade crêpe. See Crêpe.

Bark Crêpe. Batavia rubber market grade of crêpe. See Crêpe.

Batavia Clean Scrap. Lower grade than amber crêpe containing woody particles, etc. See Crêpe.

Blanket Crêpe. A thick crêpe made by rolling together several layers of thin crêpe while warm from smoke-house or vacuum dryer. See Crêpe.

Batu Pahat Sheet. Singapore term for rubber from the district of that name. Color varies from light to dark, usually softening, weakening and darkening after crêping. It makes up into type *C* of Singapore standard blanket crêpe.

Biscuits. Flat pancakes of rubber built up in thin sheets in concentric layers of nearly circular form and from 1/16 to 1/8-inch thick, 10 to 14 inches in diameter. Made from latex coagulated in shallow pans, rolled, dried and smoked.

Block. Sheets, biscuits and other forms of rubber made from latex coagulated in mass and pressed into slabs by screw or hydraulic force and averaging 10 by 10 by 6 inches.

Brown Crêpe. A Singapore low-grade crêpe, having barky particles and often tearing easily. See Crêpe.

Basilan. Plantation Hevea rubber from the island of that name in the Philippines.

Brands. As a guide to quality, producers' brands are much used. Names of the companies as a rule form the brands, and may have an English origin, as Dalkeith or Vallambrosa; a native local name, as Lumut or Siak; or in the Dutch possessions a Dutch name as Daejan. The entire output of many estates is purchased under estate brands by individual manufacturers and thus never appear in the open market.

Clean Scraps. Batavia grade. See Crêpe.

Ceara Plantation. Rubber derived from the Manihots, produced in Ceylon, Malaya and in some of the former German Colonies in Africa. Prepared in crêpe, sheet, and scrap, similar to Hevea plantation rubber.

Coagulation. The process of separating and agglutinating the caoutchouc globules in the tree milk usually effected by acetic acid treatment.

Coagulant. An agent or substance used in coagulating latex.

Colombo Scrap.—Plantation scraps massed, consisting of clear light-brown strings and bits, usually bark-speckled, in No. 1 and No. 2 qualities.

Crêpe. Sheets of rubber with irregularly crimpled or crinkled surfaces, 3 to 6 feet long and 5 to 12 inches wide. It is made from latex coagulated in bulk, passed through washer rolls and while being thus wrung is crimpled by the grooved rolls. It is then thoroughly dried and sometimes smoked.

Crêpe is graded chiefly in New York, Singapore and Batavia. A clear pale color characterizes the highest grade which is called in New York standard quality first latex, or first latex; in Singapore, standard quality pale; in Batavia, standard first latex; and in Java, fine pale and prime pale. The next grade, due to a difference in color, is known in New York as off standard or off color latex; in Singapore, off-color latex and palish crêpe; in Batavia, off-color crêpe, and in East Java, "P" red prime crêpe and "L. B." crêpe. A third grade is known in New York as prime clean light brown; in Singapore, fine brown; in Batavia, lump; and East Java "L. B." red. The next grade in New York is medium-color brown and good dark brown; in Singapore, brown and dark; in Batavia, clean lumps; and East Java, "D" dark, "D. G." dark gray, "D. D. G." red.

These are followed by the blanket crêpes known in the New York market as Nos. 1, 2, 3 and 4 amber; in Singapore as types *A, B, C, D*, blanket. This in turn is followed by the New York term, specky brown crêpe; Singapore, bark or barky; Batavia, barky specky scrap or bark crêpe, and East Java, scrap. Then comes the grade known in New York as massed or rolled crêpe; Singapore, earth or rolled bark crêpe; East Java, scrap.

Coagulum. Freshly coagulated latex in mass.

Compound Rubber. Rubber made up of lump, scraps, bark rubber and wash-water scrap, etc.

Cup Scrap. See Dry Tapping.

Curing. A common term for coagulating rubber. See Coagulating.

Castilloa. Product of cultivated Castilloa. When washed on rolls after coagulation it comes as sheets and scrap. When coagulated by centrifugal force it comes in the form of truncated cones weighing from 10 to 25 pounds. Comes chiefly from Trinidad and Mexico.

Congo. Product of cultivated Hevea from the Belgian Congo.

Bjambi. Sheet rubber from Bjambi, Malaya, from native plantations. Usually soft and dark and with much moisture, showing a shrinkage of 8 to 11 per cent on crêping. It makes up into average soft, dark blanket crêpe of the Singapore types *C* and *D*, mostly the latter. See Sheet.

Diamond Smoked Sheets. Singapore and Batavia grade of best sheet. See Sheet.

Dry-Tapping. Refers to the practice of allowing the latex that adheres to the latex cups to remain and air-coagulate, instead of rinsing the cups with water. The thin films are collected separately and form cup scrap.

Dry Rubber. A somewhat elastic term meaning generally the presence of less than 1 per cent of moisture.

Drying. Removing moisture from rubber by exposure to air at normal temperature, or by heated air, or by mechanical dryers, as vacuum dryers.

Diluted Latex. Latex to which pure water is added bringing the dry rubber content to 15 per cent, as is practiced in making sheet.

Earth Crêpe. A Singapore low grade rubber made from latex that has dripped upon the ground. Also rolled bark crêpe. See Crêpe.

East Java Prime Pale Crêpe. See Crêpe.

Earth Rubber. See Crêpe.

Estate Output. A Batavia grade which consists of about 75 per cent of fine pale crêpe or prime smoked sheet and 25 per cent of the lower grades from off-color crêpe and off-quality ribbed smoked sheet to earth.

East African. See Uganda.

F. A. Q. Ribbed Smoked Sheet. A Singapore term for a clean, tough rubber free from mould, dampness or under or oversmoked sheets. See Sheet.

First Latex. A term referring to latex free from débris, clots or rain water.

Fine Pale Crêpe. A Batavia supergrade crêpe. See Crêpe.

Fine Brown Crêpe. A Singapore term for crêpe made from latex coagulated in the cups. See Crêpe.

Fine Medium Smoked Crêpe. See Crêpe.

Fine Smoked Rubber. A general term for high quality smoked-cured sheet. See Sheet.

First Latex Crêpe. The finest grade of plantation Pará; a thin or thick pale, clean sheet of even color, free from all traces of oxidation and well prepared by acid coagulation. See Crêpe.

Fiji. Plantation Pará from the islands of that name.

Flake. Rubber in thin, flattened irregularly shaped scales.

Formal Rubber. Funtumia rubber coagulated by formaldehyde.

Funtumia Rubber. Funtumia rubber coagulated by boiling with an infusion of the twigs and leaves of native vines.

(To be continued)

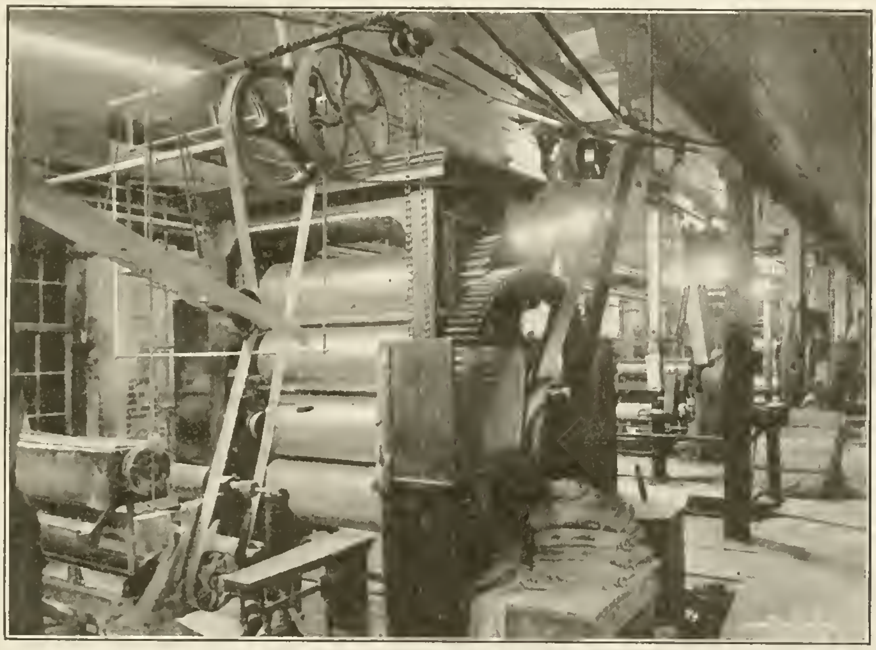
Artificial Lighting in the Rubber Industry—IV[1]

By E. Leavenworth Elliott

General Conditions to Be Considered in the Lay-out

In laying out a heating system the first question is: What temperature must be maintained? Having decided this, the amount of heat required is found by considering the volume of space to be heated; then, the amount of heat given off by a given radiating surface, such as a steam coil, being known, the total area of radiating surface is easily determined. In figuring out the quantity of heat required certain general conditions other than the cubic contents of the room must be considered, such as the rate of change of air for ventilation, the minimum outside temperature, the conductivity of the walls, etc. The influence of these factors is more a question of judgment based on experience than of mathematical calculation. Lastly, having determined the total amount of radiating surface, the method of locating it so as to secure the most uniform temperature through the space must be worked out.

The lay-out of lighting installation is a somewhat similar problem. The first question is: What degree, or intensity, of illumination is required? This will naturally depend upon a number of conditions, such as the character of the materials, the accuracy of the work, the color of surrounding walls, etc. It is not so generally known that the quality of the light is also a large factor in this determination; but before we discuss this in detail it will be well to consider the general problem.



A Good Example of Mill Lighting by Cooper-Hewitt Lamps, the Lamps Being Located to Give the Best Illumination on the Machines

Having decided upon the intensity of illumination needed, the size and location of the light-units may be determined; and from this data the total quantity of light, and the corresponding amount of electric current required, can be reckoned.

It is a curious fact that, in all the scientific investigations that have been carried out, and all the theoretical work that has been done to put the use of light on an engineering basis, all answers to the first, and most important question, have been merely so many broad guesses. Extended lists of operations with the intensity of illumination required for each have been published; but the wide differences in the figures are in themselves sufficient evidence of the uncertainty of their authority. As to what precise methods were used to determine them the authors are discreetly silent. The preceding tabulation of operations pertaining to another industry may be cited as an example.

Illumination Required for Textile Processes

Cotton	Foot-candles: Light goods	Foot-candles: Dark goods
Opening and lapping	2-6	2-6
Carding	2-6	2-6
Drawing frame	2-6	2-6
Roving, spooling, spinning, etc.	3-9	3-9
Warping	2-6	2-6
Slashing	2-6	2-6
Drawing-in	3-9	3-9
Weaving	3-9	3-9
Dyeing	3-9	3-9

It is a familiar fact that the eye can function through an enormous range of light intensities. From dim starlight to full sunlight represents a difference of more than a million to one in brightness. The question is not whether an operative can see to work, but can he see to work with his greatest efficiency? Reduced to a scientific basis, which is also the common-sense basis, the rule is this:

Such a degree of illumination must be provided, the quality of the light and all other conditions affecting vision being considered, that the muscular motions which depend upon sight for their guidance can be made with the greatest speed and accuracy of which the individual is capable under the circumstances in each case.

Or to put it the other way around: the workman must not be hindered in the slightest degree by the illumination. The problem is to find the minimum intensity required: this can be exceeded by several hundred per cent without interfering with the desired result; but to use an excess of material or power is not good engineering—in fact, it is not engineering at all, but only guesswork The extent to which excess is avoided measures the value of the engineering skill applied.

Seeing involves the recognition and discrimination of the various parts and features of the objects seen. In a general way the effectiveness of sight depends upon the amount of light reflected from the object; in other words, its average surface brightness. It is like timing a photographic exposure, which is based upon the general brightness of the field. It needs no elaborate scientific formula to tell you that more light is necessary to see dark-colored objects plainly than to see light-colored objects; also, that more illumination is needed to discriminate objects between which there is little contrast in brightness.

Recent experiments show that the intensities formerly given for different classes of work are much too low, at least in the cases where sharp vision is required. The most accurate and reliable experiments of this kind, the results of which have not yet been published, show that, in the case of average sharpness of vision, such as that required to read printing the size of this

[1]Continued from The India Rubber World, March 1, 1921, pages 412-416.

line, eight point, and with the maximum contrast—black on white—and with no disturbance from glare or scattered light in the eye, a minimum illumination of 10 foot-candles is required; 20 foot-candles giving even a slightly higher visual efficiency. This is more than five times the minimum intensity given in the list of operations in cotton goods manufacture, in which the conditions for discrimination are very similar to those in reading print.

An equally interesting and important fact is the difference in visual efficiency due to difference in the quality of the light, evidently due to the difference in the sharpness of the retinal image by light of different color composition, as explained in the preceding article. According to the experiments just referred to, the relative values of the three available sources of light, viz., daylight, incandescent electric light, and mercury-vapor light, at 5, 10, and 20 foot-candles intensity, reduced to a scale in which 10 foot-candle daylight is taken as the standard, or 100 per cent, is as follows:

	Daylight	Incandescent Electric	Mercury Vapor
5 ft.-can.	95.3	91.5	101.0
10 ft.-can.	100	97.1	106.2
20 ft.-can.	101.4	98.9	107.3

The experiments by which these values were obtained included not only the discrimination of objects in seeing, but the time required to make a muscular action in response to the visual impression, which is exactly what takes place in all manual labor that it directed by sight. The figures thus represent the actual labor-output values of the different lights and intensities.

These figures show that for all work requiring close vision and sharp focussing, at least 10 foot-candles illumination should be provided, and that at this intensity mercury-vapor light is 9 per cent better than incandescent electric, and 6 per cent better than daylight, measured in labor efficiency.

In the case of the coarser grades of work, where close vision is not required, no equally reliable data are at hand. Two general facts, however, will afford some help in forming a judgment in such cases: first, the difference in cost due to a difference of 5 foot-candles in illumination is insignificant in itself, and still more so in comparison with the cost of labor; and second, there is no danger of loss in efficiency from too much light, if it is of the right kind. A minimum of 5 foot-candles may therefore be taken as a safe figure for all cases of rough work, i.e., where the objects seen are not ordinarily closer to the eye than arm's length.

There is but one other general case to be considered; that of spaces in which no work is regularly done, such as storage rooms for raw and finished products, or the intervening spaces between machines. In the former, continuous lighting may not be necessary, but only a working intensity required locally on occasion. In the latter, a sufficient intensity to avoid any possibility of accidents from imperfect vision is the chief requirement. One foot-candle may suffice, but two is a safer amount.

There remain, then, only the special cases where unusually exacting work, like die sinking, is done, in which case 20 foot-candles is a fair minimum.

Knowing the degree of illumination required, the next question is, how to secure it. This problem involves two factors: the size of the light-unit, and its position in the space to be lighted. These two factors, when taken in connection with a number of conditions which effect the final result, afford an opportunity for endless mathematical calculations; and the vast amount of work that has been expended in this way is chiefly impressive for the inutility of the results obtained.

When reduced to its lowest terms of practicality, the problem is simple enough. To begin with, we have a light-unit, i.e., a lamp and its accessory apparatus for diffusing and reflecting light, which distributes its light in a certain manner, which is usually shown by a curve supplied by the makers. It follows that there will be as many different kinds of distribution curves as there are different kinds of reflectors and globes; but the problem has been greatly simplified by the narrowing down of the choice of light-units to two types: the Cooper-Hewitt lamp, and the gas-filled tungsten filament lamp, known in the trade generally as the "Mazda C," equipped with a white-enameled steel reflector, commercially known as an "R. L. M. reflector." This reduction of practical industrial lighting units to two types is the combined result of the process of elimination by which the fittest survives, and the American tendency to standardize. The Cooper-Hewitt lamp is regularly produced in one size, though a half-size lamp may be had on special order; the Mazda C unit may be had in a variety of sizes. The distribution curves of these two are so near alike that they may be treated as identical, as shown in Fig. 1.

"Curves" are now so frequently used to show the relation between variable quantities that a very brief explanation will be sufficient. In these curves the light-source is at the center, or "origin," and the candle-power intensities at different angles are measured off on radii from this point. In the case of the 500-watt, bowl frosted tungsten lamp shown, the intensity directly underneath is 1,500 candle-power; at 45 degrees it is 1,300 candle-power, and is cut off entirely at 15 degrees below the horizontal. The curve of the Cooper-Hewitt lamp taking 430 watts is practically the same, the difference being too slight to be recognizable in the illumination produced.

These curves deal with intensities of *light;* the problem is to select units of such size, and to place them in such positions that the desired intensities of *illumination* may be secured.

The intensity of illumination produced upon a given surface by a given light-unit depends upon three things: (1) the candle-power intensity of the light-beam; (2) the distance of the surface from the source; and (3) the angle at which the rays strike the surface. The first and second of these laws we have already discussed; let us now examine the third.

A beam of light, L-ABCD, from a source at L, will cover the surfaces S, S′ and S″, which become larger as their inclination

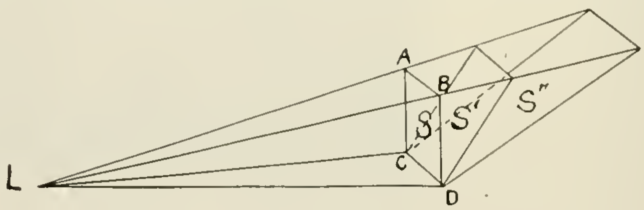


Fig. 1. Diagram Showing Increase of Surface Covered by Given Beam of Light at Different Angles of Incidence

becomes greater; and as in the case of the distance, or inverse-square law, the *greater* the surface the *less* the illumination. Expressed mathematically, the intensity varies as the sine of the angle of incidence. If this happens to be beyond your familiarity with mathematics, don't worry; the figures have been all worked out by the lamp makers, and you can use them for your estimates, just as the banker uses his interest tables instead of making laborious calculations of his own.

In figuring illumination the question naturally arises: what surface is to be taken, the horizontal, the vertical, or the surface perpendicular to the light-beam? In the actual use of light for seeing things, all three of them, and every position between, come into play; but for the purpose of estimating the size and position of light-units—and any calculations of this kind are only estimates, or indicators, at the best—the horizontal surface is usually taken as the standard, and is assumed to be 30 inches from the floor.

Uniform illumination on this imaginary plane is generally considered the 100 per cent perfect result. But perfection in light distribution is as difficult of realization as perfection in human nature, and far less to be desired. The practical object, and one which is easily within reach, is to have not less than the minimum intensity required, at every place in the room, and to avoid too large an excess above this amount.

In considering the distribution of light over a horizontal surface the most obvious fact is the way in which all conditions work together to produce the greatest intensity directly under the unit: thus the candle-power intensity is greatest in that direction, the distance from the source is the shortest, and the inclination of the surface least, in fact, zero. As we move out from this position the intensity falls off very rapidly; at a

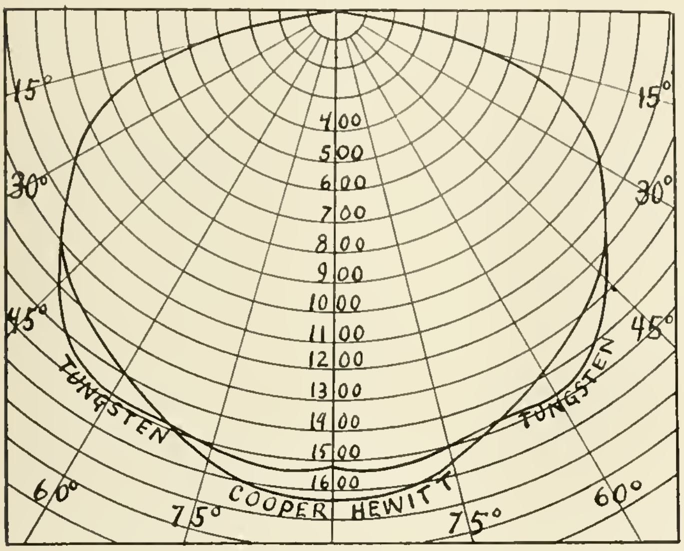


Fig. 2. Curves Showing Distribution of Light by the Two Units Best Adapted to Factory Lighting. The "Mazda C" Lamp With "R. L. M." Reflector, and the Cooper-Hewitt Lamp

distance equal to the height of the unit it falls to one-fourth, and at twice this distance of one-sixteenth, and at an equal rate beyond this. The foot-candle intensity directly underneath is found by squaring the height of the unit, measured in feet, and dividing the candle-power by this product. Example: If the 500-watt Mazda unit is placed 10 feet above the floor, the foot-candle intensity directly below is $1500 \div 100 = 15$ foot-candles. At ten feet from this spot it is ¼ of 15, or 3¾ foot-candles, and at 20 feet, 1/16 of 15, or 15/16 foot-candle, reckoned by the mathematical laws which apply in the case.

These figures are for the simplest case; that is, where a single unit is used. When more units are used to light the same surface the resulting illumination is, of course, the sum of the intensities produced by all the units used. Mathematically, the problem of figuring the resulting intensity becomes greatly complicated in the case of a number of units; but practically it is very simple. The amount of light received by units beyond those next to a given unit is so small that it may be left out of the reckoning entirely. For all practical purposes the following rules are sufficient. When the units are spaced at distances equal to their mounting heights the illumination will be uniform. When spaced at twice the mounting height the minimum illumination, midway between two adjacent units, will be one-half the maximum, or underneath intensity. Spaced at three times the mounting height the minimum will be one-third the maximum.

From the candle-power, or distribution curves, or the intensities which they represent, and these few computations by simple arithmetic, all the information as to foot-candle distribution that is worth having may be quickly obtained. Variations due to deterioration in use, accumulations of dirt on lamps and reflectors, reflection from walls and other surfaces, will far exceed any discrepancies arising from mathematical inexactness in these calculations.

Having decided upon the intensity of illumination to be supplied, either on the basis of uniformity, or of a given minimum, it is a simple matter to determine the size of units, and the spacing distance required: and from this data the total amount of current, and the ratio of current to floor space, is quickly reckoned. Thus, if a uniform illumination of 10 foot-candles is desired, it may be obtained by using either the 500-watt Mazda C units, or Cooper-Hewitt lamps, hung 12 feet high and spaced 12 feet apart. There would then be one unit or lamp to each 144 square feet, which would be at the rate of 3½ watts per square foot for the Mazda unit, and 3 watts per square foot for the Cooper-Hewitt lamp. If the ceilings are too low to admit of the 12-foot hanging, or if conditions are such that a lower hanging is practicable, they may be hung at 10 feet, which will give 15 foot-candles underneath, and with 20-foot spacing, 7½ foot-candles minimum, with a rate of 1¼ watts per square foot for the Mazda, and 1 watt per square foot for the Cooper-Hewitt. If a 10 foot-candle minimum is desired, the spacing can be reduced to 15 feet, which will give a rate of 2 watts per square foot for the Mazda, and 1.9 watts for the Cooper-Hewitt. Smaller units may be used, but their distribution is the same, and the methods of figuring will be the same, with the substitution of the smaller candle-power values, which are supplied by the lamp makers.

The method may seem very haphazard and unscientific to the professional engineer; if so, then there is plenty of opportunity to manipulate mathematical formulas for those who are so disposed: but the average factory manager probably would sooner spend his time playing solitaire, which would be quite as valuable an occupation so far as practical results are concerned. There are several published volumes of which this subject occupies the major portion. Never was so much perfectly good mathematics squandered to so little purpose.

There are two ways to lay out a lighting installation: to locate the units with reference to the structure of the building; or to locate them with reference to the machinery or the positions which the workmen occupy. There would seem to be little doubt as to which method would produce the better results, measured in labor efficiency: and yet most new installations are planned by the former method. Having produced uniform illumination over the theoretical "working plane"—on which no work may ever be done—the job is considered a fine piece of "engineering"—by the engineer. Architects have a cheerful way of lighting two kinds of the rooms in which the manner of lighting is most important, kitchen and bedrooms, in such a way that it is impossible to see plainly and comfortably what you most need to see. A single unit is placed in the center of the room; and as the tables, sink, stove, cupboards, etc., are around the walls of the kitchen, and the bureaus and mirrors similarly placed in bedrooms, you invariably "stand in your own light," that is, your own shadow is upon the very thing that you most want to see. And yet the illumination of the room is fairly uniform, and may be of ample intensity, thus fully satisfying "engineering" requirements. The best laid plans of blueprint installations "gang aft a-gley" for similar practical reasons.

We discriminate in seeing by differences in brightness, or in more familiar terms, by differences in "light and shade." A surface of uniform brightness appears perfectly flat. A light that was perfectly uniform and perfectly diffused would be about the worst possible light to work by. The best possible illumination is one in which the shadows are sufficiently light to reveal all details, and yet in which there is a sufficiently strong light from some one direction to bring out distinct contrasts. Nothing is more confusing than multiple shadows,—the result of "cross lights," which have long been recognized as serious evils. The ideal method of illumination is, therefore, to light each piece of work in the manner just stated, so as to bring out all the details as sharply as possible, and to handle the light-units in such a way as to avoid glare and scattered light in the eye of the workman. This can only be accomplished by careful consideration, and often by actual experiment, of the particular conditions arising in each case. We shall study some of these cases in our next article, in connection with typical rubber factory lighting installations, which will conclude these papers.

SUMMARY

The intensities of illumination required for various industrial purposes have generally been far underestimated in published works on the subject. The most recent and reliable investigations show that a minimum of 10 foot-candles should be supplied for close work. One-half of this amount should be furnished for coarse work, and from one to two foot-candles for general safety in all spaces regularly used by workmen.

Mercury-vapor light enables the muscles to respond more quickly to vision and brings out details more sharply than either daylight or ordinary electric light.

There are only two types of light-units to choose from for factory use: the gas-filled tungsten lamp with white-enameled steel reflector, and the Cooper-Hewitt lamp. These distribute their light in the same manner, so that the same rules apply to both in figuring a lay-out.

These units, when spaced at distances equal to their height, give uniform illumination on the floor. At twice this distance apart the illumination midway between the units is one-half what is directly underneath; and at three times the distance, one-third.

The foot-candle intensity directly underneath may be found by squaring the height of the unit in feet, and dividing the vertical candle-power intensity by this product.

The intensity of illumination on the floor produced by a single unit is found as above for the point directly below; at a distance from this point equal to the height it is one-fourth as much, and at twice this distance, one-sixteenth as much. The above two rules will give sufficient data for figuring any lay-out with the units described.

The best distribution of illumination is one in which there are no shadows so dark as to prevent seeing details, and which gives such degrees of light and shade, or contrast, that all details can be sharply discriminated

RUBBER SHOE SOLING

By B. W. Elberson

In the composition of rubber shoe soling there is generally a predominating proportion of reclaim in the mixing, enough crude rubber being added to ensure a measure of wearing quality. Formerly the only reclaim used for this purpose was that derived from reworking waste rubber from worn-out shoes.

Since the great influx of reclaim from automobile and solid tires these grades have found a place in rubber sole composition and have improved the wear resisting quality of the product. Plantation Pará in the inventories of rubber manufacturers at 27 cents per pound, suggests the possibility of again using the better formulas of forty years ago. In these mixings crude rubber predominated rather than reclaimed rubber.

SOLING STOCK IN THE FACTORY

The usual method of preparing soling in a rubber shoe factory is to allow an interval of 24 hours between mixing and calendering. The latter operation is accomplished with a small four-roll calender of special design, one roll bears the knurling for heel and forepart of the sole, these are separated by a smooth shank interval bearing the brand of the manufacturer. The knurled roll is suitably turned to give the desired variations in gage of the soles.

TUBED SOLING

In European factories soling has been run by means of the tubing machine, the cylinder of stock extruded being cut and laid open as it emerges from the die, and the knurling effected by passage of the stock through a pair of rollers close to the die of the tubing machine.

Better quality stocks are handled somewhat differently from reclaim grades. For best results with good grades, batches should be cooled after mixing and be allowed to rest for two or three days before calendering. Otherwise the stock will work up too soft, and blistering and undercuring are liable to result. On the other hand, if insufficiently ground, soling will not calender smoothly and will shrink several gages on cooling. Judgment and care are necessary to maintain the medium condition of softness, bearing in mind that the harder the stock when delivered to the heater the firmer will be the cure.

HANDLING SOLING

Calendered sheet soling is usually cut in short lengths, received on convenient thin boards with end cleats for separation in piling, and the piles set aside for 24 hours of cooling before cutting up.

SOLE CUTTING

In small factories or for small quantities of soles needed in large factories, soles are usually cut by hand, using sheet metal patterns as a guide. For large output the sole-cutting machine has become indispensable, owing to the advantage of speed attained.

DELIVERY OF SOLES TO SHOEMAKERS

It is impractical to bunch cut soles on boards for delivery to shoemakers; instead it is customary to use cloth leaf books for this purpose, which are transported on edge in trucks, to avoid pressing and adhesion in the book.

These books are on a board, and have eighteen or twenty leaves of canvas and a black-rubber top leaf for chalkmarking. In the making room the operative is not allowed to use cement. A cup of naphtha and a brush to do the "gassing" will produce enough adhesion for quick rolling on. This touching up is done while the soles are in the book, the leaves of which become so sticky after a time that they occasionally have to be dried out in the heater.

ROLLED-EDGE SHOES

A large percentage of goods are made rolled-edge, which necessitates the stock being cut face down, and therefore the back of the sheet must be marked to show the position of the brands and heel line. A small wheel may be used for this purpose, resting on the engraved roll and held in position by a hinged arm attached to the calender frame. The wheel has a couple of brands on its face spaced exactly like those on the roll; these and the heel line are slightly raised, which makes the impression.

VULCANIZING

Of the several methods of vulcanizing, the pressure-cure is the best for heavy work, as the heat penetrates the goods, and pressure ensures a strong union between the shoe upper portion and sole. Red, maroon and white stock should be pressure-cured, although maroon can be compounded with some litharge and will then cure fairly hard in open heat.

SERVICE

If goods are to give longer service the bottoms must be of more durable stock. An examination of a pile of worn-out shoes will show that a large number were discarded because of leaky soles; generally the heels wearing through first. This is a very noticeable defect in women's shoes. If a ply of good quality and thickness of rubber were added, in making up, it would prevent leaking, even after the regular heel had worn through.

"ENGLISH WEAREVER" RUBBER SPONGE OF NATURAL COLOR

A rubber sponge that is a very good imitation of a natural sponge both in color and porosity is the "English Wearever," recently developed by an American manufacturer of rubber sundries and specialties. This sponge is much firmer to the touch than the ordinary red rubber article. Its natural light tan color is very attractive. It has not the unpleasant, slimy feeling often objected to in rubber sponges when used with soapy water. The porosity is irregular as in a natural sponge and it has unusual absorbent qualities.—The Faultless Rubber Co., Ashland, Ohio.

Solvents and Thinners Used in the Rubber Industry[1]

By Frederic Dannerth, Ph.D.

A Study of Specifications, Technical Properties, and Methods of Testing, Volatile Organic Solvents

In the rubber industry the use of thinners, or volatile solvents is a primary requirement in the process of spreading, in the vapor vulcanization of rubberized and rubber-coated fabrics, in the preparation of dipping solutions which contain sulphur chloride, and in the preparation of cements used in connection with many different "building-up" processes. As examples of these built-up articles, we have such druggists' sundries as hot water bottles and fountain syringes; raincoats and rubber footwear; power transmission belting and rubber hose. Solvents are also used for the purpose of cleaning surfaces before rubber or rubber compounds are applied. These "wiping liquids" are used in the manufacture of auto tires, as well as rubber-covered rolls.

SPECIFICATIONS

In writing specifications for volatile solvents or thinners, it is desirable and necessary to take into consideration the effect which the operator seeks to attain—the effect of the solvent on rubber and rubber compounds, as well as the effect of the solvent on the workers. The questions which the buyer and the factory superintendent must therefore keep in mind are these:

1. Is it non-toxic? Will it injure the worker either externally or internally? Will it shorten his life?

2. Is it non-corrosive? Will it attack any cans, tanks or drums in which it may be stored or transported?

3. Has it the proper "speed of evaporation"? Will it evaporate before it has accomplished its purpose, or will it remain as an oily deposit after it has done its work?

4. Has it a definite boiling point, or is it a mixture of various solvent liquids which boil at different temperatures?

5. Does it contain any "high-boiling residues" such as are contained in raw petroleum before it is refined? If the solvent is to be used as a wiping fluid this is an important consideration because any grease or oil content would interfere with the adhesion of the rubber compound.

6. Is it non-inflammable? This factor will, of course, affect the fire risk and determine the amount of insurance premium demanded by the insurance companies. Solvents having a very low "flash point" will, as a rule, be prohibited by the authorities, and, on the other hand, they will generally be found to be unsuited for use in any of the operations mentioned above.

7. Is it odorless? Foul smelling liquids and those which irritate the membranes of the eye and nose will interfere with the efficiency of most workmen. For that reason an odorless liquid would be preferred to those having a foul, pungent, irritant, caustic, disgusting, offensive or other unpleasant odor.

8. What is the solvent or the swelling power which it possesses for rubber? If a cubic inch of fine Pará rubber is immersed in the solvent for 60 minutes, what change in size, shape or condition is noticeable?

9. What is the price of the solvent or thinner per gallon in original packages, F. O. B. your factory?

GLOSSARY

Gasoline. The refining processes of the petroleum industry consist for the most part of washing and distilling. The crude oil is then, one might say, analyzed on an industrial scale into its component parts. And this is possible because each part boils at a different temperature, just as we find that a teaspoonful of ether and a teaspoonful of water will not evaporate with equal rapidity.

The type of gasoline or light naphtha used in the preparation of cements and dough for rubberizing is preferably not heavier than 0.730 specific gravity, with a boiling point of 50 degrees to 150 degrees C. (122 to 300 degrees F.). Municipal fire laws usually require the user of gasoline to bury the storage tanks so far below ground level as to keep the tank cool and prevent the access of flames or electricity. Workmen should remember that the vapors of gasoline are heavy and are therefore more dense near the floor, that the sense of smell tires very quickly, and for that reason they may suddenly find themselves overcome by the vapors unless proper ventilation has been provided. The matter of correct and active ventilation is then one of the principal safeguards which must be adopted wherever this solvent is stored or used or evaporated.

Coal-tar Benzene. This is a refined oil obtained from the light oil of coal-tar by fractional distillation. It boils at a constant temperature of 81 degrees C. (= 177 degrees F.) and contains no high boiling oils, such as is the case with gasoline or petroleum naphtha. Some factory superintendents claim that it is undesirable because it evaporates all at one temperature. In 1902 Carl Otto Weber expressed the opinion that "for most practical purposes the use of a homogeneous solvent having a constant boiling point, results in solutions or doughs which dry from the surface. This yields harsh and rough coatings, and in the

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Table Showing Properties of the Principal Volatile Organic Solvents

Solvents	Specific Gravity	Pounds Per Gal.	Price, Cents per		Boiling Point		Flash Point Deg. C.	Chemical Formula
			Lb.	Gal.	Deg. C.	Deg. F.		
Gasoline 65° Bé	0.718	5.97	..	38	95% below 150°	302	Below 0	Hydrocarbons C_nH_{2n} plus 2/C_nH_{2n}
Benzene pure	0.880	7.33	..	30	81-82	178	Below 0	C_6H_6
Benzene 90%	0.870	7.24	..	30	Dry at 120°	248	Below 0	Benzol, Toluol
Coal-tar naphtha, 160°	0.860	7.15	..	28	90% below 160°	320	22-26	Benzol, Toluol, Xylol and Cumol
Turpentine	0.870	7.24	..	58	160-170	338	34	$C_{10}H_{16}$
Acetone	0.800	6.66	14	93	57-58	137	Below 0	CH_3CH_3CO
Methanol, 95%	0.817	6.80	..	130	66	150	12	CH_3OH
Denat. grain alcohol, 190 proof	0.816	6.79	..	70	79-80	175	12	C_2H_5OH + denaturant
Butyl alcohol	0.815	6.78	32	32	115-117	240	.....	$CH_3(CH_2)_2CH_2OH$
Fusel oil refined	0.820	6.83	..	360	100-140	284	.....	Amyl, propyl, iso-butyl alcohols, etc.
Carbon disulphide	1.292	10.76	8½	92	46-47	115	Below 0	CS_2
Carbon tetrachloride	1.630	13.57	12	163	77	171	None	CCl_4
Tri-chlor-ethylene	1.470	12.20	15	183	88	190	None	C_2HCl_3
Tetra-chlor-ethane	1,600	13.28	16	212	147	297	None	$C_2H_2Cl_4$
Water	1.000	8.33	..	30/1000	100	212	.....	H_2O

case of waterproof cloth, the finished cloth will curl toward the rubberized surface." Obviously the outer layer or surface of rubber coating will dry before the lower or inner layer has a chance to dry. The surface layer contracts long before the solvent has left the lower layer, and the cloth wrinkles, warps or "cockles," as the workers say.

As a thinner or solvent for sulphur chloride, coal-tar benzene is, however, used successfully to a large extent today.

Solvent Naphtha. The oil obtained from coal-tar might better be called "160-degree coal-tar naphtha." It consists of a mixture of benzol, toluol, xylol, styrol and pseudo-cumol, so that 90 per cent boils below 160 degrees C. (320 degrees F.). This material resembles gasoline in that it boils over a wide range and for that reason it does not evaporate superficially as does benzene. On the other hand, it boils similarly to turpentine (160 to 170 degrees C.), and for that reason it has been used as a substitute for turpentine in many cases where thinners are needed. In England and Europe the oils obtained from the distillation of coal-tar have for years been the logical solvents and thinners for the rubber industry because of the lack of extensive petroleum deposits.

Numerous experiments have proved that rubber which has been thinned down with "volatile solvents" loses much of its value when it is recovered from the cement thus formed. The rubber remaining after evaporation of the "solvent" has lost considerably in tensile strength. Now it is also found that the loss in tensile will vary with the "solvent" which has been employed. This may be due in a measure to the fact that the distribution of resins in the rubber has changed, or a residue of very high boiling oil has been left in the rubber after the major portion of the "solvent" has disappeared. The coal-tar naphtha at present on the market in America is of such a quality that the impurities which were mentioned in specifications twenty years ago have now practically disappeared. The one thing which should invariably be given consideration is its boiling point and the (volume) percentage which is non-volatile at 160 degrees C. (320 degrees F.).

Carbon Disulphide. Because of its ability to dissolve large amounts of sulphur, this material was one of the first to be used as a solvent and thinner in rubber work. Virtually all of the carbon disulphide used in America today is made in special electric furnaces. One shaft of the furnace is kept filled with charcoal, while the outside ring contains sulphur. The hot vapors of sulphur rise and pass through the heated charcoal, forming vapors of carbon disulphide, which are then piped off and condensed. The material has a boiling point of 47 degrees C. (116 degrees F.) and its vapors are unusually heavy. This, coupled with the fact that it is highly inflammable, makes it so undesirable that its use is extremely limited at the present day in all plants where scientific management is used. Up until about 1910 it was used quite a little as a thinner for sulphur chloride.

Turpentine. The distillation of resinous woods may be carried out in as many as five different ways and by means of destructive distillation turpentine, wood-tar and charcoal are obtained. If distilled by means of steam under a pressure of twenty pounds, a very high-grade turpentine is obtained. As far back as 1819 Thomas Hancock in Manchester, England, conducted experiments for the purpose of dissolving rubber in turpentine, but he found that the "solution" dried very slowly because the turpentine contained some high-boiling constituents. Experience has shown that the conversion of rubber and rubber compounds into "cements" is facilitated by first grinding the material in a churn or masticator. In this way the fiber of the rubber is broken down somewhat and the solvent is enabled to act more effectively. It is interesting in this connection to note that it is almost impossible to incorporate such materials as rubber substitutes (sulphurized oils) by merely mixing them in the cement in the churn. The only practical way to add these substitutes to a rubber compound seems to be to grind them into the rubber on the usual mixing mill. In this way the particles are spread through the whole mass uniformly.

In turpentine we have an example of a solvent which has an *almost* constant boiling point, 160 to 170 degrees C. (320 to 338 degrees F.). In other words, it contains no oils which boil at about 100 degrees C., and the result is that the evaporation is not facilitated. This is a problem in vapor tensions which will be recognized by students of physics.

It may be added that turpentine is today of no practical interest for most of the industrial rubber processes, but in those cases where its boiling point is not an objection it will be found to be desirable and effective as a thinner and solvent. Turpentine is interesting to rubber chemists, as it has the same empirical formula as Hevea rubber hydrocarbon ($C_{10}H_{16}$).

Para-Cymene. In the manufacture of sulphite spruce pulp certain liquors are obtained which on distillation yield a crude oil. The oil is allowed to stand over lime for about one week and is then subjected to steam distillation. This distilled oil is now washed repeatedly with sulphuric acid until a sample of it when shaken in a small bottle imparts very little color to an equal volume of sulphuric acid. The oil is finally washed with water, dried and purified by distillation. The product so obtained boils at almost exactly 175 degrees C. Its chemical name is 1-methyl-4-isopropyl benzene; its specific gravity at 16 degrees C. is 0.8623, and its flash point, 42 degrees C.

The liquid bears quite a little resemblance to turpentine (boiling point 160 to 170 degrees C.) but it is much more fragrant, and for that reason is used to a considerable extent in perfumes. In 1918 Andrews took out a United States patent covering the use of amino-cymene as an accelerator of vulcanization, but the cymene itself has up to the present been used in the rubber industry chiefly as a solvent for rubber in the laboratory. In order to avoid confusion, it should be repeated that cymene is chemically a derivative of coal-tar benzene (benzol), but is obtained on an industrial scale from sulphite spruce pulp liquors. Its market price today is approximately $2 a gallon, in 110-gallon drums.

Denatured Grain Alcohol. To chemists this material is known as ethyl alcohol (C_2H_5OH), to which a small percentage of foreign matter has been added to render it unfit for drinking. It is generally made by fermentation of Indian corn or maize with a small percentage of malt. More recently, however, it has been made by treating sawdust with dilute sulphuric acid. In this way the carbohydrates are changed to fermentable sugars, and the sugars are later fermented by means of distillers' yeast.

A finished alcohol which contains 90 per cent alcohol by volume is known in the trade as "180 proof," and this would show a specific gravity at 16 degrees C. of 0.8340. A United States proof-gallon (of alcohol) is one which consists of 50 per cent absolute alcohol by volume—the other 50 per cent being water. This is known as "100 proof."

With 180 proof alcohol at about 65 cents per gallon, and with 70 degrees Bé. gasoline rising each day from 38 cents per gallon, the question has frequently been raised by rubber factory superintendents as to whether the former liquid could be used as a thinner in admixture with the gasoline. Experiment shows that 100 gallons of 95 per cent denatured alcohol will mix with 30 gallons of a 70-degree gasoline to form a perfectly clear, water-white liquid.

Butyl Alcohol. One corporation has recently put on the market almost pure butyl alcohol. In solvent power this resembles amyl alcohol, or refined fusel oil to some extent. It shows 0.814 specific gravity, and 90 per cent of it boils between 115 and 117 degrees C. (239 to 243 degrees F.). The chemical formula of butyl alcohol is $CH_3.(CH_2)_2.CH_2OH$. It contains no water or acetic acid whatever and can readily be

mixed with an equal volume of gasoline to form a clear liquid, boiling between 115 and 160 degrees C. It may be that a use for this solvent will be found either as a thinner for the varnishes used on rubber-coated fabrics, or as a thinner for the sulphur chloride used in the manufacture of dipped goods. The use of butyl alcohol as a primary material in the manufacture of synthetic rubber from starch was proposed several years ago.

FUSEL OIL. In the manufacture of ethyl alcohol from grain and potatoes, a certain amount of fusel oil is formed. This is a mixture of propyl alcohol, iso-butyl alcohol and amyl alcohol. Its boiling point, therefore, ranges through those of its constituent alcohols, and is higher than that of grain alcohol (79 degrees C.). Fusel oil mixes with an equal volume of gasoline.

ACETONE. The material known to chemists as di-methyl ketone is interesting to rubber goods manufacturers because of its peculiar property of dissolving resins contained in crude rubber. Commercial samples show a boiling point of about 57 degrees C., with about 90 per cent boiling below 58 degrees C. (137 degrees F.). It first came into notice shortly before 1900 when experiments were conducted on deresinating crude dry Pontianak or jelutong. It was found in the laboratory that the resins of rubber could be dissolved in acetone, and this observation was carried over into factory practise. Accordingly, large deresinating plants for the treatment of the jelutong were erected in Akron as well as at Goebilt on the island of Borneo. This process becomes costly when acetone sells at 93 cents per gallon and refined Hevea rubber sells in New York at approximately 20 cents per pound.

One other consideration, however, enters into the question and that is the peculiar properties of the jelutong resin which is thus obtained from crude Pontianak. This resin is probably related to iso-cholesterol and the unsaponifiable matter in wool grease. It melts at about 160 degrees C.

Acetone and grain alcohol are unique among volatile solvents in that they both mix readily with water, and both have a boiling point far below that of water.

In a recent article published by Andrew H. King in *Chemical and Metallurgical Engineering,* mention was made of the fact that the solvent used on an industrial scale for deresinating guayule and Pontianak was composed of 53 gallons of 98 per cent acetone, mixed with 47 gallons of gasoline. The acetone had a specific gravity of 0.8041 at 16 degrees C. (60 degrees F.), while the gasoline showed a specific gravity of 0.7000 and contained practically no residues boiling above 130 degrees C. (266 degrees F.). It was shown that acetone and gasoline, when mixed in the percentages mentioned, will mix without any trouble at all. King has also prepared tables showing the specific gravity of 100 per cent pure acetone to be 0.7946, while 90 per cent acetone (10 per cent water) shows 0.8340 gravity.

The deresination of 1,200 pounds of guayule requires 3,200 gallons of mixed solvent, and the loss of solvent is about 44 gallons of gasoline and 15 gallons of acetone.

NON-INFLAMMABLE SOLVENTS

We now come to the consideration of a group of materials which are of exceptional technical importance because they are, as it were, "fire-resisting." They are, all of them, compounds containing chlorine, and all of them are much heavier than water. Carbon tetrachloride (or tetra-chlor methane), tetrachlor-ethane and tri-chlor-ethylene are the volatile organic liquids to which I have reference.

CARBON TETRACHLORIDE. Since about 1905 more and more attention has been given to the production and use of this material in the processes of the rubber industry. Its agreeable odor quickly made it a favorite over the disagreeable-smelling carbon bisulphide, and the fact that it had a definite boiling point (77 degrees C.) and was not acted on chemically by sulphur chloride, demanded the interest of many in the rubber trade. The price of $1.63 per gallon, however, is prohibitive for its general use as a thinner in cements and doughs. The speed of evaporation is another point which is sometimes left out of consideration in the choice of a solvent. For example, the cement used for painting the inner tube of fire hose should dry in 15 or at most 30 minutes, but this would be impossible if a high-boiling, slow-evaporating solvent were used.

TRI-CHLOR-ETHYLENE. The "chlorine solvents" were introduced over ten years ago, and one of the earliest makers of these products was the Bosnische Electricitaets Actien Gesellschaft in Vienna, Austria. Like tetra-chlor-methane (carbon tetrachloride), this solvent has a fixed boiling point below that of water, and a specific gravity almost one and one-half times that of water. Its current price of approximately $1.83 per gallon, including drums, has interfered somewhat with its wider application, but at the same time it should be recalled that these "non-flam" solvents can be added to gasoline in definite proportions, and the result will be a liquid which will not take fire. The fact that the vapors of carbon tetrachloride will quench the flame of gasoline has been put into practical use in the modern auto fire extinguishers.

TETRACHLOR ETHANE. This solvent has a specific gravity of 1.600, sells at about $2.12 per gallon, boils at 147 degrees C., and like the two previously mentioned chlorine derivatives, it is not ignited by sparks of static electricity. For this reason, our industrial chemists look forward with pleasure to the day when the price of these solvents will make possible a wider use of them. The spreader room fire is a bugaboo, and the fire hazard in the cement churn room is also an item to be reckoned with. Were the "chlorine solvents" now available at 50 or even 75 cents per gallon, it is safe to assume that many of our larger rubber goods factories would rapidly consider their wider use.

LABORATORY TESTS

SPEED OF EVAPORATION. One of the properties of volatile solvents which determines their usefulness to a considerable extent is that known as: *"Speed of Evaporation."* No standard methods for determining this value have been agreed upon but for the practical purposes of the rubber goods manufacturer the following method is satisfactory.

Secure ten of the flat glass dishes technically known as "Petri dishes" used for bacteria cultures. Weigh the dish. Weigh into it ten or even twenty grams of the solvent. Expose the dish to a temperature the same as the temperature which will be used to drive off the solvent, when in actual use. After a certain number of minutes, place the cover on the dish, and weigh the residue. It will be found that an exposure of 30 or of 60 minutes will give interesting results.

In a test such as this it will be found that petroleum gasoline of low and undesirable grade will leave a residue of high boiling oil, and this will interfere with its use as a wiping fluid in cases where the surface of the rubber must be quite clean before a second layer of rubber is applied.

ACTION OF SULPHUR CHLORIDE. In cases where a solvent is to be mixed with sulphur chloride, a preliminary test should be carried out to determine what chemical action, if any, the sulphur chloride will have on the solvent.

IMPROVED BURRS FOR RUBBER HEELS

A new line of rubber heel burrs, so constructed as to be guaranteed perfectly centered, has been added to the products of a manufacturer of high-grade metal specialties. The great difficulty in rubber heel burrs has been that the hole has not been centered and the edges have been ragged, causing them to catch in the mold pins and thereby inconvenience the pressmen and hold up production. This new line of rubber heel burrs is a clean-cut article, perfectly centered, made from high-quality cold rolled steel.—Independent Nail & Packing Co., Bridgewater, Massachusetts.

PAINT AND RUBBER PIGMENTS

The following covers the salient features of a talk on paint and rubber pigments given by Frank G. Breyer, chief of the Research Division of the New Jersey Zinc Co., at the March meeting of the New York Section of the American Chemical Society.

The technical man who directs the purchases of large consumers of both paint and rubber goods is hampered in his judgments of the quality of both, because each is in that peculiar state of matter which is neither true liquid nor true solid but plastic, and plastics are difficult for both chemist and physicist to deal with.

SPECIFICATIONS

Rubber, and particularly paint, experts among consumers have been trying to pin down the quality of the product they purchase by specifying what ingredients the producer should use and how he should use them.

Some success has been obtained by this procedure but the trouble is that the method is calculated to stifle the initiative of the producer whose success, in a large way, depends on the service he renders by his skill in utilizing in his goods either something that gives better properties than the specified ingredients or that gives the same properties at less cost.

Another trouble with the sort of specification referred to is that it falls short in effect with progressive manufacturers since the latter always occupy an advanced position in knowledge of the technology of the product. The time may be not far distant when the manufacturers will not state the performance of their tires in terms of mileage but instead will say that they will stand a certain number of blows dealt under an accepted standard method and specified tire inflation. Regarding a tire tread it will be said that it will give a "resistance to wear" index-number higher than a certain figure. That the temperature of the tire when worked under conditions approximating summer conditions will not rise above a certain point which rapidly increases hardening, and that when the tire is artificially aged to the equivalent of a year and a half, the rubber will not harden beyond a given point.

Similarly the paint manufacturer will not say that a paint consists of specified ingredients put together in a prescribed way, but that a sample of the paint as sold will respond to certain exact figures for color and hiding power or surface dirt-obliterating power; that test pieces of a paint film when tested in tension will give certain elastic properties when fresh and show a minimum figure for the decrease of elasticity over an artificial aging period. These tests are of exactly the same sort as those under which steel and other metals are specified.

Such as these, in contradistinction to the "ingredient and method of manufacture" specifications, do not reduce everybody in the industry to the same dead level but leave open the way to invention and skill to accomplish the desired result with less labor and with other and cheaper materials, or to make a better product with materials new to the industry.

CHEMICAL AND PHYSICAL METHODS

The study of any material may be made either analytically or synthetically. While each method has its field, experience shows that the latter method yields the more practical results. Physical tests and analysis of paint and rubber should precede if not supersede their chemical analysis. The great value of physical analysis as applied to pigments for use in the paint and rubber industries was brought out in a very clear and striking manner by means of many microphotographs, charts and special methods of test.

The paint and rubber manufacturing industries are fortunate that by the exercise of a liberal policy these new methods for physical analysis and instruments for testing will become generally available for determining pigment values and will eliminate the necessity of waiting the results of aging tests requiring months or years to complete.

PAINT AND RUBBER

A very interesting and close connection exists between paint and rubber and in each material the function of pigments is the same. This connection between paint and rubber is apparent from the following considerations: Each is a suspension of solid particles, five microns[1] or less in diameter, in a plastic medium. Each in its state of usefulness is employed in an altered form—in paint brought about by the effect of driers, and in rubber, by vulcanizing agents. The usefulness of both paint and rubber is measured chiefly by their elastic properties.

Linoleum and oilcloth products were classed as of the paint industry.

IDEAL PIGMENT

The ideal pigment is characterized by (1) the smallest particle size. (2) These do not form aggregates in the disperse medium. (3) They are free from crystallization, (4) exert no injurious but rather a beneficial influence on the mixing. Zinc oxide fulfils all of these requirements and typifies the perfect pigment.

EFFECT OF ULTRA-VIOLET LIGHT

By means of ultra-violet light different pigments which are used both in paint and rubber can be quickly identified without chemical analysis.

The destruction of ordinary paint on the outside of buildings is largely due to the effect of ultra-violet light which is present in sunlight, and to moisture. Some of the hardening and consequent short life of tires and other rubber goods can be attributed to the same agency. The reflection of ultra-violet light by pigments is an important reason for putting them into such goods.

HEATING OF TIRES

The effect of certain pigments, on the heating of tires, especially in summer service, was explained as due to the internal friction generated by the movement of pigment aggregates induced by the elastic movement of the plastic rubber. The probability of this occurring can be diagnosed in a tire by making sections and examining them under the microscope.

Among the many microphotographs of rubber sections exhibited were certain of particular interest such as those showing the even dispersion of zinc oxide in compounded rubber, the tendency of other pigments to form aggregates and the presence of vacuua adjacent to pigment particles in the direction of stretching in rubber under strain as deduced by Schippel in a paper read before the Rubber Section of the American Chemical Society.[2]

PARTICLE SIZE

Screening methods are ineffectual for the determination of particle size. Only that of aggregates can be so measured, even with a 350-mesh opening, since the coarsest pigment particle is five microns, and that of zinc oxide, for example, averages 0.4 micron.

The usual method of counting dispersed particles in the field of a microscope by means of an eye-piece micrometer is not available for measuring the particle size of pigments. A new method has been developed by Dr. Henry Green which permits particles from 0.3 to five microns diameter, magnified 20,000 diameters, to be counted, scaled and tabulated. By this method it has been ascertained that the particle size of zinc oxide is 0.4 micron and that one gram of the substance contains five trillion zinc oxide particles.

[1] A micron equals 1/1000 of a millimeter.
[2] Meeting of the American Chemical Society, Philadelphia, Pa., September 2—6, 1919. The India Rubber World, October, 1919, page 20.

Vulcanized Rubber Energy—II[1]

By William B. Wiegand[2]

THE EFFECT OF COMPOUNDING INGREDIENTS

This presents an enormous field of research, and reference will be confined to a brief outline of the basic facts.

Fig. 4 shows hysteresis plotted against the volume percentage of active pigment associated with 100 parts of rubber. The first point on the curve shows a pure gum compound, the second, a lightly loaded breaker compound containing about 4.5 parts by volume of active pigment. The third point represents a very high-grade tread compound containing about 15 volumes of active pigment: the last, another tread stock containing nearly 24 volumes. By active pigment is meant a pigment which definitely increases the energy storage capacity of the compound and includes pigments such as carbon black, lampblack, zinc oxide, the finer clays, etc. It will be noted that for the particular stocks used there is a linear relationship between the amount of hysteresis and the amount of such pigment present. It is also important to note that the effect of the addition of a highly dispersed phase upon hysteresis is much greater than moderate changes in the state of cure of a compound. It is unnecessary to emphasize the importance of this result from the standpoint of practical compounding.

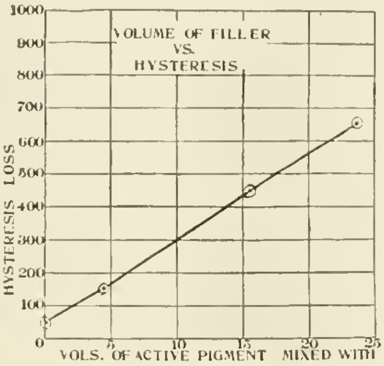


Fig. 4

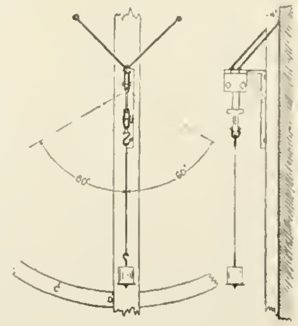
Here again, however, one must use caution not to overlook the importance of heat conductivity, and it is entirely within the realm of possibility that a pigment, although markedly increasing the hysteresis and so also the frictional heat, may at the same time compensate for this by a greatly enhanced heat conductivity. Thus, for example, carbon black not only causes high frictional heats, but is also a bad conductor, whereas zinc oxide, although producing similarly high hysteresis values, has a very much better heat conductance.

It may be of some interest to indicate roughly the actual percentages of energy which are degraded into heat in these various types of rubber compounds. A pure gum friction or skim coat stock when led through a hysteresis loop to an elongation of 200 per cent degrades about four per cent of the total energy into heat. A stock containing about five volumes of zinc oxide degrades about eight per cent, whereas a tread stock containing 20 volumes of zinc oxide degrades in the neighborhood of 14 per cent of the total energy input in each cycle.

FABRIC ENERGY LOSSES

We have dealt thus far with the degradation of energy into frictional losses in and by the rubber substance itself. These are of paramount importance in the case of solid tires, for example. However, in the case of pneumatic tires, which consist primarily of layers of fabric held together and waterproofed by rubber, we have to consider the extent to which frictional heat is developed by the carcass fabric itself. It is true that the hysteresis loss of an inflated casing taken as a whole can be accurately determined by the electric dynamometer. This, however, is an expensive machine, and has the further disadvantage of not being able to determine in what proportion the various constituent parts of the casing contribute to the integral result. The writer has therefore applied the principle of the damped pendulum to the study of casing energy losses. Briefly, the method consists in inserting a one-inch carcass section in the arm of a pendulum which is allowed to swing from a fixed position until it comes to rest. The more perfectly resilient the carcass wall, the longer will such a pendulum swing. In order to analyze the elastic properties of the various structural components of the carcass, it is necessary merely to strip off the tread and breaker and repeat the series of vibrations with the carcass alone. In order to ascertain the effect of the number of plies of fabric the carcass is stripped down ply by ply and the total period of the pendulum redetermined in each case.

Fig. 5 shows the simplicity of the set-up. The inch section is gripped by two clamps, the upper one rigidly fastened to the wall, the lower attached to the pendulum arm, consisting of thick piano wire about 2 feet long, weighted down by a cylindrical bob of convenient mass, say 0.5-pound. Space will not permit description of the minute experimental details, some of which are of considerable importance to the accuracy of the results obtained, but, briefly, the practice was to start the pendulum from a position 60 degrees from the vertical, and take shadow readings on an arc background by means of a fine needle axially inserted in the bob. The "total period" of the pendulum is the number of seconds required for the amplitude to fall from the fixed arbitrary value, viz., when the shadow of the needle reaches the point C until the shadow reaches the point D, which is preferably a small distance removed from the position of rest. The length of the carcass strip between the clamps may be varied at will, but is preferably about two inches.



Tire Pendulum

Fig. 5

Significance of Total Period. The total period, viz., the time required for the pendulum to damp down from the position C to the position D is clearly a measure of the time required for the potential energy of the pendulum system to fall from that corresponding to the height of its center of gravity when the pointer is at C to that corresponding to D. It is therefore inversely proportional to the rate of generation of frictional heat through the various internal energy losses in the casing section. If the tire were of theoretically perfect resilience the pendulum would keep on swinging forever, except, of course, for external losses due to air resistance, etc.

A typical series of determinations will serve to fix our ideas. A 3.5-inch plain casing gave a total period of six minutes 42 seconds. After removing the band ply of the carcass, the period increased to seven minutes 37 seconds; after removing the second ply, to eight minutes; after removing the third ply, to 10 minutes 55 seconds. When all the carcass plies had been removed and the tread and breaker inserted, the pendulum swung for 21 minutes four seconds. As a matter of fact, it was found in many hundreds of tests that the total period of the pendulum when plotted against the number of plies of fabric in the carcass lay on a smooth curve, shown in Fig. 6.

This curve is of the exponential type, the equation of which is

$$TP = K_1 \times K_2^N,$$

where TP is the total period, K_1 and K_2 are empirical constants,

[1]Continued from The India Rubber World, March 1, 1921, pages 425-427. Presented before the Rubber Division at the meeting of the American Chemical Society, Chicago, Illinois, September 6-10, 1920.

[2]Ames Holden McCready, Limited, Montreal, Canada.

and N is the number of plies of fabric. An interesting deduction from this curve is that the frictional losses in a casing are not a linear function of the number of plies of fabric. As a matter of fact, the total period for a 5-ply carcass bears the same ratio to that of a 4-ply carcass, as that of a 4-ply carcass bears to that for a 3-ply carcass. In other words, as the number of plies of fabric is increased the frictional heat increases not in arithmetic but in geometric progression. This constant ratio we have called the "ply factor," and its value in a typical square fabric casing lies very close to 0.7 for ranges of from 2 to 7 plies. If the total period for a 6-ply section is 100 minutes, that for a 7-ply section will be 70 minutes. If there were no fabric friction, this factor would of course become unity, except for the small losses due to the skim coat between the plies.

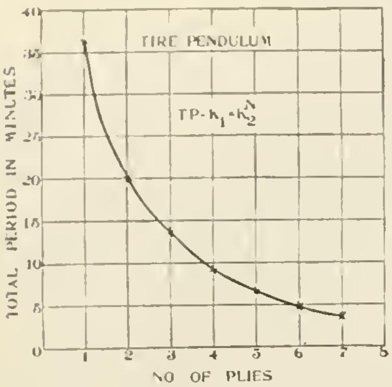


Fig. 6

Influence of Gum Stocks on Casing Energy Losses.—It was at first thought that the condition of the skim coat and friction between the plies of fabric might profoundly influence the casing energy losses, and a series of tire sections was therefore prepared of various degrees of under and over-cure. To our great surprise the effect of these exaggerated under and over-cures upon the total period of swing was entirely negligible in every case.

Effect of Tread and Breaker.—Our results, furthermore, showed that, for example, in the case of a 3.5-inch 4-ply casing, the total period of swing for the complete section was almost exactly the same as that for a 4-inch 5-ply casing, stripped of its tread and breaker. We thus see that the entire tread and breaker of a casing contribute no more to the energy losses than does a single ply of carcass fabric.

Cord Construction.—These remarkable results made it at once desirable to ascertain the effect of cord construction, the advantages of which, from the standpoint of internal chafing, seemed obvious. Our experiments fully bore out this idea, and in fact we found that a 5-inch cord carcass swings almost exactly three times as long as a square fabric carcass of the same size. Cord fabric is therefore three times as efficient as a transmitter of energy as square fabric. Our purpose in thus briefly describing the pendulum method of investigation is not to expound the behavior of the various structural elements of a casing, but rather to illustrate the usefulness of a simple, convenient, cheap, and yet accurate physical apparatus in helping to solve the pressing problems of our industry.

EFFECT OF PIGMENTS ON ENERGY STORAGE CAPACITY

Of equal interest is the study of the total energy storage capacity of vulcanized rubber and the profound changes in this quantity which can be induced through the admixture of suitable ingredients. The experimental details of this work have been published elsewhere.[1] The fundamental facts are as follows:

1—A pure gum stock is totally unsuitable for some of the most important technical applications of rubber by reason of its inability to stand abrasive wear.

2—The addition in suitable amounts of certain compounding ingredients enormously improves the wear-resisting power of rubber. Our investigation as to the reasons underlying these facts naturally began with a quantitative study of the effect of the various compounding ingredients upon the mechanical properties of the stock. These properties are very largely expressed by the stress-strain curve, and on selecting a suitable basic mix and adding to it regularly spaced increments by volume of the most important inorganic compounding ingredients, it was at once discovered that profound changes in the character of the stress-strain curve were thereby induced. These changes may be divided into two classes.

One class comprises merely a *foreshortening of the curve.* Thus, for example, the addition to the basic mixing of increasing percentages by volume of barytes produces a stock which, when gradually stressed to the failure point, preserves the same values of elongation and load as in the case of the pure mixing. The only difference is that failure occurs earlier. In other words, this pigment simply dilutes or attenuates the mechanical properties of the mixing. It plays a passive role.

In the other class the stress-strain relationships are profoundly altered. Thus, for example, if glue or zinc oxide or one of the blacks be added to the basic mix in increasing amount, the mechanical properties of the resultant vulcanisate show the following changes:

First, the curvature of the stress-strain curve is diminished and at suitable pigment concentrations actually disappears. That is to say, rubber can be so compounded as to display the same kind of stress-strain relationship as in the case of steel and the other rigid structural materials i. e., Hooke's law obtains. Again, certain of these same pigments, if not added in excessive amounts, produce compounds, the tensile strength of which at rupture remains undiminished or even increased over large compounding ranges. In these cases the final elongation is, however, markedly reduced. In the other cases, although linear stress-strain relationships are induced, both tensile strength and elongation fall off more or less equally.

It has been thought justifiable in view of these striking differences in behavior to call pigments of the second class active pigments and those of the former class inert pigments.

Table II

Pigment	Apparent Surface	Displacement of S. S. Curve	Total Energy of Resilience	Volume Increase at 200% El.
Carbon black	1,905,000	42	640	1.46
Lampblack	1,524,000	41	480	1.76
China clay	304,800	38	405	....
Red oxide	152,400	29	355	1.9
Zinc oxide	152,400	25	530	0.8
Glue	152,400	23	344	....
Lithopone	101,600	..	...	....
Whiting	60,390	17	410	4.6
Fossil flour	50,800	14	365	3.5
Barytes	30,480	8	360	13.3
			Base 450	

In Table II are brought together, along with the energy storage capacities which are here designated, the total energy of resilience, the dispersoid characteristics of the pigments in question, and also the increase in total volume of the compounded rubber when stressed to 200 per cent elongation. These volume increases, for the details of which you are referred to a recent paper[2] by my colleague, Mr. Schippel, prove beyond any doubt that particularly in the case of the inert pigments the application of stress causes a partial separation of the pigment from the rubber with resultant development of vacua at the poles. In the active pigments, those which show a positive effect upon the energy storage capacity, this separation from the rubber matrix is very slight. Column 2, which gives the square inch of surface per cubic inch of pigment, indicates that the extraordinary differences in behavior are without doubt attributable to differences in surface energy. When a stock containing one of the active pigments is stressed to rupture, the energy required to do so goes partly towards distorting the rubber phase and partly towards tearing apart the rubber from the pigment particle.

Again, the fact that in the case of the active pigments the rubber remains more nearly adhesive to each particle means more uniform stress on the rubber phase, and so enhanced tensile properties and energy capacity.

Surface energy has, of course, two factors. The capacity factor is represented by the specific surface, and it is the variations in this factor which appear to predominate in the behavior of the various pigments. The other factor, the intensity factor, which is represented by the interfacial surface tension, is also doubtless of importance, as is shown by the fact that zinc oxide

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[1] Canadian Chemical Journal, 4 (1920), 160; see also abstract in The India Rubber World, 63 (1920), 18. Both references give curves illustrating the effect of various pigments on the energy storage capacity of the rubber.

[2] Canadian Chemical Journal, 12 (1920), 33.

occupies a somewhat anomalous position in the energy column. It is, namely, a more active pigment than would be indicated by its developed surface. Briefly, any pigment of a degree of subdivision corresponding to a surface development of over 150,000 square inches per cubic inch may be expected to belong to the active class. It must of course be remembered that the activity of a pigment depends entirely upon the percentage present in the mixing. Maximum activity is developed for volume percentages lying between 5 and 25. Inert pigments, of course, develop no activity—no matter how much or how little is added.

THE STRUCTURE OF COMPOUNDED RUBBER

In view of the important rôle played by surface energy in the properties of compounded rubber, and also in view of the recently demonstrated fact of the physical separation of the constituent particles from their rubber matrix under conditions of strain, it is clearly of importance that we should know something about the spacial distribution of the component particles of a mixing. Thus, for example, how much barytes may one add to a compound before the particles actually touch each other? How far apart are the particles of zinc oxide in a tread compound containing, say, 20 volumes of this pigment?

These interparticle distances are of theoretical importance, not only for the proper calculation of the forces acting upon the rubber phase occupying the interstices, but also in connection with the influence, if any, of electrostatic charges upon the pigment particles during mixing.

Let us first assume that sufficient pigment has been added to cause actual contact between the particles.. Now it is not at all a simple matter to calculate what percentage must be added to bring about this condition. The question involves a study of the theory of piling. Thus, for example, if we fill a quart measure with marbles, the number we can get into the measure depends upon the character of the piling which they assume. If, after laying in the first layer we place succeeding layers in such a way that each marble lies vertically over and touching the one beneath, we obtain what is known as cubical or loose piling. If, however, we shake the marbles down until they lie together as closely as possible, the piling assumes a totally different character, known as normal, close, or tetrahedral piling.

This question of cubical or tetrahedral piling is important in all studies of granular bodies. Thus, for example, the rigidity of mortar under the trowel, and the firmness of the wet sand on the seashore under foot, are both due to the fact that the granules are in a condition of close or normal piling, the disturbance of which by an external force requires an increase in the over-all volume, which in turn is resisted by the vacua which tend to be formed.

If a test tube be loosely filled with sand and subsequently gently tapped, the sand will settle down a considerable distance in the tube. The sand was originally more or less loosely piled. It was certainly not piled in the most loose manner possible, namely, cubically, but occupied some intermediate position. On gently tapping the tube the particles are freed, and, attracted downward by the force of gravity, assume a spacial arrangement more nearly normal or tetrahedral.

The Piling of Compounding Ingredients.—We have now to consider what happens when a pigment is worked into the rubber in a plastic state on our mix mills. Owing to the high viscosity of the gum the force of gravity is not free to act as it did in the case of the sand in the test tube or the marbles in the quart measure. Taking first a case where so much pigment is added that the particles are compelled to touch each other, it is possible to calculate the amount of pigment required on the assumption, first, that the particles are arranged cubically or loosely, and, second, tetrahedrally or closely.

On the former assumption, irrespective of the size of the particles (which are, however, assumed to be uniformly spherical), the amount required would be 52.4 per cent of the total by volume. On the second assumption, the figure comes out at 74.1 per cent.

It is a well-known fact in mill practice that a compound containing 50 per cent by volume of pigment is almost unmanageable on the mill. We therefore deduce that with the customary amount of milling the pigment particles probably exist in a condition more closely approximating the loose or cubical piling than the close or tetrahedral piling. The writer has, however, observed that in working with extremely heavily loaded stocks it is possible, by continued milling, to bring about a more or less sharply defined increase in plasticity with the possibility of working in an additional amount of pigment. With due regard to the breaking down of the rubber owing to this excessive milling, it still remains highly probable that the additional mastication has caused a more even distribution of the rubber phase throughout the mass, which is equivalent to saying that the particles have been rearranged to more nearly normal piling. The writer has in fact succeeded in milling in over 60 per cent by volume of pigment in this way (i. e., 60 volumes pigment to 40 volumes rubber).

Spacial Arrangement When Not in Contact.—Fig. 7 shows interparticle distances for percentages of pigment ranging all the way from 0 to 80 per cent. The ordinate D shows the distance between the particles referred to their radius as unity. The upper curve shows conditions when the particles are tetrahedrally disposed. Under working conditions in the factory very few compounds contain more than 35 per cent by volume of pigment. Taking, for example, a typical tire tread compound containing 20 per cent of pigment by volume and assuming tetrahedral arrangements, the particles will be distant from each other by a little over their own radius. Assuming cubical arrangement they would be closer together, namely, distant by about three-quarters of their radius. This of course presupposes spherical shape. In actual practice, the pigment particles are by no means spherical, but on the average they are more nearly spherical than of any other definite geometrical shape, and the error due to assuming sphericity will not be large.

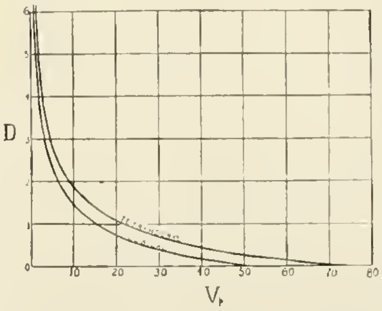


Fig. 7. Interparticle Distance vs. Volume Per Cent Pigment

The question as to whether in such cases where the particles are not in actual contact one ought to assume a tetrahedral or a cubical space arrangement is (at least to the writer) very difficult to answer by mathematical analysis. It should be quite possible, however, to reach an approximate solution by numerous direct microscopic measurements on thin sections by transmitted light, and we hope to secure results of this kind in the near future. In any case, the values shown on this chart represent the extremes between which the true values must lie, and we are of the opinion, as intimated above, that the action during milling is that the rubber phase will tend to become as evenly distributed as possible, and that therefore the tetrahedral arrangement is the more nearly in accordance with actual conditions.

The writer fully realizes that the foregoing analysis hardly scratches the surface of the problem of the structure of compounded rubber. Of cardinal importance are, for example, the direct measurement of the surface tension between zinc oxide and rubber, carbon blacks made under different conditions and rubber, and so on. When these values are once determined the capacity factor of the surface energy as measured by the average degree of dispersion of any given pigment can in our opinion be most accurately measured by its admixture under standard conditions in a rubber compound, and the determination of the

decrease or increase in energy storage capacity as compared with other samples of the same pigment. This would seem to be of particular value in the case of the finer pigments, such as the blacks, the individual particles of which are beyond the resolving power of our miscroscopes.

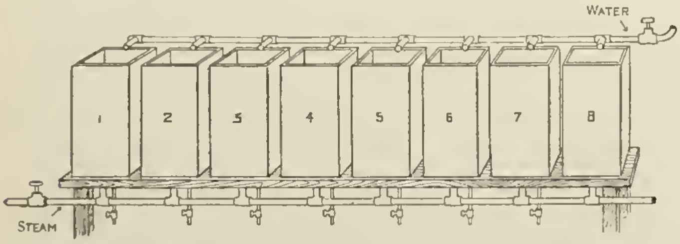
FASTENING IRON AND RUBBER

Scientific methods for copperizing iron are not within reach of all. Many have no knowledge of electro-plating and do not want it. A process used in a factory that turned out 5,000 wringer-rolls a day, but did not use electrical deposition of copper, may be of interest.

The method was termed the Adam process. As a prelimihary the wringer shafts were put in a tank, covered with a strong solution of potash and boiled for one hour. The shaft was then rinsed thoroughly in running water, put into a heater and the steam run up to 145 pounds with the exhaust slightly open. This was held for two hours. The shafts thus cleaned of grease were ground rough on a corundum or emery wheel.

For the next step which is copperizing, eight copper tanks, 18 inches square and three feet deep, with a steam coil and water pipe in the bottom of each, were used. The solutions were as follows; first tank, potash water; second, water; third, muriatic acid; fourth, water; fifth, sulphuric acid, 1/3 water; sixth, water; seventh, blue vitriol one pint, water eight gallons, sulphuric acid small quantity. (The blue vitriol is made in earthern jars with the crystals and water and a small quantity of sulphuric acid.) Eighth, hot water.

The shafts are then put in a copper pail perforated with small holes, the dipping beginning with tank No. 1 proceeds as follows: Dip twice in the first; rinse in the second; once slowly in the third; rinse in the fourth; once in the fifth; rinse in the sixth; once in the seventh; then in the eighth, holding until hot enough to dry quickly. The shafts then have a thin coating of copper. When dry, cover with cement. Then wrap a strip of inside stock spirally about the shaft. Build the shaft up with inside stock, cover with better stock for the outside. The roll must fit tight



Dipping Tanks for Copperizing
18 IN SQ - 3 FT DEEP

when driven into the mold for it takes the pressure to make it bind the shaft and it can be seen how well it does this by the length of the spinout. Small truck wheels and small carriage tires were formerly fastened by the above process.

The Moulton process was as follows: The shaft was steam cleaned and a hole made through each end inside the bearing. A layer of stock was applied to the shaft, then a wire, about one-sixteenth of an inch in diameter more or less, fastened in one end and wound spirally about the shaft and fastened in the opposite hole. The shaft was built up with stock. This, under pressure of the heating, fastened around the wire.

To attach rubber bands for carpet sweeper wheels a weak solution of muriatic acid was put in a tank with steam coils. The rings were put in the solution and heat applied. If the work was done properly this made small cracks on the surface of the ring. The rings were rinsed in running water until the acid was gone. The iron wheel was cleaned and covered with a heavy coat of shellac varnish. Then the band was put on and heated to soften the shellac and when cool the band was fast.

SHOP-MADE AIR BAG FOR GIANT TIRE REPAIR

Unable to wait for air-steam bags to be shipped from the East or the Mid-West, for the repair of giant pneumatic truck tires, a Los Angeles vulcanizer recently began to make his own bags. He claims that he has saved not only time but money, inasmuch as he has produced for $20 a bag that would have cost $40 for a 42 by 9 casing. His method is simple. Having measured with a steel tape the inner circumference of a casing, including the space between the beads as they set on a rim, he gets what he terms a true rim measure. An A-1 red tube of size indicated for the tire is then inflated, cemented and covered with ordinary bias rebuilding fabric until it equals the inner circumference of the casing. Each splice is laid back a short distance to insert the cushion stock, which, it is claimed, holds the fabric better and averts danger of loosening. Much stress is put on careful measuring. A bag made too small might explode, and one too large might buckle. It is not advisable to use the same bag for both straight side and clincher tires, owing to the difference in their contours. By removing the valve core, a solution of 2½ ounces of glycerine to a pint of water is injected into the bag to keep the rubber soft and prevent semi-curing. The air pressure used on repair work would not exceed 70 pounds even on tires that test at 140 pounds. The Los Angeles man is also careful to deflate the bag before removing it from the casing, and preserves its shape and condition by keeping it inflated when not in use. He never cools a bag by throwing it into water, because such chilling would soon crack the rubber lining.


Making a Truck Tire Air Bag

ATHOL TOP MATERIAL FOR AUTOMOBILES

A top material must be immune to the blistering rays of the sun and capable of preserving its strength through all sorts of climatic conditions. Athol top material is a rubber top material recently put upon the market and is composed almost entirely of rubber. It is offered to the trade with confidence in its ability to withstand rough abuse, as it is said to be manufactured after a formula that has stood up under the most exhaustive tests.—Athol Manufacturing Co., Athol, Massachusetts.

"MICHELIN MASTIC"

A new brand of plastic cement, "Michelin Mastic," is now marketed by a well-known tire concern and is said to be most satisfactory when used alone for repairing small punctures and for closing surface cuts in casings. For larger cuts in casings "Michelin Mastic" and cement should be used, and for this purpose these two are put up in a handy combination set containing a 2-ounce bottle of each. This forms a convenient package for the tool kit and may prove a friend in need to the motorist.—Michelin Tire Co., Milltown, New Jersey.

What the Rubber Chemists Are Doing

ACTION OF HEAT AND LIGHT ON VULCANIZED RUBBER[1]

Among the destructive agencies causing deterioration of vulcanized rubber are heat, light, air and oils. Of these, heat and light are probably the most serious and are so frequently spoken of together that many have come to believe that their action is essentially the same, whereas this is not so and the favorite explanations, "oxidation" and "depolymerization," fail as applied alike to the deteriorating action of either heat or light.

The reaction between unvulcanized rubber and sulphur is generally recognized to be a chemical one involving the addition of sulphur at the double bond; therefore the speed of the reaction varies with a change in temperature. The familiar phenomena of "burning on the mill" and hardening or "burning" of compounded rubber during storage, especially when piled up while yet quite warm from milling, illustrate this point. In the presence of certain accelerators, such as the dithiocarbamates, partial vulcanization may occur at room temperatures in 24 to 48 hours. These well-known facts show that it is not necessary to reach the ordinary vulcanizing range, 275 to 300 degrees F., to effect the union of rubber and sulphur.

It is apparent that vulcanization is the chemical addition of sulphur to rubber, the speed of the reaction depending upon the temperature, and the nature of the catalyst present. When only rubber and sulphur are present, the speed of reaction at ordinary temperatures is practically zero, and with a few exceptions this is also true with most accelerators. Vulcanization is therefore a cycle of three steps: (1) zero speed of reaction in the raw stocks; (2) high speed of reaction during vulcanization; (3) a return to zero speed of reaction after vulcanization. To effect proper vulcanization, one must find the temperature at which the quickest cure can be obtained consistent with safe manufacturing practice, and stop the process when the desired point is reached. In curing molded articles, this is done by quick removal from the molds; in such articles as tires, by drenching them with cold water.

After properly vulcanized rubber products have left the manufacturers' hands, there is danger that they may be ruined by exposure to elevated temperatures. As an example, the custom of carrying uncovered spare tires on the rear of automobiles is poor practice, because the heat from the exhaust strikes the lower part of such tires, raising the temperature locally and inducing after-vulcanization.

The principal physical change in vulcanized rubber, when exposed to sunlight, is "cracking" or "checking," which lowers the tensile property. This action is largely dependent on the composition of the mixing. Certain unpublished tests made by the author throw light on this point. About 40 samples of inner tubes were exposed to direct sunlight. Of these, 25 were red and the balance gray. With two or three exceptions, all of the red tubes showed very rapid checking, whereas the gray tubes showed a much higher average degree of resistance. This property is not inherent in the color, for later one of the red tubes which had shown a high resistance to checking was tested against a new sample of gray tube, and the latter showed serious checking after only four to six hours' exposure, whereas the red tube was in good condition after several weeks' exposure. These tests were performed outdoors in winter, and the temperature seldom rose over 50 degrees F., so it may be assumed that the changes were due to sunlight only. If the action of heat and light were the same, the chemical and physical properties would vary alike, differences, if any, being in amount and not in kind.

Heat produces an after-vulcanization, which lowers the tensile properties. Sunlight also reduces the tensile properties, so that we must look farther for differences in their behavior. In studying the chemical deterioration, we may use the method of change in solubility of the rubber substance in such solvents as acetone, alcohol, chloroform, etc. In the study of the effect of heat and light on balloon fabrics[2], there was little increase in the amount of acetone-soluble material after heating in the dark for 28 days at 70 degrees C., although the physical appearance of the samples showed that a marked change had occurred. Some of the fabrics tested were so hard as to crack when bent. The same fabrics, exposed to weathering, showed an increase in acetone extract as the rubber substance decomposed. Some fabrics increased from an initial extract of 2 to 20 degrees, after 15 to 30 days' exposure, and all showed an increase in extract in time. The same phenomena have been observed in other tests on balloon fabrics. As long as the rubber retains its original tensile properties, there is very little change in the acetone extract, but after a certain point, which represents the end of the useful life of the material, a sharp break occurs in the solution curve, marked by a rapid increase in the percentage of acetone extract. The same behavior was noted in the natural aging of rubber and reported to the Rubber Section of the American Chemical Society at its meeting in New York, September, 1916[3]. The samples under observation were rubber bands. A very rapid increase in acetone extract was noted after the bands began to be hard and brittle. These samples were stored in a cool, dark place, at a temperature not exceeding 25 degrees C.

Probably this increase in acetone extract is a true case of oxidation, the reaction being accelerated by sunlight. There is evidence that the speed of this reaction is increased tremendously by the presence of any appreciable quantity of oxidized rubber. It has been noted repeatedly that there is little change in solubility during the early stages of deterioration, but when begun the rate shows a marked increase. This is true irrespective of the time required for the sample to go through the so-called "early stage of deterioration" Rubber bands containing reclaimed rubber showed this break in the curve at a much earlier point than the bands which contained only new rubber.

Another important difference between the action of heat and sunlight is that heat acts throughout the entire mass while sunlight exerts, at first, essentially a surface change, although this rapidly travels to the interior. In the deterioration due to sunlight, the increase in the percentage of acetone extract is influenced by the thickness of the test pieces. Very thin ones such as balloon fabrics show much more rapid increase than thicker test pieces. The difference in the action of heat on thin and thick test pieces is much less marked, showing that the reaction occurs throughout the mass, and such differences as do occur are easily explainable on the basis of the heat conductivity of the rubber.

[1]By John B. Tuttle. Published by courtesy of the American Chemical Society. Read at the meeting of the Rubber Division of the American Chemical Society in Chicago, September, 1920.
[2]Third Annual Report, National Advisory Committee for Aeronautics.
[3]The India Rubber World, December 1, 1916, page 129.

LITHOPONE[1]

The manufacture of lithopone is divided into three steps: The production of a pure barium sulphide solution; the preparation of a pure zinc sulphate solution; the manufacture of lithopone from these two solutions.

BARIUM SULPHIDE SOLUTION

The most important raw material is barytes. This is now obtained chiefly from Georgia, because the ore deposits there

[1]Paper read by Donald Ross, chief chemist, Krebs Pigment & Chemical Co., before the Delaware Section of the American Chemical Society.

can be worked satisfactorily with steam shovel, whereas most Tennessee and practically all Missouri deposits are so small that they are mined by pick and shovel.

Barytes as received at the factory is crushed, mixed with coal and burned at 1,200 to 1,300 degrees C. from two to three hours in rotary kilns. The black ash formed is leached, giving a solution of barium sulphide.

ZINC SULPHATE SOLUTION

In the manufacture of zinc sulphate any form of zinc or zinc oxide such as skimmings, zinc ash from galvanizing kettles, impure oxides or zinc carbonate ores may be dissolved in sulphuric acid. Zinc sulphide or roasted zincblende may also be used. The resulting solution is purified by various oxidizing processes, depending on the nature of the liquor.

LITHOPONE

By mixing proper proportions of the zinc and barium liquors, lithopone is precipitated. Plate and frame presses or continuous filters are used in filtering the pigment and the cake is dried and heated in muffle furnaces to about 500 degrees C. When uniformly heated the material is raked out, quenched in water and ground to remove grit due to sand from the furnace walls or to the sintering of overheated particles of lithopone. The ground pulp is washed, filtered, dried, pulverized, sometimes air floated, and packed in barrels of 400 pounds or bags of 50 pounds.

USES OF LITHOPONE

Lithopone is surpassed in whiteness only by the finer grades of zinc oxide. Large quantities of lithopone are used in the manufacture of paint, rubber goods, linoleum, wall paper, window shades and printing inks. The lithopone industry has grown from 920 tons in 1900 to a production of 79,619 tons in 1919, and it is expected that the 100,000-ton mark will be reached in 1920 or 1921.

THE ABSORPTION OF LIGHT BY CAOUTCHOUC[1]

By S. Judd Lewis and B. D. Porritt[2]

In view of the changes which are produced in rubber when exposed to light and air, it is somewhat surprising that no record appears to exist of any effort having been made to study the action of light on caoutchouc in a quantitative manner. It was therefore decided to carry out some preliminary experiments to determine the character of the absorption of light of short-wave length by caoutchouc, to which experience has shown that the successive physical and chemical changes which occur during "perishing" must be attributed.

With this object a specially good sample of fine hard Pará rubber was selected in the crude condition before subjection to any manufacturing operation. This was cut into fine strips and submitted to repeated extraction with cold distilled water for a period of over a week, followed by extraction with cold acetone until the washings were no longer colored. A final prolonged digestion with several changes of absolute alcohol was employed to ensure the complete removal of resins and soluble coloring matters, and the extracted rubber was thereafter dried at ordinary temperature in a current of hydrogen to prevent oxidation. The dry material was then transferred to a stoppered separating funnel in which it was allowed to swell and slowly dissolve in anhydrous ethyl ether (purified by treatment with sodium and fractional distillation) without agitation. The clear caoutchouc solution was withdrawn at intervals before it became unduly viscous, from the bottom tap, the passage of proteid and insoluble matter being prevented by the insertion of a small plug of asbestos fiber, and the volume removed was replaced by the addition of fresh solvent.

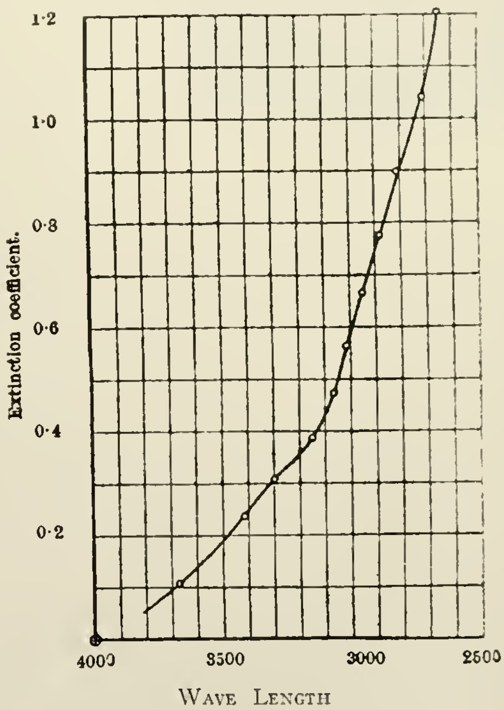
In this way a sufficient quantity of a perfectly transparent, colorless solution of caoutchouc was obtained containing approximately 0.94 per cent of solute by weight. As it was found that this solution gave only very feeble absorption, it was reduced by spontaneous evaporation to about two-thirds of its original volume, thus increasing its strength to approximately 1.5 per cent.

The method of procedure followed was similar to that described elsewhere with the exception of the photometer employed, which was of the new sector type, the details of which have lately been published[4].

The 2-cm. cell containing the solution was placed in one path of light, and a duplicate cell filled with the purified ether, similar to that used for the preparation of the solution, was placed in the other beam for the purpose of providing a control. The absorption effect was therefore confined to the solute alone, that of the solvent being eliminated. The ether employed was found to give no absorption at wave lengths above 2170 sufficient to interfere with the experiment.

The results obtained are exhibited in the accompanying curve, in which are plotted the values of the extinction coefficient, that is of log I/I', relative to a three per cent solution in a cell of unit thickness as ordinates against wave lengths as abscissæ (I is the intensity of the incidental light, and I' is that of the light transmitted). The curve has not been smoothed out, as the slight irregularities may prove to be significant.

In considering these preliminary results it is in the first place remarkable that caoutchouc should be so transparent to light as to call for the use of so concentrated a solution as 1.5 per cent in a 2-cm. observation tube.



Ultra-Violet Absorption Spectrum Curve of Ethereal Solution of Caoutchouc Calculated on a 3 Per Cent Solution in a One-Cm. Cell

The curve exhibits only a general absorption which is fairly strong for wave-lengths below 2700, but rapidly diminishes with increase in wave-length.

Neither with the strong solution nor with weaker ones has there been any decisive evidence of absorption bands, but the investigation has not gone far enough to say whether caoutchouc is capable of exhibiting these or not.

Further work is in progress on different types of rubber and allied compounds with a view to confirming these preliminary observations, and if possible securing some evidence regarding the constitution of caoutchouc.

[1]Journal of the Society of Chemical Industry, January 31, 1921.
[2]Rubber Research Association, University College, London.
[3]Proceedings of the Royal Society, Bristol, 89, 329.
[4]Chemical Society Transactions, 1919, 115, 312.

CHEMICAL PATENTS

THE UNITED STATES

Tire Filler. Comprising a mixture formed of the following ingredients: Crude rubber, a compounding ingredient or filler, a vulcanizing ingredient, an accelerator, a leavener and a vehicle—the mixture having minute air pockets distributed throughout, thereby providing the mixture with a rebounding quality.—Vincent Cuttitta, New York, New York. United States patent No. 1,369,626.

THE DOMINION OF CANADA

Rubber Compound consisting of crude rubber, granulated iron slag and cork flour, the quantity of rubber in the compound by weight being less than the combined weights of the iron slag and cork flour.—Eugene Von Vergyas, Washington, British Columbia, Canada. Canadian patent No. 208,194.

Sizing Fibrous Materials, Process and Product. The process of treating fibrous material which comprises applying thereto a lubricant including castor oil and beeswax and treating the material thus prepared with a coating of rubber. The manufactured article having the individual fibers coated with waxy lubricant while maintaining the spaces normally present between the fibers substantially open and a layer of rubber intimately associated with the fibrous material, the proportion of lubricant being relatively small to obviate deleteriously affecting the bond between fiber and rubber.—The Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, Canada, assignee of Alfred E. Jury, Newark, New Jersey, U. S. A. Canadian patent No. 208,397.

Process of Compounding Rubber consisting of incorporating glue containing 7 to 13 per cent of water and implasticized rubber to a mixing or milling action at a temperature sufficient to plasticize the glue and substantially dry the mixture.—The Goodyear Tire & Rubber Co., assignee of William G. O'Brien, both of Akron, Ohio, U. S. A. Canadian patent No. 208,406.

Process of Reclaiming Waste Rubber comprising disintegrating it, subjecting the disintegrated mass to the action of a heated liquid bath containing approximately 10 to 15 per cent by weight of caustic soda in aqueous solution for approximately from six to 20 hours at a pressure of from 50 to 200 pounds per square inch. Then subjecting the treated waste to the action of a solvent comprising approximately one part by weight of phenylene diamine, two parts by weight of paraffine oil, two parts by weight of mineral rubber, one part by weight of rubber resin, two parts by weight of acetic acid, and washing and drying the resulting mass.—Frank L. Kryder, Akron, Ohio, U. S. A. Canadian patent No. 208,506.

THE UNITED KINGDOM

India Rubber Composition containing china or other clay which has been treated with water and a deflocculating agent such as sodium carbonate or ammonia, and which has been dried while in a deflocculated state. In an example, 160 parts of the treated and dried clay are mixed with 228 parts of rubber and 12 parts of sulphur.—P. Schidrowitz, 57 Chancery Lane, and W. Feldenheimer and W. W. Plowman, 20 Holborn Viaduct, both in London. British patent No. 153,343.

Devulcanizing Rubber. Vulcanized rubber is devulcanized by simultaneous treatment with a benzene hydrocarbon, such as ten per cent of xylol or one of its homologs and a carbocyclic amido compound such as 2½ per cent of aniline or one of its homologs in the presence of a substance capable of absorbing or combining with sulphur, such as a hydrate of an alkali metal. The treatment is conducted in a digester in which the temperature corresponds with a steam pressure of 60 to 150 pounds per square inch.—J. Young and W. W. Benner, Akron, Ohio, U. S. A., British patent No. 153,646.

Vulcanizing India Rubber. An aryl substituted thiourea containing one or more alkyl groups, one of which is in ortho position to the nitrogen of the thiourea, is used as an accelerator in the vulcanization of rubber. The accelerator is the product of the reaction of carbon bisulphide on an ortho-alkyl substituted aromatic amine, namely, orthotoluidine. In an example, a mixture of 50 parts of rubber, 45.5 parts of zinc oxide, 3.5 parts of sulphur, and one part of di-ortho-toluyl-thio-urea is vulcanized by steam at a pressure of 40 pounds in ten minutes.—The Goodyear Tire & Rubber Co., Akron, Ohio, U. S. A., British patent No. 153,890.

Rubber Substitute is made by mixing a cellulose derivative, with or without a solvent, with a larger quantity of a gelatinizing medium than is necessary for gelatinizing the cellulose derivative, adding large quantities of organic or inorganic filling materials, heating to drive off water, and molding under heat and pressure. In an example, 400 grams of nitrocellulose are mixed for half an hour with 260 grams of water, and 1200 grams of barytes; 300 grams of a gelatinizing medium such as ethyl-acetanilide is added and kneaded for an hour, when the temperature is raised to evaporate the water. The mass is molded under pressure at about 130 degrees C., and on cooling is ready for use.—P. Balke, and G. Leysieffer, Troisdorf, near Cologne, Germany. British patent No. 154,157.

OTHER CHEMICAL PATENTS

GERMANY

PATENTS ISSUED WITH DATE OF ISSUE

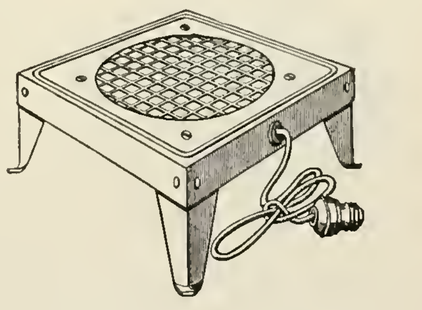
333,496 (August 22, 1918.) Method for making rubber-like products. Badische Anilinund Sodafabrik, Ludwigshafen on Rhine.

332,974 (February 21, 1919.) Process for drying crude rubber with the help of indifferent gases. Aktiengesellschaft Metzeler & Co., Munich.

LABORATORY APPARATUS

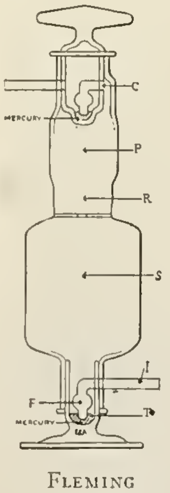
LABORATORY STOVE

A new, simple and efficient electric stove for laboratory use is shown in the accompanying illustration. It is of durable construction of sheet metal, with cord and plug ready for attachment to any convenient lamp socket. It can be used for direct or alternating current of 110 volts.—The Will Corporation, Rochester, New York.



Electric Stove

MERCURY SEALED ABSORPTION TUBE



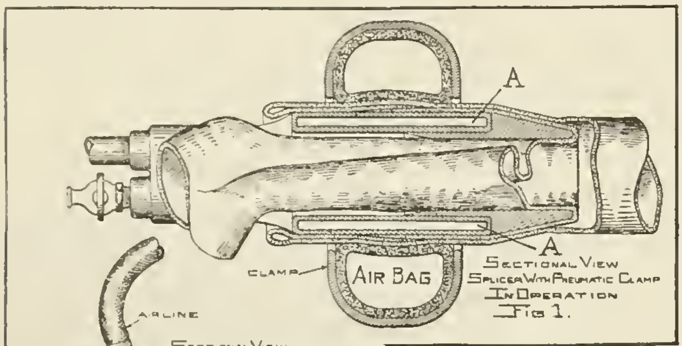
Fleming Absorption Tube

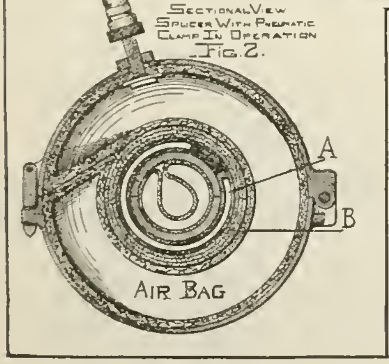
One of the most popular absorption bulbs for CO_2 determinations is the new Fleming mercury-sealed bulb shown in the illustration, which shows plainly the method of filling. Place just enough mercury in lower trap *T* to seal. Wet a small piece of cotton and lay around *F* to keep asbestos out of mercury. Over this place small amount of asbestos. Fill *S* with 20-mesh soda lime, well screened from dust, preferably 2 per cent moisture soda lime is used, and after filling run air through warm water and into *I* until absorbent increases about 10 per cent in weight. Plug *I* loosely with cotton. Pack *R* with asbestos and fill *P* with phophorus pentoxide. Tube *C* of hollow top stopper is packed as follows: A little pledget of cotton is first inserted into this tube, followed with a little asbestos.—Eimer & Amend, 211 Third avenue, New York.

New Machines and Appliances

PNEUMATIC TUBE STEAM SPLICER

It is estimated that 95 per cent of inner tubes are spliced by the well-known cold cure or acid method. This is due to the fact that steam cure methods generally are not economical in labor cost, although more reliable in effect and eliminate all of the serious objections incident to the cold-cure method. A successful pneumatic steam tube splicer recently perfected is shown in the illustrations. Fig. 1 is a sectional view showing method of holding the inner tube and clamping the joint for steam cure. The clamp contains an inflatable air bag for exerting pressure on the joint under cure by the circulation of steam in the annular space *A*. Fig. 2 is a cross-section through the clamp and tube, showing the arrangement of the air bag, steam space *A* and tube *B* during the curing operation.





Inner Tube Steam Splicer.

It is claimed that the splice need not exceed from one-half to one inch in length, thus saving stock and material. There is no overcure of the rubber at the splice. The speed of operation of this method exceeds that of the acid cure. An important saving is effected in the matter of wrappers and by the elimination of acid fumes safe working conditions are secured as regards the health of the employes.—The Pneumatic Tube Steam Splicer Co., Baltimore, Maryland.

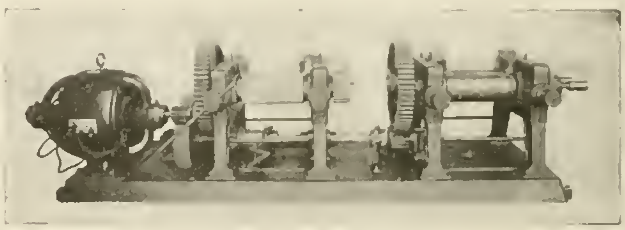
THE YARWAY SEATLESS BLOW-OFF VALVE

Very ingenious is the celluloid sliding model of the Yarway seatless blow-off valve, made by the Yarnall-Waring Co., Chestnut Hill, Philadelphia, Pennsylvania. The valve is of the seatless hollow piston type, without any projection upon which scale or sediment can accumulate. The pressure is against the side of the piston when the valve is closed, and means are provided for setting up the packing when the valve is under pressure. There is also visual indication of the location of the plunger in the body at all times. The packing is automatically compressed when closing the valve, and remains stationary, being protected from the blast of the blow down.

EXPERIMENTAL RUBBER MACHINERY

A very useful combination of rubber-making machinery designed for laboratory and experimental purposes is herewith shown. It consists of a corrugated roll wash mill and a mixing mill.

The mills and motor drive are mounted on a single continuous bed-plate for greater rigidity. The gears are all machine cut and

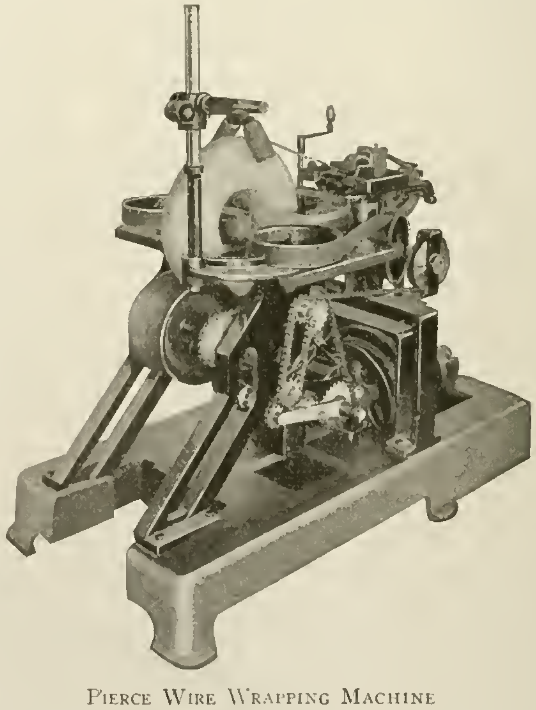


Laboratory Mills

either machine is operated by independent clutch connections.—The Banner Machine Co., Columbiana, Ohio.

MACHINE FOR WRAPPING COILS OF WIRE

Small or medium sized coils of either insulated or bare wire are quickly wrapped with this machine. The open-gap type shuttle carries sufficient paper to wrap from 12 to 20 coils, depending on their size. The paper plays out at one end through a tension device and an edge folder applies it with the edge turned under. At the same time a strip of gummed tape is also applied. This strengthens the wrapping and prevents the layers from slipping.



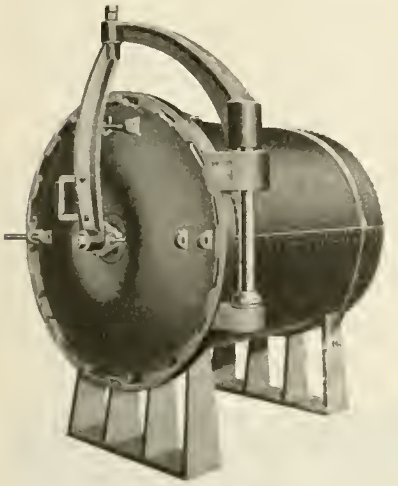
Pierce Wire Wrapping Machine

A set of gear chains is provided which permits the wrappings to be done with an advance of 7/8, 1, and 1 1/8-inches per revolution of the shuttle, the speed of which is 300 r. p. m. The device handles coils with an inside diameter of from 5 to 20 inches, and cross-sections of from 2 to 5 inches. It is stated that the actual wrapping time of a coil of average size is 10 seconds and that a regular output of 125 coils an hour may be attained.

The machine is provided with a motor, and a conveniently located lever controls both the clutch and the brake. A novel way of overcoming the difficulty of getting the various sized coils exactly in the center of the shuttle in order to apply the paper evenly, is through the use of the slanting runway at the left of the machine. The correct position for the different sized coils is secured by raising or lowering the bar, which in turn raises or

lowers the necessary mechanism.—Pierce Wrapping Machine Co., Chicago, Illinois.

A QUICK CLOSING VULCANIZER HEAD



The Adamson Self-Sealing Door

A vulcanizer door of simple design that is self-sealing, and moves on roller bearings is shown in the accompanying illustration. The head is made of high grade cast steel with all bearings either roller or ball. The design makes balance perfect and permits the door to be easily opened by one man, swinging in half the space usually required. It is perfectly universal in movement, and can be opened without binding, swinging to and fro with utmost freedom. The door is built complete with vulcanizer shell in all standard sizes up to 96-inch diameter, for any desired pressure and any length. It is easily adapted to installations by use of a special shell ring.—The Adamson Machine Co., Akron, Ohio.

WOOD APRON CONVEYORS

A most effective installation is that shown in the illustration which is typical of how leading rubber and other industrial

Conveying Coal and Ashes in an Akron Rubber Mill

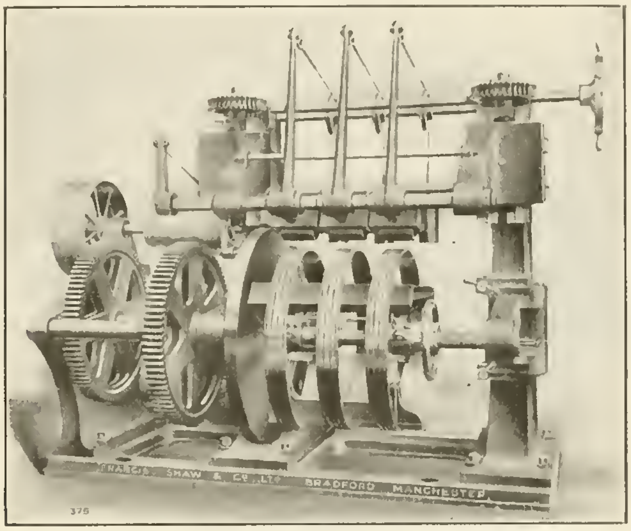
plants are keeping on the move such materials as coal, ashes, raw materials and outgoing products.

For handling coal and ashes the equipment consists of a track hopper, plate feeder, single roll crusher, and bucket conveyer. For handling material such as cases of crude rubber and other materials, an apron conveyer is furnished.—The Jeffrey Manufacturing Co., Columbus, Ohio.

A BRITISH MACHINE FOR BUILDING SOLID TIRES

This machine for building solid tires direct from the calender consists of a sturdy frame on which is mounted independent gearing for driving a face plate with adjustable arms, arranged to take all standard sizes of truck tire rims. The arms are expanded and contracted by a hand-wheel and screw, thus affording means for placing and removing the rims.

The machine is placed in front of a three-roll calender, having rollers approximately 27 inches long by 12 inches diameter, provided with cutting knives, to supply three widths of rubber sheet, which are built up on the rims. The driving mechanism is so arranged that the periphery speed of the tire, as it becomes larger in diameter, is regulated to suit the speed of the calender. Pressure is applied on the rims during the building up operations



The Shaw Solid Tire Builder.

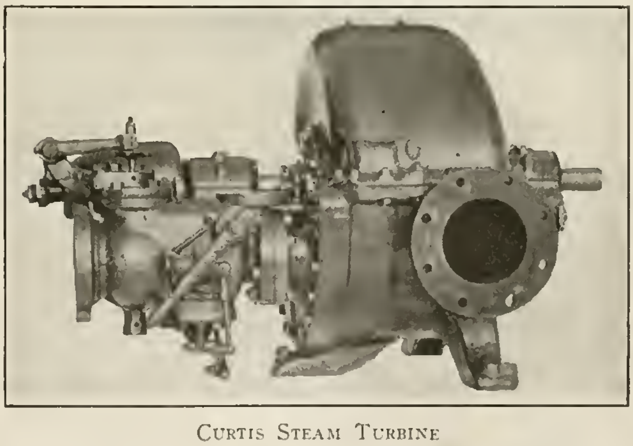
by means of rollers suspended on wheels, provided with balance weights.—Francis Shaw & Co., Limited, Bradford, Manchester, England.

STEAM TURBINE FOR PUMPS AND BLOWERS

A new turbine of the Curtis type suitable for driving centrifugal pumps, blowers, etc., has recently been developed. The turbines are of one, two, or three stages, and operate at steam pressures of from 50 to 300 pounds, with or without superheat, and either condensing or non-condensing.

The turbine is constructed throughout to give the greatest strength and rigidity possible, and the casing is divided horizontally in halves, the upper of which can be easily raised for inspection or removal of the wheels. The steam connections are arranged so that they need not be disturbed when it is desirable to remove the top of the casing.

The turbine is equipped with speed control in the form of a centrifugal governor, and if desired an emergency governor. The first is of the centrifugal tension spring type, the motion of the



Curtis Steam Turbine

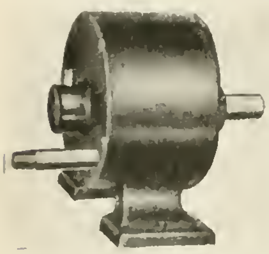
weights being transmitted through ball-bearing connections to the governor valve. The speed may be adjusted while the turbine is running by a simple operation of the governor valve. The emergency governor, if attached, operates entirely independently of the

main governor, when the speed rises to about 15 per cent above normal.

The steam passes through the first stage nozzles, from the steam chest, the nozzles being opened, or closed, as required by hand valves placed in the steam chest. The governors control the flow of steam to all nozzles.—The General Electric Co., Schenectady, New York.

TOY BALLOON INFLATING DEVICE

One of the simplest devices for inflating toy balloons is a small rotary air compressor, connected direct to a small motor, arranged for either alternate or direct current. The motor armature and parts of the compressor shown herewith are fully protected by the steel casement in which they are enclosed. The compressing element of the compressor is also enveloped by a cast steel body, and is complete with a steel shaft. Both are supplied with a heavy base, and finished in black enamel. The pressure of air varies with the speed at which the compressor is driven. The volume of air depends upon the type of the machines, which are made in three sizes, all of which can be made to drive from 500 to 1600 r.p.m. The minimum pressure of the smallest size is three pounds, while the maximum pressure of the largest is thirty-two pounds. The pressure to be used is naturally determined by the quantity of balloons to be inflated daily and the quickness with which the operator works.—Anderson Electric & Equipment Co., 154-160 Whiting street, Chicago.

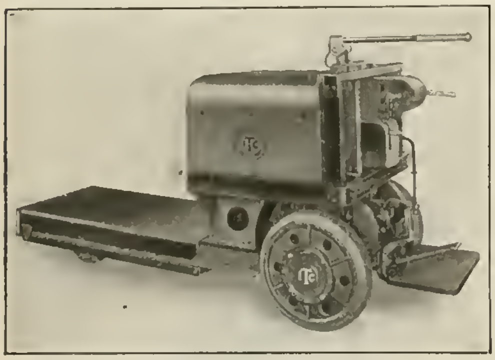


Rotary Compressor Without Motor

SELF-LOADING ELECTRIC TRUCK

The principal feature of this all-steel electric truck with a capacity of five thousand pounds, which commends it to rubber manufacturers, is the fact that it is self-loading and offers many possibilities for saving both time and labor in handling crude rubber and other materials in bulk, or carrying cores and molds about the plant.

As shown in the illustration, the loading platform is in front of the truck and runs on small wheels. The lifting mechanism is operated by an independent, heavy-duty, series-wound motor and worm-gear reduction. The platform lifts vertically, the rise being 4½ inches. It can be stopped at any point in the rise or descent by the operator, who stands on the platform at the back of the truck and controls the lifting mechanism with a foot-pedal. It is stated that three seconds are sufficient for full lowering, and five or six for elevation, depending upon the size and number of batteries used. The back of the truck is fitted with a heavy bumper which takes all shocks and protects the rear end of the lift platform. A draw-bar attachment enables the truck to haul a trailer and act as a light-duty tractor.



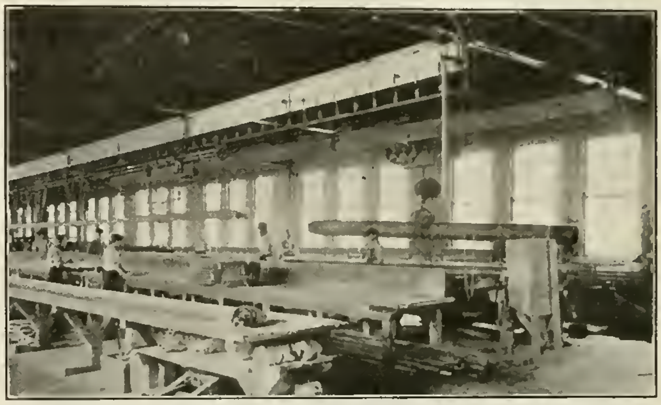
The Cowan Industrial Truck

Automatic brake and circuit breaker, four-wheel steer, and single reduction worm-drive of the power axle are the main features of the operating mechanism. The wheels are of heavy steel with solid rubber tires. The length with platform is 102 inches overall, the width is 36 inches overall, and the height is 51 inches over steering shaft head. By folding the foot-pedal and steering handle into a vertical position, the overall length is shortened to 91½ inches for use on elevators. The batteries are either alkaline or lead, and the controller is of the drum type, with three speeds forward and three speeds reverse.

This truck can be used in intersecting aisles 5 feet wide, and the extreme outside point of the turning radius is 7 feet, 10 inches. —Cowan Truck Co., Holyoke, Massachusetts.

OVERHEAD CARRYING SYSTEM

An overhead carrying system is a great time saver in production expense whether a rubber plant be large or small. The illustration shows a system of this sort that is different from the ordinary. It meets every condition and requirement and takes the place of the usually heavy, cumbersome and costly *I* beam and travelling crane and displaces barrows, trucking and other slow, laborious, time-wasting contrivances. Its system of tracks, turntables, switches and carriers will go anywhere, curving in and out of doors, over and around machinery, or from floor to floor, placing the loads exactly where wanted.



Hose Pole Conveyor

The illustration shows the overhead system used for conveying hose poles in a rubber hose making room.—The Louden Machinery Co., Fairfield, Iowa.

FABRIC KNIFE FOR TIRE REPAIR

A very convenient and effective tire repair tool, known as the H. F. safety canvas knife, is shown in the illustration. It holds two adjustable blades which can be set for cutting through fabric without harm to the underlying plies in the operation of stepping down stock for rebuilding or repairing the canvas. The handle of this tool is of ball form, fitting the palm of the hand conveniently for pushing the cutting edges through the rubberized fabric.—Harvey Frost & Co., Limited, London, England.

Safety Fabric Knife

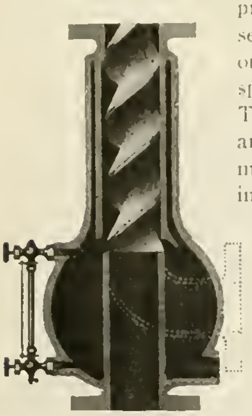
CUTTING PURE RUBBER SHEET

Pure rubber sheet for making dress shields, bathing caps and similar goods is calendered very thin, and is correspondingly difficult to cut into bands or strips with sharp edges without special machinery. However, when dusted and snugly rerolled on a heavy paper tube, it may be neatly cut in a lathe with a hand knife, provided the precaution is observed to cool the rubber to freezing or below. Under this condition the strip gum will have smooth, un-

attached edges, whereas at ordinary room temperatures the rubber would cut with rough edges fused together.

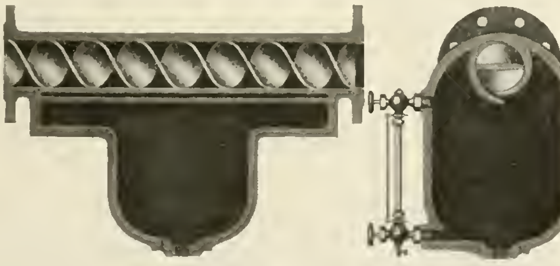
DEVICE FOR SEPARATING MOISTURE FROM STEAM, GAS AND COMPRESSED AIR

Many rubber manufacturers have found this type of separator gives excellent service in eliminating the moisture from compressed air at the point of usage. The separators are installed at proper points on the pipe lines and take up no more space than the pipe itself and its flanges. The horizontal, vertical, and angle types are shown herewith. The separators are made of steel plate and built for a working pressure of 200 pounds unless otherwise specified. Companion flanges and gage glasses are also furnished.



Vertical and Angle Separator

The steam or compressed air, when passing through the separator, is caused to revolve around the spiral many times. Any foreign matter that is heavier than the steam is thrown outward by centrifugal force, where it is acted on over and over again. The denser portion is repeatedly shaved off by the overlapping edge of the slotted opening shown in the cross-section. The water or other matter thus separated is delivered into the collecting chamber below, where it is entirely isolated and cannot



Horizontal Separator

be picked up again and carried along by the currents of steam. The steam passes through easily without obstruction and without loss of pressure.—United Machine & Manufacturing Co., Canton, Ohio.

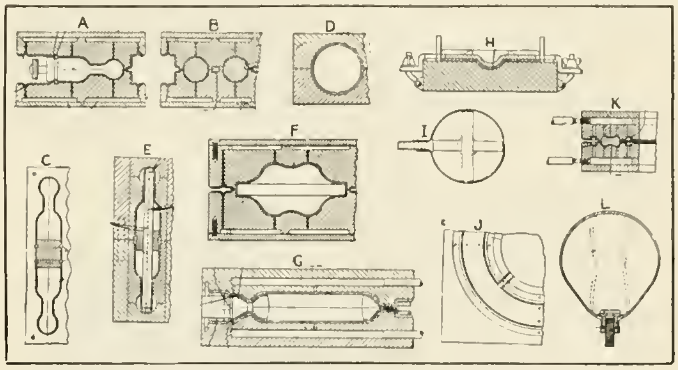
MACHINERY PATENTS

VACUUM PROCESS OF MOLDING HOLLOW RUBBER GOODS

In the manufacture of hollow rubber articles, like nipples, syringe bulbs, hot water bottles, football bladders, inner tubes for pneumatic tires and so forth, the rubber sheets are seated by vacuum in two sets of mold dies or cavities. The sheets are brought together to form a peripheral seam which encloses an interposed mandrel or permanent hollow stem. At the same time the sheet is cut to the desired shape by knife edges extending around the mold cavities.

Figs. *A* and *B* apply to nursing nipples. A rubber sheet is seated on each mold plate and is drawn into the mold cavities by vacuum. The clamping grooves and the cavities are both in connection with the chambers to which vacuum is applied. A set of mandrels carried by a bar is then placed in position and the mold plates are forced together. Knife edges running around the interior of the mold and extending to meet the mandrels, sever the sheets and force together the severed edges, at the same time pressing the rubber into the grooves provided to form the beaded edge of the nipple. The mandrel carrying the partially formed nipples is then removed to the vulcanizing chamber.

Another method, slightly different in application is shown by Fig. *C*. Here the nipples are formed end to end and the connecting part of the mandrel is slightly enlarged in order to force the rubber into the bead grooves and at the same time to make the waste portion relatively thin. In vulcanizing this form, the seam produced by molding, is placed out of the plane of the vulcanizing mold plates, see Fig. *D*. Still another manner of making the double nipple is illustrated by Fig. *E*. A cylindrical mandrel with a central collar is employed and the vulcanizing mold cavities are formed perpendicularly to the faces of the mold plates, thus avoiding any external seam and obviating the need for the waste piece. The nipple end is expanded for vulcanization by



Various Molds for Hollow Rubber Goods

water, etc., enclosed prior to molding, the pressure being transmitted by passages indicated by the dotted lines shown in the illustration *E*.

Fig. *F* relates to syringe bulbs. The mandrel is entirely enclosed. After vulcanization, it is removed by cutting off the ends of the necks. The humps prevent undue stretching of the rubber when drawn into the cavity. Fig. *G* pertains to hot water bottles. In addition to the main mold cavity there is a half-conical cavity to take the funnel mandrel, which carries the usual internally threaded ferrule. It is formed with a bevel to act in unison with a semi-circular extension of the knife edge running around the cavity. The rubber sheet is secured over the mold plate prior to being drawn into the cavity by a clamping ring (Figs. *G* and *H*) formed with an extension surrounding the funnel. A similar process and apparatus is used for football bladders, etc. A hollow rubber stem, in this case, is vulcanized into the bladder. Both this and the preceding example illustrate the ready applicability of reinforcements such as strips shown in Fig. *I*, or the tab and neck pieces in Fig. *G*. These are placed in position after the sheet is seated and prior to the closure of the mold. Similarly the necks of the syringe bulb may be reinforced by a small section of rubber tube carried at each end of the mandrel.

For inner tubes, Figs. *J* and *K*, the molds have inner and outer clamping grooves, inner and outer cutting edges extending radially inwards to sever the portions of sheeting for enclosing the valve stem. Each mold cavity and likewise the vulcanizing mold, is formed with a hump giving the tube a cross-section as indicated in Figs. *K* and *L*. On the expansion of the tire cover, the inner and the outer peripheries are somewhat thicker than the side walls and in addition, insertion is facilitated. Before closing the valve stem Fig. *J*, reinforcing washers and rings are laid in the groove between the cutting edges. During the vulcanization, where necessary the articles are kept extended in the mold by pressure supplied through the hollow stem, similar to the valve stem in the case of the inner tube, or by water, ammonia, and other liquids introduced before closing the mold.—Fred T. Roberts, Cleveland, Ohio, U. S. A., July 8, 1919; British Patent No. 17085.

APPARATUS FOR WEAVING MULTIPLY TUBULAR FABRICS

This invention relates to a process of producing multiply tubular fabrics such as gas tubing or fire engine hose, without the necessity of drawing one tube within another. The loom weaves one ply of fabric directly upon another in such a manner that the intersections of the inner ply are filled by the threads of the outer ply, producing a locked effect which increases the non-leakable properties.

The apparatus consists of a multiplex circular loom with a central weaving pin having a number of weaving surfaces along its length, superimposed shuttleways with supports, a set of shuttles arranged to travel in each raceway, a set of heddles for each shuttle, warp and weft thread-tensioning devices, means for operating both, and an arrangement for drawing the woven fabric from the weaving pin and from one weaving surface to another. The operating mechanism for each set of devices weaves a circular ply of fabric in one direction while the other set weaves a circular ply in the opposite direction, but directly upon the ply woven by the first device. In other words, the shuttles at one elevation operate in a direction opposite to that of the shuttles of another elevation. The heddles work in unison with the particular shuttle for which they make the shed.

As the bobbin unwinds, the tension is maintained in proportional relation to the diameter of the bobbin and the peripheral winding speed. The weft thread in unwinding travels from one end of the bobbin to the other, thus centralizing it and equalizing the lengthening and shortening of the thread from different points of the bobbin to the spindle. The thread passes over the spindle to the conical grooved tension wheels, where it passes back and forth until the right tension is attained. The warp threads coming from their respective spools are tensioned by passing through guide bushings over and under removable rods having a surface of leather or other friction material.

The finished multiply fabric is pulled from the weaving pin, after the last ply has been woven, by the take-off mechanism which consists of two adjustable pressure rollers furnished with gripping-pin bars. The pins are of sufficient length to penetrate the outer ply of fabric and to engage the inner ply, maintaining an even tension on both plies as the fabric is pulled from the weaving pin. The tendency to tear the fabric or the crowding of the fabric between the pins is fully overcome. The weaving pin has two weaving surfaces with the connection portion reduced in diameter. The reduced portion serves to guide the fabric from the lower weaving surface to the upper.—Maglois P. DuPray, Trenton, New Jersey. United States patent No. 1,357,967.

OTHER MACHINERY PATENTS

THE UNITED STATES

No. 1,366,969 Machine for manufacturing articles of rubber and fabric. C. W. Steele, assignor to the Firestone Tire & Rubber Co.—both of Akron, O.

1,367,626 Tire repairing apparatus. J. Reinhardt, Norman, Okla.

1,368,478 Adjustable section and retread mold for pneumatic tires. R. A. Brooks, assignor by mesne assignments to Western Rubber Mold Co.—both of Chicago, Ill.

1,368,527 Core for pneumatic tires. F. Paulsen, Kansas City, Mo.

1,368,631 Expansible core for vehicle tires. A. Huetter, Dayton, O. (See The India Rubber World, March 1, 1921, page 433.)

1,368,641 Tire mold. T. Midgley, Springfield, assignor to The Fisk Rubber Co., Chicopee Falls—both in Mass.

1,368,679 Tire vulcanizer. A. Adamson, Akron, O.

1,368,862 Collapsible tire core. J. Traum, Coshocton, O.

1,368,929 Tire-building machine, with vertical adjustment. W. H. Hermann, Lancaster, assignor to The Herman Tire Building Machine Co., Columbus—both in Ohio.

1,368,933 Machine for the simultaneous slitting and artificial selvaging of fabrics. C. L. Hutchingson, assignor to Cameron Machine Co.—both of Brooklyn, N. Y.

1,369,080 Rubber mixer. D. R. Bowen, assignor to Farrel Foundry & Machine Co.—both of Ansonia, Conn.

1,369,260 Form and shield for facilitating the manufacture of rubber overshoes having metallic fastenings. C. H. Morrill, Swampscott, Mass., assignor to United Shoe Machinery Corporation, Paterson, N. J.

1,369,695 Apparatus and method for manufacturing cushion units for cushion wheels. J. I. Morand, assignor to Morand Cushion Wheel Co.—both of Chicago, Ill.

1,369,715 Tire-wrapping machine. C. Spreckels, San Diego, Calif.

THE DOMINION OF CANADA

208,233 Multiple vulcanizing press. The Goodyear Tire & Rubber Co., assignee of E. A. Nall, executrix of estate of E. Nall, deceased—both of Akron, Ohio, U. S. A.

208,234 Tire mold. The Goodyear Tire & Rubber Co., Akron, O., assignee of B. Darrow, Los Angeles, Calif.—both in U. S. A.

208,373 Apparatus for vulcanizing a plurality of tires whether of the same or different diameters. B. H. Rose, Cleveland, Ohio, U. S. A.

208,398 Apparatus for manufacturing solid tires. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of W. J. Steinle, Elmhurst Heights, New York, U. S. A.

208,424 Air bag of knitted rubber-coated fabric. The Smith One-Heat System, assignee of C. L. Smith and E. S. Webster, coinventors—all of South Bend, Ind., U. S. A.

THE UNITED KINGDOM

152,987 Apparatus for manufacturing tires. The Goodyear Tire & Rubber Co., assignee of R. S. Trogner, 149 King Drive—both of Akron, Ohio, U. S. A. (Not yet accepted.)

152,989 Machine for withdrawing core from built-up tire casing. The Goodyear Tire & Rubber Co., assignee of H. A. Miller, 74 South Martha avenue—both of Akron, Ohio, U. S. A. (Not yet accepted.)

153,974 Press for molding rubber toys, etc. H. S. Golland, Dunstan, Westminster Road, Eccles, Lancashire.

154,551 Machine for mixing and kneading rubber. Farrel Foundry & Machine Co., assignee of D. R. Bowen, 5 Clover street, and C. F. Schnuck, 80 North State street—all of Ansonia, Conn., U. S. A. (Not yet accepted.)

154,664 Apparatus for molding and vulcanizing tire studs. Dunlop Rubber Co., 1 Albany street, Regents Park, London, and C. Macbeth, Fort Dunlop, Erdington, Birmingham.

154,684 Apparatus for vulcanizing tires. Dunlop Rubber Co., 1 Albany street, Regents Park, London, and C. Macbeth and W. E. Hardeman, Para Mills, Aston Cross, Birmingham.

155,016 Extrusion machine adapted to cut apart two solid tires when extruded in one piece. Refers to Specification No. 128,722. Dunlop Rubber Co., 1 Albany street, Regents Park, London, and A. W. T. Hyde, Fort Dunlop, Erdington, Birmingham.

155,086 Apparatus for making tires. D. Maggiora, Firenze, Careggi, Italy.

GERMANY

DESIGN PATENTS ISSUED, WITH DATES OF ISSUE

761,824 (October 23, 1920.) Press in five parts for making dental plates with several round rubber suckers. Hans Wetzler, Geleitstrasse 14, Offenbach a. Main.

764,238 (December 17, 1920.) Vulcanizing apparatus. Fr. Lindemann, Schleusingen i. Th.

PROCESS PATENTS

THE UNITED STATES

No. 1,367,180 In the manufacture of pneumatic tires, painting the carcass at approximate juncture of tread and side-walls to prevent direct or indirect union, and subsequently curing the tire. B. Darrow, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O. (Original application divided.)

1,367,231 Lining metal tanks with hard rubber. E. S. Boyer, Plainfield, N. J., assignor to American Hard Rubber Co., New York City.

1,367,496 Manufacture of resilient tires. A. J. Ostberg and A. Kenny, Richmond, near Melbourne, Victoria, Australia.

1,367,731 Method of vulcanizing rubber footwear. C. E. Bradley, Montclair, N. J., assignor to The Goodyear's Metallic Rubber Shoe Co., Naugatuck, Conn.

1,368,071 Vulcanizing rubber articles by immersion in liquefied metal; subsequent cooling, heating, cooling and melting of the metal, etc., to remove finished article. F. O. E. Stone, Akron, O.

1,368,682 Manufacture of rubber footwear under differential of pressures. J. Alm and J. Hughes, assignors to The Goodyear's Metallic Rubber Shoe Co.—all of Naugatuck, Conn.

1,369,240 Treating leather by impregnating with rubber cement from which a portion of the sulphur has been removed, and subsequently vulcanizing to unite the rubber and leather integrally. S. O. Hahn, Lincoln, Nebr., assignor to The Chrome Leather & Rubber Tire Co., Inc., Pueblo, Colo.

THE DOMINION OF CANADA

208,269 Covering tennis balls. A. G. Spalding & Brothers, Chicopee, assignee of Frank J. Faulkner, Lynn—both in Mass., U. S. A.

208,584 Manufacture of friction facing. The Canadian Raybestos Co., Limited, Peterborough, Ont., assignee of F. C. Stanley, Bridgeport, Conn., U. S. A.

GERMANY

PATENTS ISSUED, WITH DATES OF ISSUE

333,215 (March 30, 1920.) Manufacture of packing. Franz Masarey, Ziegelstrasse 26, Berlin.

333,729 (March 20, 1919.) Manufacture of stuffing-box packing. Hoffmann & Co., G. m. b. H., Essen, Ruhr.

DESIGN PATENTS ISSUED, WITH DATES OF ISSUE

762,520 (December 11, 1920.) Method for applying rubber to damaged parts of rubber hose. Wilhelm Schmauch, Frankenallee 29, Frankfort-on-the-Main.

763,432 (December 18, 1920.) Attachment of patch on rubber tread. Wilhelm Hauke, Polierstrasse 25, Dresden.

766,225 (December 11, 1920.) Method for cleaning damaged parts in hose. Wilhelm Schmauch, Frankenallee 29, Frankfort-on-the-Main.

New Goods and Specialties

RESPIRATOR WITH HOOD, FOR FUMES AND DUST

The requirements of the industrial world today for protective equipment and clothing for its workers have resulted in the perfecting of a number of different types of gas-masks or respirators for use under specified conditions. The one illustrated is the sponge filter type for dust and light fumes. The hood is furnished in light dust-tight cloth for dust conditions or air-tight acid-proof cloth for work in fumes, spattering acid, etc. The hood is attached to the La-France respirator which features the rubber air face cushion adjustable to all shapes of faces. This rubber cushion is removable and the respirator is adjusted by a strap with sliding buckle outside the hood. This hood is used in poisonous dust, fume or acid conditions such as aniline, lead, etc., where face, head and neck covering as well as breathing protection is required. The skirt of the hood may be worn under the coat or other clothing if desired.—American-LaFrance Fire Engine Co., Inc., Elmira, New York.

American-LaFrance Sponge-Filter Hood Respirator

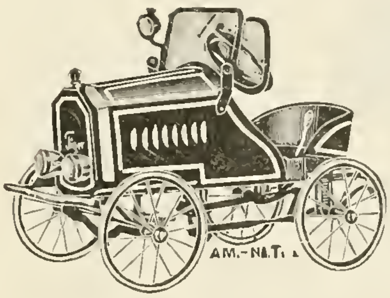
GOOD-LOOKING BABY PANTS

The variety of styles in rubber pants seems to be endless, and each new one puts forth additional claims to superiority besides the one that is common to them all—the entire suitability of sheet-rubber of good quality as the prescribed material out of which they are made. The ones pictured here, called the "Everychild," are manufactured by the same company as the "Everychild" wading bloomers described in our issue of August 1, 1920. They are made from medium weight natural-colored rubber and are gathered in a ruffle around the waist-band and leg openings. The reinforcement of these shirrings, which are marked by machinery to look like sewed shirrings, as well as the reinforcement of the seams, is vulcanized and no stitching is used. No strings or buttons are used, the entire garment being rubber. Particular attention is directed to the shape which, it is claimed, is different from previous models. The garment is made in three sizes.—Arthur Frankenstein & Co., 514-516 Broadway, New York.

"Everychild" Baby Pants

RUBBER-TIRED AUTOMOBILE FOR LITTLE FOLKS

The joy of owning an automobile of your own is not confined to "children of an older growth." The little folks can now ride in rubber-tired comfort on non-skid wheels, with head-lights and windshields and all the accessories that go with grown-up automobiles. The juvenile automobile illustrated here is equipped with ½-inch corrugated solid rubber tires, mounted on 12-inch steel wire wheels. It is claimed that these rubber-tired wheels improve the appearance of the car and add a touch of realism; are quieter and prevent the well-known rattling sound of untired wheels; and make the machine run more smoothly and easily as well as more comfortably.



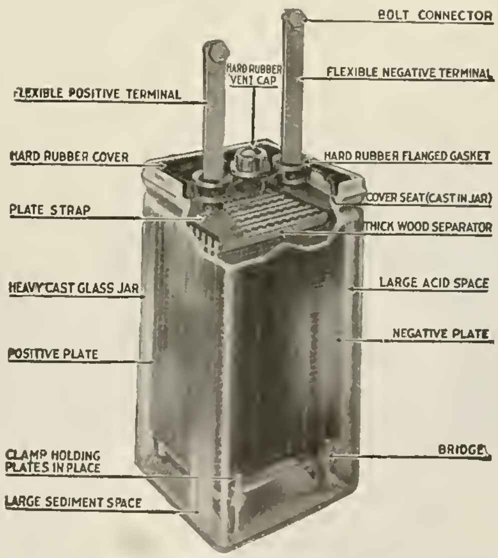
Rubber-Tired Juvenile Auto

This company is also using the corrugated solid rubber tires on its coaster wagons, having been the originator of this idea, as it also was of using pneumatic tires on baby carriages.—The American-National Company, Toledo, Ohio.

"NU-SEAL" GLASS-JAR STORAGE BATTERY

A new style glass-jar storage battery has been designed especially for farm lighting and power plants. These batteries are made in six sizes—88, 110, 120, 150, 180 and 210-ampere-hour capacity on the 8-hour rating. Intermittent basis adds 45 per cent to these capacities.

The construction of the jars is such that the hard rubber cover fits on the seat inside the jar with a thin layer of special sealing compound between it and the sides of the jar. By running a

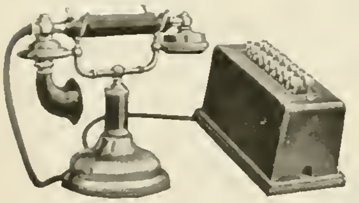


"Nu-Seal" Structural Features

sharp, hot tool around the inside edge of the jar this cover is quickly removed. The cover is of the one-piece molded type with large screwed vent opening elevated to prevent spilled water or electrolyte running back into the cell, carrying impurities with it. This opening is fitted with a hard rubber threaded plug, making a tight and neat fit. It can be removed and replaced easily and does not need renewing as the soft rubber plug does. A tight fit around the strap post is assured by the use of a hard rubber flanged gasket shrunk on the strap post and forced down into a well filled with sealing compound. This eliminates leakage; also breakage in transit, due to the elements shifting and striking the sides of the jar.—Universal Battery Co., 3410 South La Salle street, Chicago, Illinois.

HARD RUBBER HANDLE FOR THE MICRO-TELEPHONE

The innocent-looking instrument which is the subject of this paragraph is reminiscent of those thrilling scenes at the cinema where the lady seizes with one hand this same hard rubber handle and holds the telephone in position for use while she scribbles madly with the other hand, writing down the information supposed to be coming in over the wire. The chief difference between the cinema 'phone and the one shown here is that this one is connected with the practical interphone device for communicating with different parts of the same building. The hard rubber handle is grooved and turned on the ends in a way to make it fit the hand comfortably.—Federal Telephone & Telegraph Co., Buffalo, New York.


Cradle-Switch Desk 'Phone

THE "ERROR-NO" COPYHOLDER

One of the newest copyholders for use by stenographers and typists is the "Error-No," arranged with either right or left-hand operating rod. It is provided with a horizontal arm resting on a rubber foot, which insures stability without the necessity for attaching to the desk or table, and permits moving the holder as desired. The roller which holds the copy or note-book is also provided with pieces of white rubber tubing which easily grip the paper.—Error-No, Inc., Rochester, New York; 298 Broadway, New York.

TOYS TO GO WITH NURSERY RHYMES

A British rubber company that certainly must have a warm sympathy for the whims of children and a keen appreciation of their love of the quaint and humorous in toys, has brought out what it calls the "Rubbadubdub Floating Toys." They are made of pure durable rubber, with fast colors and are easily inflated and deflated by means of a valve. Some of the characters are shown here, but the line is being increased, with the aim of providing children with toys of which they will not tire easily. A little booklet printed artistically in black and orange on cream-colored paper shows twenty-five of these toys, which are covered by registration of designs and trade-mark and on which the company has applied for patents. Each figure, bird or animal, is pictured over a verse similar to those in "Mother Goose."—J. G. Franklin & Sons, Limited, 17 Colverstone Crescent, Dalston, London, E. 8.

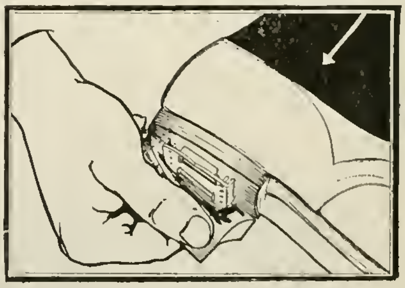

Lukkidukki Bird Humpty Dumpty King Swan

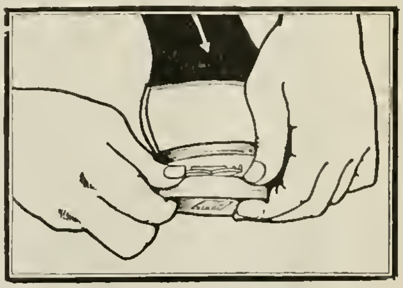

Doctor Beetle Pip Teddy Tail Penguin

INTERCHANGEABLE RUBBER HEELS

This interchangeable rubber heel consists of a light steel plate and a rubber heel grooved on the inside. When signs of wear appear, the left rubber heel is transferred to the right shoe and the right rubber heel to the left shoe. These heels are said to have an increased life of from one to two months because they always keep square. The leather sole of the shoe wears out more evenly and keeps its shape better with this style heel.


Steel Plate Attached


Wings Fitted Into Grooves


Springing the Fastener

The method of attaching is not complicated. The repairer removes the leather heel in the usual manner. The remaining lift, however, must be scoured absolutely smooth and flat, so that the cupped edge of the heel will make a tight edge when attached. The heel, with the plate already in it, is placed in position and a few taps of a hammer drive the plate into the leather. The plate is then removed and, separated from the rubber heel, is attached with nails. The wings of the plate fit into grooves in the rubber heel with a firm grip. The outer edge of the rubber heel is trimmed, then the rubbers are interchanged and any slight excess of rubber or leather is removed, thus insuring an equal fit on either shoe.

These heels are no heavier than ordinary ones, though they are bigger and an eighth of an inch deeper, which means longer wear. The rubber portion is renewable, using the same plate.—Wids Co., 1205 Little Building, Boston, Massachusetts.

THE FIRST TORONIZED TIRE

One of the newest tires is pictured here, which depends on its internal hydraulic expansion process in addition to the high quality of its materials to produce an oversize tire guaranteed against rim cuts, stone bruises and blow-outs.

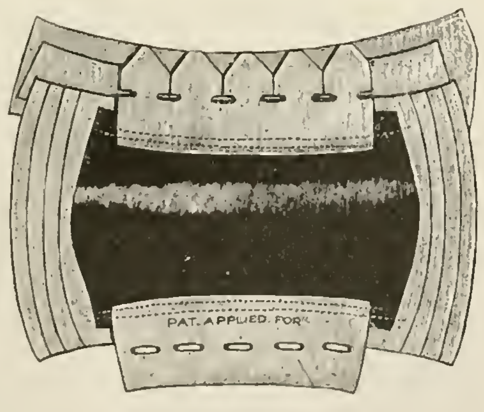
Hydro-United Toronized Tire

The foundation of this tire is the new moisture-proof fabric treated by the patented toron process which is said to increase the tensile strength and friction and minimize the tendency toward oxidation and decay. An additional amount of rubber is calendered into this fabric, made possible because of the special affinity for rubber credited to toron. This process also protects the tire against the free sulphur which comes from ordinary vulcanized rubber. The toron process was described in The India Rubber World, October 1, 1920, page 26.

The "Hydro-United" tire is built over a three-piece collapsible core, for which is subsequently substituted a heavy fabric bag the exact size and shape of the inside of the tire. The uncured tire is placed in the mold which is closed by hand without external pressure and the mold placed in the vulcanizer. Water heated to vulcanizing temperature is then pumped into the fabric bag through a connection extending through the mold. A pressure of 200 pounds to the square inch produces a tire of uniformly united parts, perfectly vulcanized, without any exterior strain.—Hydro-United Tire Co., 10th street and Columbia avenue, Philadelphia, Pennsylvania.

NEW BLOW-OUT BOOT

The Fowler "Spear-Lock" blow-out boot comes to automobilists with a guaranty of a permanent repair that will not cut the tube, creep, blow out or bulge. This boot locks the tube within itself, taking the full strain of the air pressure. The rubber apron, which is an exclusive feature, takes up the friction, making it harmless, and, acting as a gasket, keeps out water, dirt and sand. The application of this boot is quite simple. The injured rubber and fabric is cut away, making a clean hole through the tire. The boot is placed on the tube about 18 inches to the left of the valve stem and inserted in the tire before inflating. The tube is then inflated enough to hold the boot in place until the tire is on the rim, and then inflated to full regular air pressure. The boot should extend at least three inches on each side of the hole. Ordinary length boots for 3-, 3½-, 4-, 4½- and 5-inch tires are, respectively, 9, 11, 12½, 13½, 14½ inches. Special lengths are 12, 14, 15½, 16½, 17½ inches, and extra special for 3½, 4, 4½ and 5-inch tires are 17, 19, 20 and 21 inches.—Fowler-Williams Co., 504 Exposition avenue, Dallas, Texas.



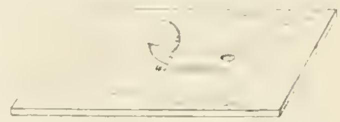
Fowler Spear-Lock Boot

RUBBER-SOLED SHOES ADVOCATED FOR GOLF

Progressive sportsmen who like to see well-kept golf links have long deprecated the damage done to turf on the putting greens by some types of sports shoes intended to afford the player a firmer footing. Such will welcome the recent advocacy of rubber-soled golf shoes which obviate injury to the turf and the club-house floor as well as improve the player's game. Pliable and comfortable, at the same time that they furnish adequate security against slipping, the new types of rubber-soled golf shoes should find ready favor during the coming season.

GOLF WITHOUT LINKS

All the excitement of an eighteen-hole course without the attendant embarrassment of a "gallery" is promised the golfer who uses a newly patented substitute for a practice ball in the house or the back yard. This clever invention utilizes the elastic principle of rubber to provide a substitute for a golf ball, which after being hit immediately returns to its original position in readiness for another stroke, and requires no teeing-up. The construction provides for a rubber mat through which is cut a recess hole, out of which protrudes a rubber tongue of somewhat globular form and of the same dimensions as the average sized golf ball. This rubber tongue is firmly held by a countersunk screw at the same height above the mat as a golf ball when teed-up. When hit by the club the rubber tongue flattens out against the mat and, as soon as the club passes over it, springs back to its original position. Its use is said to perfect a golfer's stroke and to provide a maximum of practice with a minimum amount of lost motion.—Edward J. Vogel, San Francisco, California; United States patent No. 1,363,446.

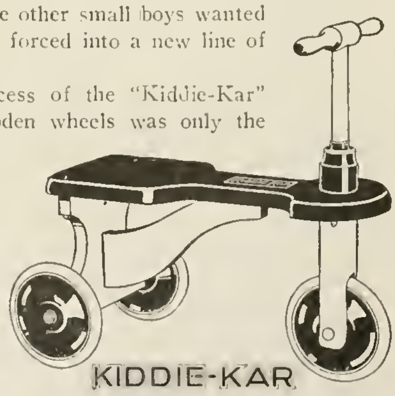


Practice Golf Ball Substitute

RUBBER-TIRED WHEELS FOR THE "KIDDIE-KAR"

The story of the man who made stereoscopes—and still makes them—but left his work one day to make his small boy a strong wheeled toy that would not easily wear out, is only one of the interesting "real life" bits that furnish the color and romance in modern business success. When the small boy ventured forth with his new vehicle, all the other small boys wanted one like it, and father was forced into a new line of business.

The almost instant success of the "Kiddie-Kar" with its solid-looking wooden wheels was only the forerunner of the greater success that would come to it when equipped with "real rubber tires." The "Kiddie-Kar Special," as the new model is called, has double disk electrically welded steel wheels with dust-proof roller bearings, and these wheels are fitted with large rubber tires in sizes from ½-inch on the No. 1 model to ¾-inch on the No. [illegible]. The finish of the wheels is baked red enamel and of the "Kar," red and cream. These toys are packed one dozen in a crate, with the exception of No. 5, which is packed by the half-dozen.—H. C. White Co., North Bennington, Vermont; 200 Fifth avenue, New York.



New "Special"—Rubber-Tired

THE EDITOR'S BOOK TABLE

"Estate Rubber. Its Preparation, Properties and Testing." By Dr. O. De Vries. Director of the Central Rubber Station, Buitenzorg, Java. Drukkerijen Ruygrok & Co., Batavia, 1920. Paper, 649 pages, 6 by 9½ inches.

This timely volume by a recognized authority on plantation rubber treats systematically the preparation of plantation rubber from latex to final product, and indicates the methods necessary to obtain good, uniform and cheap rubber.

There are chapters on the treatment of latex preliminary to coagulation; the theory and practice of coagulation; the structure and properties of the coagulum and the importance and composition of serum; the details of preparation of crêpe and sheet rubber. Other chapters relate to smoked sheet and crêpe; keeping qualities of rubber and defects that develop; the general properties of lower grades; the Brazilian method of preparation; special methods of preparation; common but incorrect opinions on rubber preparation; methods of testing the physical and chemical properties of crude rubber, and judging rubber from the exterior.

The book ends with a list of publications devoted to rubber and its manufacture and an excellent index of subjects. This book is a valuable contribution to the literature of the technology of plantation rubber.

"Rubber Manufacture." By H. E. Simmons, Professor of Chemistry, Municipal University of Akron, Ohio. D. Van Nostrand Co., New York. Cloth, illustrated, 149 pages, 7 by 11 inches.

Professor Simmons has put into book form his series of articles which appeared in one of the rubber trade journals three years ago.

In a series of twenty chapters will be found a concise treatment of crude rubber, its history, wild and cultivated sources, colloidal relations, preparation, constitution, synthesis and chemical and physical testing. This portion is followed by chapters on the manufacture and use of inorganic fillers, organic accelerators and rubber substitutes, theories of vulcanization and methods of reclaiming rubber. The chapters on rubber manufacturing deal with the preparation of the crude material, and the principles of compounding. In the last two chapters the chemical analysis of manufactured rubber and physical testing of vulcanized rubber are considered. An appendix is devoted to the laboratories and equipment of the Municipal University of Akron. The book is well worth a good index, but has none.

"Times of Ceylon Green Book, 1921." The Times of Ceylon Company, Limited, Times Building, Colombo, Ceylon. Cloth, 802 pages, 4½ by 7 inches.

This volume contains general information on Ceylon, together with an up-to-date map of the island; also a chart showing times throughout the world when it is noon in Colombo, and directories under divisions—Official and Professional, Mercantile Section, Classified Occupations, Institutions and Clubs, Estates and Companies, Men's Section, Ladies' Section, Foreign Directory and Necrology covering the period from 1914 to 1920.

The information is up to date and its alphabetical arrangement under the main heads enables it to be secured at once.

"What a Cost System Should Do for You." A brochure issued gratis by the Fabricated Production Department of the United States Chamber of Commerce, Washington, D. C. Seven pages, size 6 by 9 inches.

With the gradual resumption of production to meet a reviving demand, and after the post-bellum slackening has run its course, competition is again certain to become keen, and war-time margins but a memory. It follows then, in the opinion of the national board of commerce that the industry that will best survive in its class will be the one that not only produces a superior article and is adept in marketing its products, but which can demonstrate its profit through sheer efficiency and an accurate accounting of costs. Most business concerns fail, it is claimed, because they either do not know or they disregard the question of costs. Some excellent headway has already been made in the rubber industry in conducting such records, but there are still many in the trade who have not yet given the matter the attention its importance merits; and to them is the brochure commended.

"Safety Lessons for Automobile Drivers." Copyrighted and published by the National Safety Council, 168 North Michigan avenue, Chicago. Complete in a set of twelve lessons and twelve illustrated safety bulletins obtainable from the Council for a nominal charge.

A concise series of safety precepts to lessen hazards to automobilists and the general public, covering details of car construction, tire and other equipment, and the loading and handling of all kinds of pleasure and business motor vehicles.

Even an experienced motorist needs to be reminded that a blowout, especially on a front tire, and when speeding may upset a car or cause some other serious accident; that running with a soft tire is dangerous, especially on a front wheel, and if the rims are of the quick-demountable type, as steering is made harder, extra power is needed, and the tire may even be thrown off the rim; that split rims need to be securely locked and wedges screwed tight; that over-inflation is unsafe, as tires testing 60 pounds on inflation may show 70 pounds after a hard run on a hot road; that where wire wheels are used they should be securely locked, all spokes tight, and wheels well alined; and that wheels should never be locked on applying brakes, as it increases tendency to skid and subjects tires to severe road grind.

"Crain's Market Data Book and Directory of Class, Trade and Technical Publications." By G. D. Crain, Jr., 417 South Dearborn street, Chicago, Illinois. First edition, 1921, cloth, 462 pages, 6 by 9 inches.

This book contains a most complete list of trade publications, accompanied by interesting data on the trade reviewed, all arranged alphabetically. Among the publication listings those appealing to our readers are: Automotive, Chemical Industries and Tires and Rubber.

The book has three indices: Advertisements, Markets and Publications.

NEW TRADE PUBLICATIONS

The Adamson Manufacturing Co., East Palestine, Ohio, manufacturer of automobile accessories and specialties, has issued pamphlets descriptive of Adamson portable vulcanizers for tires and inner tubes; foot accelerators for Ford cars; brake-shoes for Ford, unlined and lined; and a simple and effective oil cooler for Fords which is readily bolted to the bottom of the engine crank case.

Binney & Smith Co., 81 Fulton street, New York, manufacturers of carbon black for rubber manufacturers, has issued a brochure entitled "The Black Art of Rubber Compounding, Chat No. 2," illustrated by half-tone reproductions of microphotographs, which should prove of much interest to rubber manufacturers.

The Jeffrey Manufacturing Co., Columbus, Ohio, has just issued Catalog No. 257 on Jeffrey standardized scraper conveyers. The catalog features both single and double strand conveyers designed to handle all kinds of loose products in manufacturing and mining industries, power plants of rubber mills, sugar mills, retail coal yards, canning plants and practically all other industries. It is profusely illustrated, contains numerous tables of specifications and dimensions, and, with the instructive descriptive matter, easily enables not only an engineer but a purchaser more or less unfamiliar with engineering problems to select the right

conveyer for his needs. Copies of the catalog will be sent free upon request to the maker by interested persons.

The Brown-Wales Co., Fargo and Egmont streets, Boston, has issued a handbook entitled "Steel," which covers a great variety of structural materials among which are iron and steel bars, floor and tank plates, corrugated sheets for roofing, asphalt shingles, ventilators and wire. A copy of this ready reference book will be sent to rubber engineers upon request.

The Hood Rubber Products Co., Inc., Watertown, Massachusetts, is mailing to the trade a handsome 56-page buying guide of rubber footwear for 1921 and a 64-page buying guide of canvas footwear. Both are profusely illustrated, printed in two colors and depict a profusion of attractive styles. The former includes net prices to the retailer.

"Patent-Sense," published by Lacey & Lacey, United States and foreign patent attorneys, 639 F street, Northwest, Washington, D. C., is a pamphlet which will be of interest to inventors and manufacturers, as it deals with the patenting of inventions.

The Columbus Rubber Company of Montreal, Limited, Montreal, Canada, has issued an attractively arranged catalog on their "Made to Wear Well" rubber footwear for the season of 1921-1922. The Santa Maria brand includes boots, lumbermen's, fine Jersey overs, and light specialties in footwear for men and women. The Columbus branch includes boots, lumbermen's, excluders and light overs. It is printed in black and red in separate editions in the English and French languages, meeting the requirements of the French-Canadian trade.

Ames Holden McCready, Limited, Montreal, Canada, is distributing to the Dominion shoe trade its 1921-1922 illustrated catalog of rubber and tennis footwear. In parallel columns of English and French text concise specifications of the goods are given. The range of types and styles is comprehensive and the quality of all is guaranteed to outwear any pair of similar shoes of any other make, sold at the same price and worn under the same conditions. The various lasts are shown in several pages of profiles and plans, in half-tone and outline. The catalog is a fine example of two-color printing and was designed with an expert's knowledge of shoe trade requirements.

INTERESTING LETTERS FROM OUR READERS

WHAT THE COMPOUNDER AND LABORATORY MAN CANNOT DO

To the Editor:

Dear Sir: In all rubber factories whenever anything goes wrong with a stock, the first impulse is to tell the trouble to the compounder, or refer to the compound book, or damn the laboratory. Without trying to absolve the originators of compounds and processes, from all blame, because they are human and fallible, I do want to point out that they are often made the convenient scapegoats for sins of the factory. Because brevity was never so much a virtue as in these days of hustle, I will confine my argument to one illustration only.

Assuming a stock which has been working well and showing a good test, suddenly goes wrong and fails under test, what can happen to it, in the factory to make it go wrong? Well:

1. The compound man may use wrong ingredients or wrong weights. Of course each batch should be checked, but is it? Echo answers; "Is it?" Frequently a test for specific gravity shows it is not.

2. The mixing man may overwork or underwork the rubber before adding the powders. This breaking down process should be very carefully controlled. Then he may dump in the powders and not half mix them, because he happens to be paid piece work, or may loaf on the job if paid day work. Also, he may scorch the stock, or work it to death, or he may use the rubber for one stock and the powders for another. Of course, he should be checked, but is he? And echo answers, "Is he?" Sometimes the laboratory man is able to prove that he is not, but the laboratory man cannot check each batch. That is not laboratory work.

3. The calender man can do all sorts of things which he shouldn't do. He can burn the stock or destroy its nerve and vulcanizing properties by letting it work itself into semi-liquid mud, or fail to give his rolls the right set to squeeze through the duck or bedevil the stock in several other ways, perhaps quite innocently, but none the less effectively. Does he do these things? And echo answers, "Does he?" The laboratory man knows he does, but he cannot check this operation.

4. The duck drying man can fail to thoroughly dry the duck or dry it and forget to keep it dry or make it only partly dry like the Volstead law or as bone-dry as Sahara, or a Scotch Presbyterian sermon, and then set it to recover under a leaky roof where for one devil of moisture driven out seven new lively little devils enter and dance with unholy glee. Does he do such things? And echo answers, "Does he?" The laboratory man says, "I'll say he does."

5. The press man may neglect to keep his inlet valve well open and his exhaust circulating freely so that he has nice stagnant pockets and pools of water in the plates instead of brisk dry steam, or he may fail to watch his temperature and time charts or use a 5/32-inch gage bar to get a ¼-inch squeeze, or overfill his press area, or not notice that the hydraulic pressure has gone on strike or has a fit of indigestion, or he can burn the belt or stretch the daylights out of it and otherwise gently manhandle it. Does he? Oh, does he?. This writing man says: "I'll say he does—I'll tell the world he does."

Then the factory superintendent promptly refers to the never failing compound book to discover what, if any, changes have been made. If none, he is stupefied, but if there's so much as one minor unimportant alteration, that's his "alibi." That lets him out. Does the compounder ever make mistakes? Oh, yes! Is his judgment always right? Oh, no. Is he always to blame? Most emphatically he isn't. What's the answer? Now, don't say "Search me," or "I give it up," because it is staring every man in the factory right in the face and it is no "alibis," "no passing the buck," but sensible, honest team work.

Arthur E. Friswell.

Jersey City, New Jersey.

THE ACCELERATED AGING OR LIFE TEST OF RUBBER

To the Editor:

Dear Sir:—Your columns under the heading "What the Rubber Chemists Are Doing," are always of interest and never so much so as recently.

Part of my work is compounding rubber to meet specifications for rubber-lined fire hose, air-brake hose, p[illegible]kings, etc., where not only are there imposed limitations for weight, tensile strength, elongation, permanent set, free sulphur, acetone and chloroform extracts, etc., but in some cases, for loss of strength and elasticity when samples are subjected to the test forming the subject of this letter.

The question is, what if anything, does this test actually amount to? One chemical consultant is on record that a week of these conditions equals approximately a year's normal exposure. The Bureau of Standards does not lay down any dictum, but the test is part of their equipment. The Underwriters' Laboratories insist upon it. The Associated Factory Mutual does not attach much importance to it. Some chemists with whom I have talked casually regard it as of some value in forming comparisons, but not as at all analogous to normal exposure. Others seem to think it is too good a thing to discard, as it may lead to something more definite.

My own experience has been that where a lot of rubber has proved weak by vulcanized test, goods made from it develop

greater weakness under this so-called "life test" than do goods made from stronger, better lots of rubber, but—here is a curious apparent anomaly—goods containing a certain percentage of resinous and bituminous substances, pitches, vulcanized oils, etc., debarred by the chemical tests imposed by specifications, frequently show up better in the so-called "life test" than do those in which such substances have not been introduced. Again, goods in which the free sulphur content is greater than the specifications permit, often test better after this accelerated aging process than do goods in which the free sulphur is kept within the specified limits. The subject is both puzzling and interesting.

Physical tests before and after this so-called life test, indicate variations in strength of plantation rubbers of the highest grade, which so far seem to be quite beyond ordinary factory control. I know that such strength variations in actual service are by no means as serious as laboratory figures, regarded only as figures or curves, appear to indicate, but they exist, and it seems to me that candid expressions of opinions through your columns, based upon actual experience, would prove to be not only of great interest, but of mutual assistance.

Superintendent.

CONTRACT CANCELLATIONS CONDEMNED

To the Editor:

Dear sir: We have read your editorial as to contract cancellation in your March issue, with which we cannot feel in any way in accord. The time to make a contract fair is when the two parties are contracting for it, and not after the contract has been signed. The privilege which you seem to uphold of one party arbitrarily changing the contract because the market has made it unprofitable for him to continue, is one which will strike at the root of all business honesty.

No one has been obliged to make contracts unless they felt it to their advantage to do so, and the fact that their judgment is wrong, does not justify them in cancelling them. A year and a half ago many contracts held by the sellers became very unprofitable to them, by reason of the advance in the market. The sellers carried out their contracts, as the buyers should do now.

We agree that so far as deliveries and financing are concerned, the buyer and seller should work thoroughly together, and that each one should do what he can to make the burdens of the other light enough to be carried, but the matter of cancellation merely because the contracts prove unprofitable, is a different matter, and has never been the policy of American business.

We are writing you as readers of your magazine, and we have taken a great deal of pride in it, and therefore feel that we are entitled to dissent from the view expressed.

Meanwhile, we should like to say that for ourselves there has been no epidemic of cancellation in the rubber industry. We have not even been asked to cancel a contract, and consider this a distinct honor to the industry, but the encouraging of cancellation of contracts is a policy which we think ought to be condemned by a representative trade paper.

J. Spencer Turner Company.
John E. Rousmaniere, President.

New York, March 11, 1921.

TO DEMAND ZINC TIRES

To the Editor:

Dear sir: While it is true that much more mileage is built into tires than formerly, yet it is also a fact that still too many tires, even among those of so-called standard make, fail to reach a reasonable age in fair condition. Motorists often wonder why, in comparing two makes of tires selling at a good price, one should last long and give very good service while the other proves to be very disappointing. The fact is that most motorists know much more about judging cars and their mechanism than they do about tires. Exacting in the choice of the former, they only too often take the latter wholly on faith. When a tire fails them they usually attribute the trouble to weakness in the shoe's construction.

Personally, I believe that the average well-made fabric or cord reinforcement in a tire serves its purpose very well. When a breakdown occurs the fault will be found generally in the rubber compound used in the tread and sidewalls. Pure crude rubber must, of course, be incorporated with other substances to make it serviceable for tire needs; but, though numerous fillers are used, the really worth-while ones are very few. The trouble with most fillers is that there is an inter-friction among their particles, which work on one another under service and heat the rubber compound to such an extent that it gets over-cured, scales, loses its life, becomes brittle, and dries or crumbles from its reinforcement, causing cracking, blowouts, etc.

While not denying that some fillers have real merit, my experience, confirmed by exhaustive tests, is that the most satisfactory results are obtained with a zinc oxide tire compound. A rubber company at Akron ran two tires at either side of a car on a 10-mile road covered with ice and snow. One tire had a proper proportion of zinc oxide, the other had no zinc in it. When the latter was examined at the end of the run it was found badly cut, but the zinc tire was unblemished. Compounding materials come and go, but for all-around merit in adding toughness and tensile strength to tire rubber zinc oxide is still unrivalled.

The color of the tire is more or less due to the filler used. As zinc oxide is white, the resulting tire is usually white or light gray, but color is not always a certain indication, since zinc oxide, because of its recognized value, is utilized in restricted percentages as a filler in many black tires.

The buyer is the ultimate arbiter. What he demands the maker will perforce supply. If he takes without question what is offered he will get what is easiest and cheapest to make. If he demands a zinc tire, he will get a zinc tire and his money's worth in service and satisfaction.

C. A. Stedman.

160 Front Street, New York.

RUBBER TRADE INQUIRIES

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

(851) An inquiry has been received for a formula for a substitute for chicle in manufacturing chewing gum.

(852) A reader asks for sources of information concerning manufacture of dipped goods.

(853) Request is made for the addresses of manufacturers or jobbers selling paper in rolls to fit the Pierce tire-wrapping machine.

(854) A chemical house asks for information concerning "Non-Blow," used by the rubber industry.

(855) Request is made for the addresses of manufacturers of golf-ball winding machines.

(856) A foreign manufacturer desires addresses of manufacturers of uncovered balls for making into tennis balls.

(857) A reader inquires for the addresses of manufacturers of felt for covering tennis balls.

(858) A correspondent desires to purchase a bulb-spray for testing waterproof material.

(859) The address of the manufacturers of Rubies' plastic pitch is requested.

(860) Addresses of manufacturers or jobbers who handle molded rubber gloves containing lead, suitable for X-ray work, are desired.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS

Addresses may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or from the following district or cooperative offices. Requests for each address should be on a separate sheet, and state number.

District Offices.	Cooperative Offices.
New York: 734 Customhouse.	Cleveland: Chamber of Commerce.
Boston: 1801 Customhouse.	Cincinnati: Chamber of Commerce; General Freight Agent, Southern Railway, 96 Ingalls Building.
Chicago: 504 Federal Building.	Dayton, Ohio: Dayton Chamber of Commerce.
St. Louis: 402 Third National Bank Building.	Los Angeles: Chamber of Commerce.
New Orleans: 1020 Hibernia Bank Building.	Philadelphia: Chamber of Commerce.
San Francisco: 307 Customhouse.	Portland, Oregon: Chamber of Commerce.
Seattle: 848 Henry Building.	

(34,435) A commercial representative in Cuba desires to secure exclusive agencies for the sale in Latin American countries of rubber goods and druggists' sundries. Quote f. o. b. New York or southern port. Correspondence and advertising matter should be in Spanish.

(34,471) The office in the United States of a publishing house in Spain desiring to increase circulation by giving premiums, desires to be placed in touch with manufacturers of suitable goods, including fountain pens, office appliances. etc. Purchases on cash basis.

(34,475) Commercial representative of drug and hospital trade in Mexico desires agencies from manufacturers for sale of druggists' sundries, rubber goods, and allied lines.

(34,476) Mercantile firm in Canada desires to purchase leather and rubber belting.

(34,488) A manufacturer in Jugoslavia desires to purchase 100 long tons of asbestos yearly. Quote c. i. f. Hamburg or Trieste.

(34,489) A mercantile agency in Ireland desires to secure agency for sale of high-grade automobile tires.

(34,495) A firm in the Netherlands desires an agency for the sale of all technical chemicals. Quote c. i. f. Netherland port. Payment against documents on arrival of goods.

(34,497) A commercial agent in Brazil desires to hear from American firms with view to securing representation for sale of rubber goods in Brazil.

(34,511) A merchant in France desires to secure an agency for the sale of tires, tubes, and automobile accessories. Quote c. i. f. French port. Correspondence in French.

(34,533) A merchant in India desires to be placed in communication with firms for the purchase of novelties, sporting goods, bicycles, motorcycles, and automobiles and accessories. Quote c. i. f. Indian port.

(34,542) A company of manufacturers and importers in India desires to be placed in connection with firms for the importation of electrical goods, bicycles and motorcycles, telephones, printers' supplies, toys and novelties.

(34,551) A firm of importers in England desires to be placed in communication with manufacturers of toys.

(34,553) A firm in Italy desires to secure an agency for the sale of automobiles and accessories, vacuum cleaners, and electrical household appliances. Quote c. i. f. Italian port. Correspondence in French or Italian.

DISTRIBUTION OF TIRE SALES

The following table, compiled by the United States Tire Co., gives the average monthly sales of automobile tires compiled from the statistics of many years' observation.

Month	Per Cent	Month	Per Cent
January	4	July	14
February	5	August	12
March	5	September	10
April	9	October	5
May	13	November	4
June	15	December	4

It will be seen from this table that 64 per cent of the sales of the year are made between May 1 and October 1.

THE OBITUARY RECORD

ACTIVE IN STANDARDIZING RUBBER ANALYSIS

Ernst J. Lederle, founder of the Lederle Laboratories, died at Goshen, New York, March 7, 1921, after unsuccessfully endeavoring to restore his broken health since 1916 when he retired from active participation in official and professional work.

Dr. Lederle was born on Staten Island, New York, in 1865. He received the degree of Ph. B. in 1886 from the School of Mines of Columbia University, of Ph. D. in 1895 and Sc. D. in 1904 from Columbia University.

From 1889 to 1902, Dr. Lederle was chief chemist of the Department of Health, New York City, then Commissioner of Health during Mayor Low's administration. He reorganized the department and placed it upon its present modern and thoroughly scientific basis. In 1904 he established the Lederle Laboratories to render technical and scientific service to official and private organizations of a wide variety and type of activities. The firm of Lederle & Provost, covering the field of sanitary and hydraulic engineering, was established. He was a member of the Water Supply Commission and also chief sanitary expert and adviser on the construction work on the Catskill Acqueduct and its associated reservoirs. He was also the founder of the Lederle Antitoxin Laboratories, manufacturer of biological products, vaccines, etc.

In addition to the industrial problems which were studied by Dr. Lederle and his associates in the institution that he founded were many problems of the rubber industry, the chief of which was the standardization of methods of rubber analysis. The institution was particularly active and favorably known in this field.

PROMINENT IN THE CHEMICAL TRADE

Jacob Hasslacher, well known in chemical circles and one of the founders of the chemical firm of Roessler & Hasslacher, New York City, died at his New York home on March 15, in his sixty-ninth year.

He was born in Ems-on-the-Lahn, Germany, in 1852 and received his education in that country. Coming to New York in 1884, he established with Franz Roessler the firm of Roessler & Hasslacher, manufacturing and importing chemists, the copartnership being incorporated under the present name of the Roessler & Hasslacher Chemical Co. in 1889. Under the able guidance of Mr. Hasslacher the business grew to its present eminence.

Mr. Hasslacher was identified with many organizations for the advancement of the arts and sciences, also a member of numerous business and social clubs. Forceful, liberal, charitable, an ardent American, his passing is regretted by many friends.

A VETERAN CITIZEN OF AKRON

J. W. Chamberlain, one of Akron's oldest and best-known rubber machinery men, died suddenly last month in Akron. An appropriate obituary will be published in our next issue.

ADJUDICATED PATENTS

Tee Pee Rubber Co., Inc., vs. I. T. S. Rubber Co. United States Circuit Court of Appeals, Ohio.

The Tufford reissue patent, No. 14049, for a rubber heel, claims 7, 9, and 10 construed and the peculiar concavity indicated by the suction effect of the construction shown; held, a limitation of all claims essential to show invention over that of a prior patent, also held, not infringed.—*Federal Reporter,* volume 268, page 250.

JUDICIAL DECISIONS

Gammeter vs. Backdahl. Court of Appeals, District of Columbia. Decided June 2, 1920.

The decision in this case, reviewed in The India Rubber World, September 1, 1920, may be found in full in the *Federal Reporter,* volume 267, page 347.

History of The Goodyear Company

The Goodyear Tire & Rubber Co. was incorporated in August, 1898, under the laws of Ohio, with $100,000 capital, to make and sell rubber goods. The incorporators were: David E. Hill, president; George R. Hill, vice-president; Henry B. Manton, treasurer; Frank A. Seiberling, general manager; Samuel S. Miller, superintendent. Mr. Seiberling had been secretary of The India Rubber Co., of Akron, since its organization, and Mr. Miller had been superintendent of the same company.

The plant of the Akron Woolen & Felt Co., affording 50,000 square feet of floor space, was purchased and equipped, and with an operating force of about 100 a beginning was made in the manufacture of bicycle tires and solid and cushion carriage tires which were sold direct to the carriage trade. The first year's gross business was $527,080, the factory being operated night and day in 1899 to turn out 4,000 bicycle and two tons of vehicle tires daily. Plant facilities were accordingly enlarged and the capital stock twice increased.

In 1904 the company found itself in financial difficulties, and as part of the plan of reorganization, the capital stock was changed from $1,000,000 common, of which only half had been issued, to $500,000 common—of which about $150,000 was surrendered in the final settlement, and $500,000 six per cent cumulative preferred. There were also issued $300,000 in first mortgage 10-year six per cent bonds, against which it was stated the company had assets approximating $800,000. Creditors were offered the option of surrendering their claims for 40 per cent in bonds and 60 per cent in preferred shares, or 20 per cent in cash and 80 per cent in bonds, the company having the right to redeem these securities at any time. The company's entire note indebtedness was taken up with $245,500 in bonds.

Following the reorganization the directorate was as follows: L. C. Miles, president; Charles Dick, vice-president; Charles W. Seiberling, secretary; H. B. Manton, treasurer; F. A. Seiberling, general manager; A. W. Firestone and F. G. Carnahan. Four years later the directorate was as follows: F. A. Seiberling, president and general manager; Charles W. Seiberling, vice-president; G. M. Stadelman, secretary; Frank H. Adams, treasurer; Paul W. Litchfield, superintendent; James P. Loomis and Henry B. Manton. With few changes other than the promotion of men long in the company's service this management has continued up to the present time. In 1915 Paul W. Litchfield was elected vice-president in charge of production; G. M. Stadelman, vice-president in charge of sales; and A. F. Osterloh, secretary. In 1917 W. E. Palmer was elected treasurer, but was succeeded at the end of 1920 by T. Jackson, representing the new banking interests.

After the reorganization in 1904, frequent increases were made in the capital stock to finance plant extensions, increasing raw material purchasing and to reimburse shareholders for earnings devoted to capital purposes. The financial expansion of the company is concisely indicated by the following table showing the successive increases of its capitalization:

	Total Authorized	Common	Preferred	Total Issued	Common	Preferred
1898	$100,000	....	....	$45,000	....	....
1899	200,000	....	....	....	....	....
1902	1,000,000	....		500,000	....	....
1904	1,000,000	$500,000	6% cum. $500,000	....	....	....
1908	2,000,000	1,000,000	1,000,000	....	....	....
1910	6,000,000	1,000,000	1,000,000	3,286,100	$2,286,100	$1,000,000
1911	6,000,000	5,000,000	1,000,000	3,284,100	2,284,100	1,000,000
1912	15,000,000	10,000,000	7% cum.* 5,000,000	10,026,700	5,026,700	5,000,000
1914	15,000,000	10,000,000	5,000,000	14,991,110	7,991,110	7,000,000
1915	25,000,000	17,000,000	7% cum.† 8,000,000	15,027,200	8,377,200	6,650,000
1916	50,000,000‡	25,000,000	7% cum. 25,000,000	35,000,000	17,500,000	17,500,000
1917	50,000,000	25,000,000	25,000,000	44,672,320	20,278,620	24,393,700
1918	100,000,000	50,000,000	7% cum 25,000,000 8% cum. 25,000,000	59,250,600	20,466,800	7% cum. 23,783,800 8% cum.§ 15,000,000
1919	200,000,000	100,000,000	100,000,000 7% cum.	57,428,900	20,757,600	7% cum. 23,173,900 8% cum.‖ 13,497,400
1920	....	....	....	....	61,890,000	66,844,100
1921	....	....	....	....	61,111,650	65,497,700

*Retirable after 1915 at $120.
†A portion set aside for employes on easy payments. The company began this year to retire preferred stock at the rate of about $250,000 annually.
‡To take care of a 100 per cent common stock dividend of $8,427,000, and to replace the former preferred issue retired by redemption.
§Seven hundred and sixty-seven thousand dollars additional was reserved for employes on partial payments.
‖Of which $347,100 was reserved for employes on partial payments.

The corresponding industrial growth of the company is shown by the following table of totals from the balance sheets for fiscal years ending October 31:

	Gross Sales	Net Earnings	Total Assets and Liabilities	Surplus	Reserve	Dividends	
						Preferred	Common
1899	$527,080	....	....	....	....	....	....
1908	2,189,749	$120,925	....	....	....	$10,308	....
1909	4,277,067	651,687	$2,597,988	$223,256	$606,555	17,620	$49,200
1910	9,560,145	1,406,105	4,612,005	243,642	855,178	43,034	120,000
1911	13,262,266	1,291,625	6,953,769	1,119,752	710,241	70,000	274,092
1912	25,232,207	3,001,295	13,818,214	1,856,889	818,219	139,605	603,192
1913	32,998,827	2,041,268	18,858,251	2,820,071	1,367,391	350,000	604,056
1914	31,056,129	3,391,165	21,459,335	4,052,395	1,747,745	431,666	958,933
1915	36,490,652	5,137,083	26,279,927	7,031,940	2,276,187	469,583	1,686,151
1916	63,950,400	7,003,330	49,217,794	2,253,167	2,796,654	764,239	1,261,332
1917	111,450,644	14,044,206	82,562,592	12,763,681*	4,000,062	1,499,040	2,228,342
1918	131,247,382	15,388,191	93,619,018	20,717,356*	5,567,579	2,199,736	2,451,816
1919	168,914,983	23,277,245*	120,276,832	33,332,666*	7,729,782	2,813,940	2,489,355
1920	205,000,000	....	....	....	....	....	....

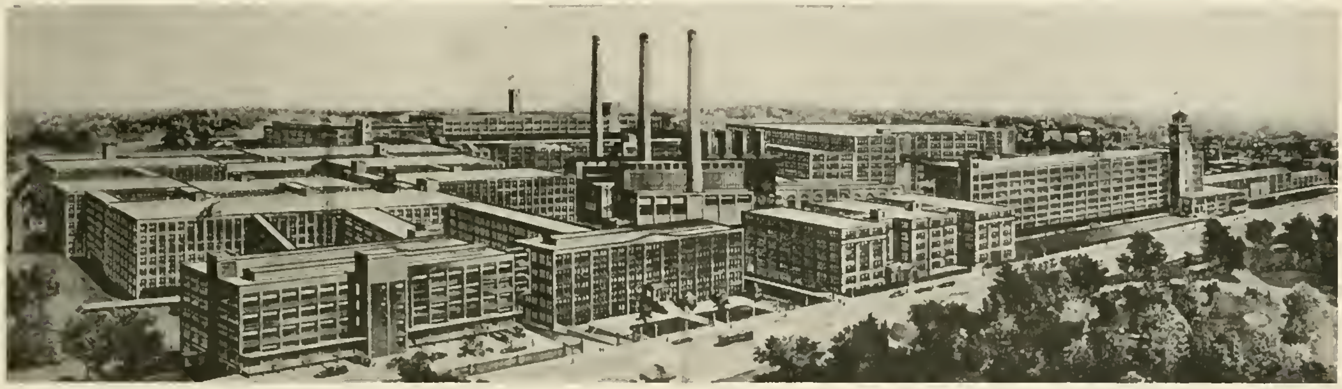
*Subject to Federal taxes.
In 1911 the common stock was paying 12 per cent. In 1912 common stockholders received a 100 per cent common bonus and the right to subscribe for $341,800 new common at par. The old preferred was retired at $105 and holders were allowed to subscribe for the new preferred share for share at par. A speculative fever placed fictitious values on most Akron rubber stocks and Goodyear common went as high as $460. In 1916 common stockholders received a 100 per cent stock dividend of $8,427,000.

From a small beginning in the manufacture of bicycle and carriage tires only, the scope of the business was broadened rapidly. In 1901 pneumatic carriage tires became an important product, a line of soft rubber specialties was added, and in 1903 golf ball manufacture was begun. Meanwhile the automobile was coming into prominence and the company became one of the leaders in the manufacture of both pneumatic and solid tires for passenger and commercial cars, a position which it has occupied ever since. The company's products in 1904 included rubber tiling, druggists' sundries and horseshoe pads.

In 1911 some 3,300 employes were turning out daily 100,000 pounds of products, including 3,500 automobile tires, 500 motorcycle tires and 30,000 pounds of solid tires. There were 55 branches in the United States and 11 in Canada, some separately incorporated and many in buildings owned by the company. Branches were opened in Mexico City in 1912, also in Argentina, Australia, and India in 1915, and the company has long devoted much attention to foreign business. In 1910 the Goodyear Tire & Rubber Co. of Canada, Ltd., was incorporated with $250,000 capital and the Durham Rubber Co. at Bowmanville, Ontario, acquired. In 1916 a new plant was built at Toronto. The present capitalization of the Canadian company is $30,000,000, half common and half preferred. In 1912 plans were made for a complete $1,000,000 rubber plant in Rio de Janeiro, Brazil, to take care of South American business and also to prepare crude rubber for use in Akron.

In 1912 the manufacture of rubber clothing was begun and the following year mechanical rubber goods, such as belting, hose, packing, tiling, matting, etc., had become important products. Tire output reached 10,000 daily in 1914, 1,478,396 being sold during the year. Branches discontinued retail business to distribute in wholesale quantities only.

The cushion tire business of the Motz Tire & Rubber Co. of Akron, 50 per cent of whose stock was owned by the Goodyear company, was taken over in 1915 and operated as a department of the latter company. Hose production that year reached 1,000,000 feet for one month, and pneumatic tires up to 48 by 12 for 5-ton trucks were being made. Balloon manufacture was begun, and after 1916 the company took a prominent place among the producers of both the kite and dirigible types for use in the war. Daily tire capacity was increased to 15,000 and later to 20,000, the total output being more than 3,000,000 in 1916. Rim output also increased rapidly. At present the company has about 20 per cent of the automobile tire business of the country, and normally produces 80,000 fiber soles a day. It has 72 branches in the United States, and branches or agencies in most important cities of the world.



The Goodyear Tire & Rubber Co.'s Akron Plant No. 1. Main Factory with General Offices in Center Foreground.

Ever since its organization the company has been engaged in an almost constant program of plant extension to take care of increasing business. Factory additions were made in 1901, 1902, 1905, 1908 and 1911, when the plant with its increased factory, warehouse, office and laboratory facilities covered a ground area of 31 acres, had a floor space of 1,000,000 square feet and a power plant of 7,500 horse-power. Four new factory buildings comprising 10 acres of floor space were erected in 1915, and the following year factory, warehouse, office, garage, restaurant and reclaiming plant additions approximated 1,125,000 square feet, including a power plant of 12,000 horse-power. Last year a rim plant 660 by 250 feet was erected, employing 500 workmen. The plant now stands on 150 acres of land, has a combined floor space of about 90 acres and normally employs over 20,000 persons.

The Goodyear Tire & Rubber Co.'s Akron Plant No. 2. Output Principally Mechanical Goods and Small-Sized Tires.

Realizing the importance of raw material supply and costs, the company in 1913 acquire' control of the Killingly Manufacturing Co. at Killingly, now Goodyear, Connecticut, equipped the plant with new machinery and began the weaving of tire fabric, of which it was using some 8,000,000 yards annually. In 1917 this company was reorganized under the name of the Goodyear Cotton Mills with $5,000,000 capital. A new yarn mill and tenement houses

were erected, increasing the capacity to 100,000 pounds of tire yarn per week. A motor truck express service operating on giant pneumatic cord tires was established between these mills, the Akron factory and Boston branch, which has demonstrated the practicability of this type of tire and haulage and materially assisted in improving tire and truck design and construction.

Meanwhile in 1916, some 10,000 acres of land were purchased in the Salt River Valley at what is now Litchfield, Arizona, the Southwestern Cotton Co. was organized and cotton raising was begun on a large scale in order to ensure a fixed supply of the long-staple Egyptian variety. The area had increased to 14,000 acres in 1919. Rubber growing was also undertaken and in 1919 the company had a 20,000-acre rubber plantation well under way in Sumatra, half of it planted, 125 miles of good roads constructed and 7,000 to 8,000 laborers employed.

With a cotton supply in the Southwest, much crude rubber coming through Pacific ports and a large business on the Coast, construction was begun in 1919 on a $4,000,000 rubber manufacturing plant and a $1,500,000 cotton mill in Ascot Park, Los Angeles, California, on a tract of 480 acres offering opportunity for plant expansion and an industrial village and park adjoining. The Goodyear Tire & Rubber Co. of California was incorporated and capitalized at $20,000,000 and the Pacific Cotton Mills Co. at $5,000,000. Plans were for a capacity of 7,500 tires daily, or an annual business of $15,000,000, employing 1,500 operatives; and a cotton mill of 33,000 spindles having a capacity of 75,000 pounds each of cord and woven fabric, or an annual business of $7,500,000, employing 1,200 operatives. This tire plant began operation in June, 1920.

Among the more important construction projects contributory to the industrial expansion of the company may be mentioned the erection of hundreds of homes beginning in 1913, to be sold at cost to employes on easy payments on a 500-acre tract known as Goodyear Heights, Akron, which was improved with streets, parks, schools, churches, public utilities. In 1919 Goodyear Hall, a $2,500,000 five-story club house 400 by 170 feet was erected opposite the Akron plant to provide such club features as gymnasium, bowling alleys, showers, rest, reading, study, and class rooms, restaurant, theatre, and to house the Goodyear Industrial Republic House and Senate and Goodyear Industrial University with its 600 students and faculty of 117.

To conserve cash reserves, the quarterly dividend on Goodyear common was passed in November, 1920, for the first time in 22 years. It had paid 12 per cent until the last meeting, when the rate was reduced to 10 per cent. In December the credit demands of the company necessitated borrowing $18,825,000 and it became apparent that only a reorganization could avoid bankruptcy. Refinancing was necessitated by the fact that the annual budget was made up to meet a production of $250,000,000 worth of goods, and when general business depression came the company was caught with unduly large inventories of finished products, raw materials and future commitments at high prices.

The meeting of the stockholders at which the final approval of the refinancing plans will be asked continues to be postponed. The reason given by officials of the company is that more time is needed for the working out of the details of the plan with the bankers and merchant creditors. At every postponement, however, it is announced that progress is being made toward clearing up the Goodyear situation which is of vital importance to the rubber industry at large.

The officers of the Arch Narrow Fabric Co., Auburn, Rhode Island, manufacturers of elastic braids, are: Archibald E. Lewine, president; Alvin T. Sapinsley, secretary-treasurer; and Milton C. Sapinsley vice-president. The company purchased its present plant in May, 1920, from the Triple A. Narrow Fabric Co.

IN DEFENSE OF THE CARBON BLACK INDUSTRY

A vigorous protest against state legislation for the prohibition or serious curtailment of the carbon black industry is made by the Natural Gas Products Association, an organization representing the producers of carbon black in Virginia, Kentucky, Louisiana, Montana, and Wyoming. The Association says that carbon black has been made from natural gas for forty years, and that the factories, wells, pipe-lines, and gasoline-extracting plants represent an investment of over $25,000,000; and that not only is employment given by its members to a large number of people, but that the product is one of a most essential character. Carbon black, it is explained, has long been as indispensable (for printers' ink) as wood pulp is in the production of material for the nation's newspapers and other printed matter. So, too, is it of great value in the production of paint, varnish, cement colorings, stove polish, crayons, waterproof coverings, composition goods, carbon paper, typewriter ribbons, etc.

But is is in the making of solid and pneumatic tires and other rubber goods that the intrinsic merit and commercial importance of carbon black have been most strikingly demonstrated. In the making of a considerable part of the better class of the 35,000,000 tires produced in the United States last year, and worth some $800,000,000, carbon black, as A. F. Kitchel, assistant secretary of the Association points out, was used to impart greater toughness and resiliency, to retard oxidation and hence lengthen tire life, while lessening weight, and adding much to tire efficiency.

The companies producing carbon black have been accused of using the natural gas recklessly, and fear is expressed that the entire supply will give out in a few years. Hence it is proposed to forbid the use of the gas for so-called "wasteful" manufacturing purposes and to conserve it and distribute it for domestic needs solely. The carbon black makers deny that they are wasteful, as they extract every bit of available gasoline from the gas before burning the residue for the impalpable carbon, and in that way they add several million gallons yearly to the nation's gasoline supply, a measure of true conservation. Chemists and engineers are constantly at work for the members devising better means for utilizing natural gas and for conserving at the same time the product on which their business vitally depends. The real wastage, they say, can be blamed on oil and gas concerns that are allowing natural gas to escape at the rate of 150,000,000 cubic feet a day, and doing nobody any good.

Is not the true principle that of equal opportunity and open competition, which it has long been the American policy to foster and encourage? The old fable of the body and its members has not ceased to be true. In the laudable desire to save natural gas in certain localities, we must not forget the welfare or convenience of the body politic as a whole. A saving would be too dearly bought if accomplished only at the inconvenience and detriment of the entire public, and the rubber industry in particular.

RUBBER TRADE OF PERU FOR 1919

The foreign trade of Peru for the calendar year 1919, according to statistics recently made available, reached an unprecedented total. Exports of india rubber totalled 3,232,211 pounds, valued at 473,950 Peruvian pounds or 11,531,678 Panamericanos. The Peruvian pound is worth nominally $4.8665 and the Panamericano, a proposed international money of account, is equal to one-fifth of a dollar. Imports of rubber manufactures into Peru were valued at 94,106 Peruvian pounds or 2,289,693 Panamericanos. The quantity of rubber manufactures exported totalled 154 pounds, valued 139 Peruvian pounds or 3,382 Panamericanos.

News of the American Rubber Industry

ANNUAL REPORT OF THE B. F. GOODRICH CO.

Net sales for the fiscal year ended December 31, 1920, were $150,007,345 as compared with $141,343,419 for the previous year. Net profits, after allowances for depreciation, interest and exchange losses, but before Federal taxes, were only $921,248 against $17,304,813 the previous year. After payment of dividends on the preferred and common stock there was a deficit of $5,371,792 as compared with a surplus of $12,657,813 after dividends in 1919. This deficit, together with the 1919 Federal taxes, cost of notes, pension fund, exchange losses and transfer of $8,000,000 to reserve, aggregating $21,253,608, were charged against the profit and loss surplus of previous years, thereby reducing that amount from $41,203,046 on December 31, 1919, to $22,706,498. The reserve for contingencies totals $10,000,000 to provide for anticipated losses on raw material commitments for future delivery and covers the difference between commitment prices and prices of corresponding materials in the inventory, which approach the nominal market quotations on December 31, 1920.

The balance sheet shows current assets of $97,481,559, of which $72,631,057 represents raw materials, partly manufactured and finished stock; accounts receivable, $20,172,177; cash, $3,058,314. Current liabilities total $33,164,523, of which $29,122,955 represents bills payable. Total assets and liabilities are $138,910,112.

The income accounts for the years 1919 and 1920 are as follows:

	1920	1919
Net sales	$150,007,345	$141,343,419
Manufacturing expenses, etc.	142,250,719	121,579,265
Balance	7,756,626	19,764,154
Other income	976,346	576,060
Total income	8,732,972	20,340,214
Depreciation	1,937,759	1,835,540
Interest, etc.	4,081,926	1,199,861
Net profits	[1]2,711,286	[2]17,304,813
Previous surplus	41,203,046	33,894,923
Stock profits	45,775	......
Premium and accrued dividends	......	387,000
Preferred dividends	2,688,840	2,247,000
Common dividends	3,604,200	2,400,000
Federal taxes	[3]3,057,627	[4]5,558,912
Pension fund, etc.	100,000	177,778
Cost of notes	2,012,903	......
Exchange loss	1,790,037	......
Reserve for commitment losses	8,000,000	......
Profit and loss surplus	22,706,498	41,203,046

[1]Before Federal taxes and deduction of exchange loss.
[2]Before Federal taxes.
[3]For 1919.
[4]For 1918.

The directors regard the report as satisfactory, considering the depression in the rubber industry during the last half of 1920, and the financial position of the company excellent. Subject to the approval of the stockholders, they have voted to retire 11,880 shares of treasury preferred stock. The plants of the company are in efficient working condition, and no further expenditures for additional expansion of fixed properties will be necessary during the current year.

GOODRICH DIVIDENDS

At the directors' meeting held January 19, 1921, a dividend of 3½ per cent was declared on preferred stock, 1¾ per cent payable April 1, 1921, to the preferred stockholders of record at the close of business March 22, 1921, and 1¾ per cent payable July 1, 1921, to the preferred stockholders of record at the close of business June 21, 1921.

FISK RUBBER REPORT

The Fisk Rubber Co. reports for 1920 a surplus, after inventory adjustment and Federal taxes, of $2,130,133, or $1.68 a share earned on its common stock of $25 par value after preferred dividends. In 1919 its earnings amounted to $3,994,657, or $5.99 a share on its common stock then outstanding. Its net profits in 1920 were $5,034,950 and inventory adjustment, $2,669,117.

The company's 1920 Federal taxes requirements were $235,700; its preferred dividends, $1,086,981, and its common dividends, $1,474,758, leaving a deficit of $431,606 at the close of that year.

MILLER PASSES PREFERRED DIVIDEND

The Miller Rubber Co. has issued notices to all preferred stockholders that the preferred stock dividends payment has been passed by order of the board of directors. This is the first time in its history that the Miller company has passed or deferred payment of a preferred dividend.

ANNUAL STATEMENT OF THE LEE TIRE & RUBBER CO.

The Lee Tire & Rubber Co., for the year ended December 31, 1920, reports net profits, after all charges and federal taxes, of $326,638, equal to $2.11 a share on 150,000 shares of common stock of no par value, against $471,805, or $3.14 a share in 1919. The consolidated income accounts for the past two years follow:

	1920	1919
Net sales	$6,705,930	$5,583,993
Cost of goods	6,404,896	4,999,949
Operating profits	301,034	584,044
Other income	116,058	59,332
Total income	417,092	643,376
Federal taxes, interest, etc.	90,054	171,571
Net profits	326,638	471,805
Dividends	225,000	......
Surplus	101,638	471,805

The plant at Conshohocken, Pennsylvania, is now operating at 50 per cent capacity with orders holding up well. The company sold all its high-priced rubber and fabric last August and is now in position to take advantage of present low prices.

STATEMENT OF THE HOOD RUBBER CO.

The sales of the Hood Rubber Co., and of the Hood Rubber Products Co., Watertown, Massachusetts, for the year ended December 31, 1920, amounted to $32,867,000 compared with $25-444,016 in 1919. Tire sales were $8,700,000 in 1920 as compared with $6,500,000 in 1919. Earnings were gratifying to the stockholders. Inventory merchandise values have been marked down liberally and the balance sheet shows a surplus of $1,934,143, subject to a reserve for federal taxes, after deducting a stock dividend of $2,000,000 from the surplus of December 31, 1919, which was $2,863,953. Regular quarterly dividends of 7 per cent per annum were paid on the preferred stock of both companies, while common stockholders have received during the year dividends of $14 per share on their stock of January 1, 1920. Preferred stock amounting to $150,000 was retired. Total assets and liabilities have increased from $16,067,081 in 1919 to $23,-104,606 in 1920.

STATEMENT OF THE AJAX RUBBER CO., INC.

The annual report of the Ajax Rubber Co., Inc., New York City, for the year ended December 31, 1920, shows a loss of $177,-920, after depreciation charges, against a net profit of $2,201,267 for 1919. Sales for 1920 amounted to $18,639,866.

The balance sheet shows inventories of $7,408,967; notes and accounts receivable of $3,959,947; cash, $301,990, and deferred charges of $336,205. Total assets and liabilities are $18,376,853. The liabilities include $6,145,000 in notes payable, and $528,292. Deductions for $1,100,000 dividends paid, provisions for 1919 taxes, and the loss for the year 1920 has reduced the surplus from $2,128,848, as of January 1, 1920, to $1,615,480. Future commitments for future deliv~~ries of raw materials amount to only $220,000 for rubber and $1,767,000 for fabric.

The directors have passed the quarterly dividend of 1 per cent on common stock. Three months ago it was reduced from 1½ to

1 per cent, the highest rate having been paid since August, 1917.

At the annual meeting the retiring directors were re-elected, with the exception of Harold W. Stimpson, who declined re-election, Benjamin Briscoe being elected in his place.

ANNUAL REPORT OF THE KELLY-SPRINGFIELD TIRE CO.

Gross profits of $7,721,901 are shown in the annual report of the Kelly-Springfield Tire Co., New York City, for the year ended December 31, 1920, against $7,034,284 the previous year. Net profits were $3,430,914, against $3,257,549. Deductions totaling $2,076,152, which included $500,000 for fluctuations in inventory valuations as well as for losses on Liberty bonds and fixed and miscellaneous charges, left a net income of $1,959,293 before providing for Federal taxes. Cash and stock dividends on preferred and common stock amounting to $2,230,606 reduced the total surplus from $8,120,453, as of December 31, 1919, to $7,203,915.

The balance sheet shows cash, $2,182,089; accounts receivable, $2,100,358; notes receivable, $114,419; merchandise and material inventories, $9,751,388; accounts payable, $217,412; notes payable, $8,155,000; total assets and liabilities, $36,293,942. The company has no supplies or future commitments of raw materials at former high prices.

FINANCIAL NOTES

At the meeting of the board of directors of the Firestone Tire & Rubber Co., Akron, Ohio, held March 10, 1921, the quarterly dividend on the 6 per cent and 7 per cent preferred stock was declared, but no dividend was declared on the common stock, though there is approximately $33,000,000 surplus, and cash in the banks of more than $77,500,000, thus conserving cash resources and enabling the company to increase production and replenish the stocks of finished tires depleted during the past eight months. Sales are increasing, and March business is estimated in excess of $6,000,000. There is even predicted a possibility of a tire shortage later in the year. It is believed for the next quarter the resumption of the dividend on the common stock will be justified, as sales and administrative expenses have been reduced more than 60 per cent, and with lower labor costs there is a firmer foundation for increased production and sales, which should result in increased earnings.

The Delion Tire & Rubber Co., Baltimore, Maryland, successor to the company of the same name originally formed in New Jersey, has utilized the proceeds from the sale of its 8 per cent cumulative preferred stock in the purchase and equipment of its factory at Baltimore. The capitalization of this company is as follows: preferred stock (par $10) authorized $600,000, presently to be issued $600,000; and common stock (no par value) authorized 100,000 shares, presently to be issued 100,000 shares. Subscribers to the preferred stock have the privilege of subscribing for the common stock at $5 per share, subject to allotment, to the extent of 60 per cent of their preferred stock subscription. The directors of the company are: C. B. Buchanan, W. T. Tillar, W. H. Trolinger, W. H. Price, Jr., John E. Semmes, Jr., John W. Price, Robert B. Arnold, W. C. Price, Walter M. Ballard and J. I. Berinstein.

Stockholders of Ames Holden McCready Limited, Montreal, Canada, have authorized the issue of $2,000,000 seven per cent 10-year second refunding mortgage bonds.

NEW YORK STOCK EXCHANGE QUOTATIONS

March 26, 1921

	High	Low	Last
Ajax Rubber Co., Inc.	....	....	34
The Fisk Rubber Co.	16¼	15⅞	16⅛
The B. F. Goodrich Co.	38⅜	37⅛	38
The B. F. Goodrich Co., pfd.	....	....	....
Kelly-Springfield Tire Co.	41	39⅛	39½
Kelly-Springfield Tire Co., pfd.	....	....	87
Keystone T. & R. Co.	16¾	16	16
Lee R. & T. Corp.	28¼	28	28
United States Rubber Co.	73⅞	72	73⅛
United States Rubber Co., 1st pfd.	....	....	102

DIVIDENDS DECLARED

Company	Stock	Rate		Payable	Stock of Record
American Chicle Co., Inc.	Pfd.	1½%	q.	Apr. 1	Mar. 19
Boston Woven Hose & Rubber Co.	Com.	$3.00	q.	Mar. 1	Mar. 15
Brunswick-Balke-Collender Co.	Pfd.	1¾%	q.	Apr. 1	Mar. 20
Canadian Consolidated Rubber Co., Limited	Pfd.	1¾%	q.	Mar. 31	Mar. 24
Canadian General Electric Co., Ltd.	Com.	2%	q.	Apr. 1	Mar. 15
Canadian General Electric Co., Ltd.	Pfd.	3½%	s.a.	Apr. 1	Mar. 15
Canadian Westinghouse Electric & Manufacturing Co., Limited	Com.	2%	q.	Apr. 1	Mar. 21
Dayton Rubber Manufacturing Co.	Pfd.	1¾%	q.	Apr. 1	Mar. 15
Driver-Harris Co.	Pfd.	1¾%	q.	Apr. 1	Mar. 26
du Pont de Nemours, E. I. & Co., Inc.	Com.	2%	q.	Mar. 15	Feb. 28
du Pont de Nemours, E. I. & Co., Inc.	Deb.	1½%	q.	Apr. 25	Apr. 10
Firestone Tire & Rubber Co.....6%	Pfd.	1½%	q.	Apr. 15	Apr. 1
Firestone Tire & Rubber Co.....7%	Pfd.	1¾%	q.	May 15	May 1
Fisk Rubber Co., The.....2d	Pfd.	1¾%	q.	Mar. 15	Feb. 28
General Electric Co.	Com.	$2.00	q.	Apr. 15	Mar. 9
General Tire & Rubber Co., The	Pfd.	1¾%	q.	Apr. 1 July 1	Mar. 22 June 21
Hood Rubber Products Co., Inc.	Pfd.	1¾%	q.	Mar. 1	Feb. 21
Kelly-Springfield Tire Co.....6%	Pfd.	$1.50	q.	Apr. 1	Mar. 15
Mason Tire & Rubber Co., The	Pfd.	Reg.	q.	Apr. 1	...
United Shoe Machinery Co.	Com.	$0.50	q.	Apr. 5	Mar. 21
United Shoe Machinery Co.	Pfd.	$0.37½	q.	Apr. 5	Mar. 21
Westinghouse Electric & Mfg. Co.	Com.	2%	q.	Apr. 30	Mar. 31
Westinghouse Electric & Mfg. Co.	Pfd.	2%	q.	Apr. 15	Mar. 31
Wilson Rubber Co.	Com.	10%	an.	...	...

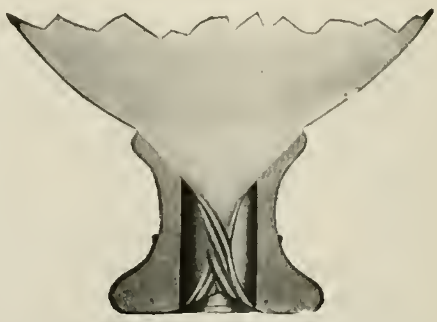
AKRON RUBBER STOCK QUOTATIONS

The following are closing quotations of March 23, supplied by The App-Hillman Co., Second National Building, Akron, Ohio:

	Bid	Asked
American R. & T. Co., com	40	50
Amazon Rubber Co., The	20	30
Firestone T. & R., com	75	78
Firestone T. & R., 6% pfd	83	84
Firestone T. & R., 7% pfd	73	75
General T. & R. Co., The, com	180	205
General T. & R. Co., The, 7% pfd	75	85
Goodrich, B. F., The, com	39	39½
Goodrich, B. F., The, pfd	73	76
Goodrich, B. F., The, 5-yr. 7% notes	89	90
Goodyear T. & R. Co., The, com	13¾	14
Goodyear T & R., Co., The, 7% pfd	32½	33
India T. & R. Co., com	100	130
India T. & R. Co., 7% pfd	..	80
Mason T. & R. Co., The, com	15	16
Mason T. & R. Co., The, 7% pfd	64	66
Marathon T. & R. Co., com	3	4
Miller Rubber Co., The, com	65	70
Miller Rubber Co., The, 8% pfd	68	70
Mohawk Rubber Co., The	125	135
Phoenix Rubber Co., com	..	18
Phoenix Rubber Co., pfd	..	88
Portage Rubber Co., The, com	18	20
Portage Rubber Co., The, 7% pfd	..	35
Republic Rubber, com	¾	1
Republic Rubber, 7% pfd	..	20
Republic Rubber, 8% pfd	8	10
Rubber Products Co., The	..	100
Standard Tire Co., com	..	100
Standard Tire Co., pfd	..	90
Star Rubber Co., com	..	100
Star Rubber Co., 8% pfd	..	100
Swinehart T. & R., com	30	40
Swinehart T & R., 7% pfd	..	70

VALVE FOR TOY BALLOONS

The newest valve for toy balloons is so constructed that it does not cut the balloon. The inside of the neck is concaved in order to accomplish this and the demand for this valve leads the manufacturers to believe that this is one of the outstanding features. During the last three months it has been necessary to triple production to meet the growing demand from jobbers for this particular balloon valve. The interior construction of the valve, which is covered by patents, is shown in the accompanying illustration in cross-section.—The Anchor Rubber Co., Inc., Barberton, Ohio.



Anchor Valve for Toy Balloons

NEW INCORPORATIONS

Allsteel Ridewell Tire & Rubber Co., The, November 5, 1920 (Ohio), $250,000. A. Huetter, president and general manager; H. Knapp, secretary and treasurer. Principal office, 513-519 Lindsey Building, Dayton, Ohio. To manufacture Huetter metallic steam bags.

Atlantic Rubber Ace Co., March 1, 1921 (New Jersey), $100,000. C. M. Haight, New Market; C. Sebolt; Louis J. and Edward L. Belloff, all of New Brunswick—both in New Jersey. Principal office, National Bank of New Jersey Building, 390 George street, Rooms 410-411-413, New Brunswick, New Jersey. Agent in charge, C. Sebolt. To manufacture, buy, sell, and deal in tires, tubes, etc.

Atlas Rubber Co., January 14, 1921 (West Virginia), $25,000. E. A. Jordan; C. L. Hibner; E. F., M. M. and H. M. Hartley—all of Huntington, West Virginia. Principal office, Huntington, West Virginia. To buy and sell rubber goods, supplies, etc.

Barbanell Trading Corp., March 15, 1921 (New York), $15,000. E. Light, 68 West 113th street; M. Erenstoft, 65 Lenox avenue—both in New York City; M. E. Graef, 68 Winfield avenue, Jersey City, New Jersey. To deal in crude rubber.

Bickett Rubber Products Corp., January 31, 1921 (Wisconsin), $100,000. M. G. Kusel, president; L. M. Bickett, vice-president; O. C. Wertheimer, secretary and treasurer. Principal office, 600 South First street, Watertown, Wisconsin. To manufacture and sell rubber products of every nature.

Brazilian Rubber Co., The, January 12, 1921 (Virginia), $50,000. W. Y. Hosier; C. Randolph and George W. Gilbert—all of Norfolk, Virginia. Principal office, Norfolk, Virginia. To conduct a brokerage, commission and mercantile business in products and merchandise of all kinds.

Brazilian Rubber Refining & Mfg. Co., Inc., March 10, 1921 (New York), $400,000. J. E. Strowbridge, 812 Bergen street, Brooklyn, New York; J. T. Coggins, Plainfield, New Jersey; F. Chamie, Rua St. Antonio, 39, Pará, Brazil, South America. To manufacture rubber products.

Clark Rubber Co., February 8, 1921 (Massachusetts), $100,000. L. B. Conant, Cambridge; M. C. Clark, Emmons street; H. L. Metcalfe, West Central street, both of Franklin—both in Massachusetts. Principal office, Franklin, Massachusetts. To buy, sell and manufacture rubber goods.

Cotter Tire & Rubber Co., March 9, 1921 (Delaware), $500,000. T. L. Croteau; M. A. Bruce; S. E. Dill—all of Wilmington, Delaware. To manufacture and sell rubber tires.

Crude Rubber Examiners Co., Inc., March 9, 1921 (New York), $1,000. E. Lacey; W. Fagan, both of 60 Park avenue; C. H. Jenkins, 1491 Westchester avenue, Bronx—both in New York City. To examine crude rubber.

Fulton Tire Corp., February 16, 1921 (Massachusetts), $50,000. Joseph Prince, 146 Coolidge street; Jacob Prince, 122 Pleasant street, both of Brookline; L. J. Blank, 20 Merrimac street, Boston—both in Massachusetts. Principal office, Boston, Massachusetts. To deal in tires, automobile accessories, etc.

Gold Medal Rubber Co., Inc., March 15, 1921 (New York), $25,000. S. and A. Newman; G. J. Bates—all of 1934 Broadway, New York City. To deal in tires, etc.

Gotham Tire Co., Inc., March 10, 1921 (New York), $10,000. L. and J. Weiss, both of 215 Audubon avenue; M. Hillman, 255 West 55th street—both in New York City. To deal in tires.

Jamestown Tire Service Corporation, March 11, 1921 (New York), $25,000. M. H. and N. L. Kent, both of R. F. D. 77; H. W. Burgeson, 72 Sturgis street, both of Jamestown, New York. Principal office, Jamestown, New York.

National Rubber Goods Manufacturing Co., March 12, 1921 (Delaware), $2,000,000. R. A. Stillwell, Akron; W. H. Hill; B. Williamson, both in Cleveland—both in Ohio. To manufacture products from rubber.

New York Kelly Springfield Motor Corporation, March 15, 1921 (New York), $200,000. E. Hunn, Jr.; G. S. Hauck, both of 70th street and East River, New York City; A. C. Hare, 300 Walnut street, Philadelphia, Pennsylvania. To deal in tires, etc.

Parker Rubber Manufacturing Co., February 17, 1921 (Massachusetts), $125,000. D. H. Finberg, president; P. Finberg, vice-president; H. D. Finberg, treasurer; J. T. Dunn, clerk; M. Finberg, director—all of 621 Albany street, Boston, Massachusetts. Principal office, Boston, Massachusetts. To manufacture and deal in rubber products.

Prince Reenforced Rubber Co., The, March 1, 1921 (Massachusetts), $50,000. H. P. Knox, president; H. B. Morse, treasurer and clerk; J. D. Prince, director—all of 140 Oliver street, Boston, Massachusetts. Principal office, Boston, Massachusetts. To manufacture and deal in rubber, tires, tubes, etc.

Resistance Tire & Rubber Co., February 25, 1921 (New York), $250,000. D. F. O'Meara; W. Troy, both of 60 Broadway; F. G. W. Campbell, 22 Broad street—both in New York City. To manufacture tires, etc.

Union Rubber Co., Inc., March 3, 1921 (Massachusetts), $100,000. R. D. Smith, president; J. W. Worthen, secretary and treasurer; M. E. Buchanan, clerk—all of 55 Congress street, Boston, Massachusetts. Principal office, Boston, Massachusetts. To manufacture and deal in boots, shoes, rubbers, etc.

United Rubber Co., February 5, 1921 (Washington), $100,000. C. G. and P. L. Austin; W. W. Powers; A. Fulrath; J. T. Casey. Principal office, 632 New York Building, Seattle, Washington. To manufacture, sell and deal in rubber goods.

United States Armorcord Tube Co., January 17, 1921 (West Virginia), $50,000. W. A. Ream; E. D. Tumlin; J. H. McDermott; L. E. McWhorter, Jr.—all of Morgantown, West Virginia; H. M. Ream, Mansfield, Ohio. Principal office, Morgantown, West Virginia. To buy and sell tubes, etc.

ROCHESTER MEETING OF THE AMERICAN CHEMICAL SOCIETY

The spring meeting of the American Chemical Society will be held at Rochester, New York, April 26–29, 1921. An interesting and important program has been planned and a large and successful meeting is assured. Two days, April 27 and 28, have been allotted to the divisional meetings.

The secretary of the Rubber Division will send its members, prior to the meeting, a draft of tentative specifications for the analysis of rubber goods in order that each member may be prepared to discuss this subject, which will be the main order of business for the first day. The second day will be devoted to the presentation of an interesting series of papers on chemistry and research in the rubber industry.

PERSONAL MENTION

Charles B. Whittelsey, president of the Hartford Rubber Works Co., a subsidiary of the United States Rubber Co., has been reelected treasurer of The Society of Automotive Engineers.

Mr. Whittelsey was elected to membership in the society in 1910 and became a life member in 1916. He was a member of the Standards Committee for several years, beginning in 1911, and served as chairman of the Tire and Rim Division in 1918 and 1919. Mr. Whittelsey was a member of the council in 1912 and 1913, was elected treasurer in 1918 and has been reelected each year since.

D. Stewart Iglehart, vice-president of W. R. Grace & Co., New York, import, export and banking, recently returned on a Grace line steamship from a business trip of several months on the west coast of South America.

A. B. Jones, formerly vice-president of The B. F. Goodrich Co., has been elected president of the Kelly-Springfield Tire Co., in place of F. A. Seaman, who temporarily acted as president, and who has been elected first vice-president.

Ernest Schulthess, who is well known in the mechanical rubber goods trades of the New York metropolitan district, and formerly with the Gutta Percha & Rubber Manufacturing Co., 126-128 Duane street, New York, is now general manager of the Atlas Rubber Co., 26 Cortlandt street, New York.

C. J. Welch, assistant general sales manager of the United States Rubber Co., 1790 Broadway, New York, has been elected director of that company.

F. H. Lyon, formerly manager of the crude rubber department of the Pacific Trading Corporation of America, 90 West street, New York, is now associated with Roger S. Hardy, crude rubber broker, 82 Beaver street, New York.

James C. Griven, who has been connected with the rubber business since 1909, as Philadelphia salesman and branch manager, Richmond branch manager and Pittsburgh district manager, has recently joined the forces of The Miller Rubber Co., of Akron, Ohio, as special eastern representative, with headquarters in New York City.

E. B. Tozier has resigned as president and general manager of the Polack Tyre & Rubber Co., that company having been absorbed by The Buckeye Rubber Products Co., Willoughby, Ohio. Mr. Tozier has not yet announced his future movements. His headquarters will be at the Buckeye office, 527 West 23rd street, New York.

Victor W. Fink established an office on March 1, as a dealer in crude rubber at 24 Stone street, New York.

Guy M. Sherriff, who has been appointed district sales manager of the Automatic Safety Tire Valve Corporation, New York, was formerly connected with the Lynn, Massachusetts, plant of the General Electric Co. for some time, and during the war with the Wright-Martin Aircraft Corporation, going from them direct to the Automatic Safety Tire Valve Corporation as assistant sales manager, having special inside duties.

Business acquaintances of Irving Laurie, secretary and treasurer of the Somerset Rubber Reclaiming Works, New Brunswick, New Jersey, will be interested to hear of his marriage to Miss Blanche Susskind at the Hotel Savoy, New York City, February 8, 1921. Mr. Laurie entered the employ of the Somerset Rubber Reclaiming Works, of which his father, Irving Laurie, senior, is president, in 1913. In January, 1920, father and son purchased the entire outstanding stock of the company, each controlling fifty per cent of the stock.

A LEADER IN TIRE FABRIC MANUFACTURE

Robert J. Caldwell, manufacturer, capitalist and publicist, was born in Louisville, Kentucky, May 12, 1875. Following his graduation from the Polytechnic Collegiate Institute, Brooklyn, New York, he engaged in business as a commission merchant, organizing and assuming the presidency of the R. J. Caldwell Co., Inc., New York City, which markets the output of several large cotton fabric mills.

R. J. Caldwell

Mr. Caldwell soon became one of the best known and most successful operators in tire fabrics, later engaging also in their manufacture. He gained control of various weaving and spinning mills in the United States and Canada and enlarged and developed them for this highly specialized product. Chief among them are the Connecticut Mills Co., Danielson, Connecticut, where a model industrial village was erected with excellent community features, and the Taunton Cotton Mills, a spinning plant at Taunton, Massachusetts.

The broad scope of his activities in this direction is indicated by the fact that he is at present chairman of the Connecticut Mills Co.; Taunton Cotton Manufacturing Co.; Canadian Connecticut Cotton Mills, Limited, Sherbrooke, Canada; Knitted Padding Co., Canton, Massachusetts; and R. J. Caldwell, Limited, and The Globe Mills, Fall River, Massachusetts. He is also a director of the Salt River Valley Cotton Co., Nobska Spinning Co., Connecticut Cotton Co. and Seaboard National Bank.

Ever a student of the mutual problems and responsibilities of capital and labor, Mr. Caldwell has found opportunity to utilize his wide practical experience to good purpose as chairman of the sub-committee on industrial relations of the National Republican Advisory Committee on Policies and Platform, and as chairman of the industrial relations committee of the National Republican Club. In 1919 he was appointed a member of the United States Industrial and Economic Commission to make a survey of the industrial situation in Europe. The following year he was appointed special economic commissioner by the United States Department of Labor, to report on industrial and economic conditions in mid-Europe. He is the author of "Industrial Democracy," "Proceedings, Academy of Political Science, 1916," and various reports and articles on industrial and labor conditions in Europe and the United States.

Mr. Caldwell was much impressed by the organization of labor abroad to prevent strikes, unemployment and war, and believes that American manufacturers will do well to watch the results being achieved by shop committees participating in factory management under the Whitley system. America, he thinks, must come sooner or later to this conception of industrial democracy.

Mr. Caldwell is president of the American Mid-European Association and a member of the New York Chamber of Commerce, France-America Society, American-Hellenic Society, the Pilgrims and the Academy of Political Science. His clubs include the Bankers' Club of America, Authors' Club of London, Cosmos Club of Washington, Lotos Club, Metropolitan Club, Nassau Country Club, Automobile Club of America, Piping Rock Horse Show Association and the International Sports Club.

THE RUBBER TRADE IN THE EAST AND SOUTH

By Our Regular Correspondent

NEW YORK

At the annual meeting of the Dunlop Tire & Rubber Corporation of America, held March 15, at 120 Broadway, New York, the following officers and directors were elected:

Officers: F. C. Walcott, president; P. D. Saylor, vice-president, general manager and treasurer; R. J. Dillon, assistant-treasurer; S. S. Walcott, secretary and assistant-treasurer.

Directors: L. M. Bergin, F. C. Walcott, P. D. Saylor, J. Westtren, Pierre du Pont, R. W. Pomeroy, George duCros, Sir Harry McGowan.

At the annual meeting of the National Aniline & Chemical Company, Inc., the following directors were elected: William Hamlin Childs, William H. Nichols, William H. Nichols, Jr., and Edward L. Pierce in place of C. S. Lutkins, H. Wigglesworth, T. M. Rianhard, F. M. Peters and W. N. McIlravy. The remainder of the board was reelected.

The Kelly-Springfield Tire Co. with general offices on Seventh avenue at 57th street, New York, announced the election of the following directors at its meeting on March 8: Stephen Peabody, A. L. Scheuer, F. A. Seaman, Gustavus Maas, A. M. Poole, Arthur Sachs, Alfred B. Jones and Theodore G. Smith.

The Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin, announces that E. N. Lightfoot will assume the title of manager of the heating department with headquarters at the New York works. He will be in full charge of all matters relating to the sale of electric heating devices.

The Miller Rubber Co., Akron, Ohio, announces that owing to the increase in their export business larger offices and storage facilities have been secured for the New York branch. The new address is 121-125 Duane street. The export headquarters remain at the main office.

The American Hard Rubber Co., 11 Mercer street, New York, announces the retirement of Philip H. Campbell as manager of the sundries sales department after forty years' connection, to be succeeded by G. Brette Glaenzer.

Sweeney, Sniffen & Sweeney, crude rubber brokers, have removed their offices to The New Gotham National Bank Building, Columbus Circle and Broadway, New York, where added facilities will enable them to render still more efficient service.

Judge Mayer has appointed former Governor Benjamin B. Odell and former Judge Van Vechten Veeder receivers of Gaston, Williams & Wigmore, importers of crude rubber, exporters and steamship owners, of 100 West 41st street, New York. The bond is $25,000, and they are directed to continue the business. The liabilities exceed $6,000,000. The assets consist mainly of the stock of the company and of twenty-five subsidiaries.

The National Balloon Co. has moved recently from 41 Union Square into larger quarters at 799 Broadway, New York.

The Asbestos & Rubber Works of America has removed its offices from the old Gotham National Bank Building to the eleventh floor of The New Gotham National Bank Building, Broadway and 59th street, New York.

The Climax Compression Tube Co. of New York, Inc., 505 Fifth avenue, New York, is a subsidiary of the Climax Rubber Co., Columbus, Ohio. The factory is located in Buffalo, New York. The executive offices on Fifth avenue are in charge of A. L. Case, chairman of the board of directors. The officers of this company are: Peter A. Miller, president; W. J. Wright, vice-president, and Frank M. Seeger, secretary-treasurer. The factory has been undergoing repairs and alterations preparatory to manufacturing Climax air tight and compression tubes. Early in April it is expected there will be a production of from 500 to

1,000 air tight tubes and in another month at least an equal number of compression tubes.

The Vulcanized Rubber Co. capitalized at $1,500,000 under the laws of Maine, has dissolved its New York incorporation and appointed H. S. Dodd its representative at 251 Fourth avenue, New York.

The Norwalk Tire Sales Co., Albany, New York, has changed its name to Surgenor Auto Supply Co.

The Habershaw Electric Cable Co., New York, has increased its capital from $31,500,000 to $33,000,000.

The Naugatuck Tire & Rubber Co., Manhattan, has increased its capital from $10,000 to $50,000.

Reichard-Coulston, Inc., 303 Fifth avenue, New York City, has been appointed representative of Typke & King, Limited, Surrey, England, manufacturer of chemicals for the rubber trade, including the well-known T & K brands of golden and crimson antimony.

The Palmer Tire Co., 5 Columbus Circle, New York, which formerly manufactured the "Palmer Rebiltright" tire, will erect an addition to its factory at Poughkeepsie, New York, to manufacture Ford size, 30 by 3½ inches, tires and tubes, and will discontinue the rebuilt tire business. C. J. Davis will take entire charge of manufacture of the new product, which will be known as the "Henry" tire and tube. F. D. Palmer will have charge of the Poughkeepsie office and E. K. Dusenbury will handle sales at the New York office, to which the home offices have been moved from Poughkeepsie. The officers of the company are: William Celler, president; Harry J. Fitzpatrick, treasurer; and E. K. Dusenbury, secretary. These, with A. Quinn and Walter Weaver, make up the board of directors.

Franklin Import & Export Co., Inc., crude rubber importer and dealer, has removed from 220 Broadway to 213 Water street, New York.

The Good Luck Tire & Rubber Co., Inc., has changed its name to the Climax Compression Tube Co. of New York, Inc., in order to more closely identify itself with the Climax compression inner tube which it manufactures. Officers are Peter A. Miller, president; H. R. Tucker, vice-president; Frank M. Seeger, secretary and treasurer. The offices of the company are located in the Root Building, 70 West Chippewa street, Buffalo, New York, and branches are maintained in Rochester, Lancaster and Watertown.

PENNSYLVANIA

The Quaker City Rubber Co., Philadelphia, Pennsylvania, announces the election of the following officers: C. A. Daniel, president and treasurer; William F. Metzger, vice-president; and H. R. Shellenberger, secretary and assistant treasurer.

Taylor, Stiles & Co., with general office and factory at Riegelsville, New Jersey, has opened offices at 204 Bailey Building, 1218 Chestnut street, Philadelphia, with Charles T. Stiles as manager and factory representative. The company manufactures scrap rubber, rag, waste paper and thread waste cutters under the "Giant" trade-mark, and also machine knives of all kinds.

Lynskey-Neal-Lynskey, Pittsburgh, Pennsylvania, well-known local tire dealers, were recently appointed by the Syracuse Rubber Co., Inc., Syracuse, New York, to handle "Syra-Cord" tires in the Pittsburgh territory. William H. Neal, manager, reports a bright outlook for the tire business during the coming season.

Charles L. Langholtz has been appointed assistant manager of the export division of the H. H. Robertson Co., Pittsburgh, Pennsylvania.

SOUTHERN NOTES

The Consumers Tire & Supply Co., Inc., Charlotte, North Carolina, advise that they have increased their capital from $100,000 to $1,000,000. If conditions improve, this company expects to open stores, garages and service stations in South Carolina and Florida.

Albert Numbers, who was formerly at the head of the Reliable Tire & Rubber Co., and the National Tire Co., Trenton, New Jersey, has been appointed general manager of the Virginia Rubber Co., at Charleston, West Virginia. The company is a $1,000,000 concern and specializes in automobile tires. It has one of the most modern plants in the country. Mr. Numbers has been associated with the tire industry for many years.

The Ten Broeck Tyre Co., Louisville, Kentucky, recently disposed of its plant and property to the Cumberland Tire & Rubber Co., of the same city. The Cumberland company expects to enlarge the textile mill from its present capacity of about 5,000 spindles to 30,000 spindles sometime during the current year.

The Currie Brothers Co., Inc., Atlanta, Georgia, was recently incorporated to manufacture "Tirometer" heavy touring tubes. J. W. Currie, formerly senior member of the Currie-Akers Tire Co., tire distributers, is president; Peter W. Hutcheson is general manager. The company will establish branch offices in New York, Chicago, Cleveland, Kansas City, Denver and Los Angeles. The "Tirometer" tube is described elsewhere in this issue.

The Davis Carbon Black Co., Charleston, West Virginia, which was incorporated August 31, 1920, is capitalized at $500,000. The incorporators were: O. L. Davis, Alton N. Davis, W. H. Davis, F. R. Hurlbutt, and Lodore Davis.

NATIONAL ASSOCIATION OF WASTE MATERIAL DEALERS

The annual meeting of the National Association of Waste Material Dealers took place at the Hotel Astor, New York, on the 16th of March, preceded on the 14th and 15th by the meetings of the various divisions.

Frank C. Overton, of Castle, Gottheil & Overton, of New York, dealers in paper stock, was unanimously elected president of the Association for the ensuing year, succeeding F. W. Reidenbach.

Frank C. Overton

In his address Mr. Overton made a strong plea for the support of the individual members in maintaining the dignity and advancing the standing of the Association by the addition to its membership of responsible, well-meaning concerns in the waste business. There is no room in the Association for concerns or individuals who do not value the standards of business integrity that the Association advocates.

President Overton summarized the accomplishment of the National Association by saying that it started without any recognized rules of trade, without any standard gradings for material, without any recognition whatever among the mills, but that it has now reached a point where it is recognized by the people from whom it buys, to whom it sells, by the railroads over which it ships and by the steamship lines which bring its merchandise from abroad, and as time goes on its power will increase and more recognition will be given to its legitimate wishes.

SECRETARY'S REPORT

Secretary Charles M. Haskins in his annual report said that "One of the most encouraging accomplishments during the past year has been the high regard in which the organization's credit bureau has come to be held, not only by members, but by financial institutions throughout the country and by consumers."

One of the most recent additions to the organization is that of a Southwestern Division recently formed, with headquarters in St. Louis. This division has already been active in preventing unjust and discriminatory legislation against waste material dealers in that section.

Several proposed changes in the by-laws of the Association were adopted, the most important of which was that permitting waste material merchants in foreign countries to become associate members of the organization. This change was viewed as an expansion of the Foreign Trade Division of the National Association.

SCRAP RUBBER DIVISION

Nat E. Berzen was reelected chairman for the coming year. The meeting was interested particularly in the effect of present high freight rates in the present market. Reclaimed rubber, in order to compete with crude at present prices, must depend on such low-priced scrap that for most collectors it is almost impossible to sell scrap at such levels on account of the high freight rates. It was therefore the sense of the meeting that railroad rates ought to be reduced, and that the Association ought to endeavor to bring them down within reason.

VICE-PRESIDENT, KELLY-SPRINGFIELD TIRE CO.

Frederick A. Seaman, vice-president of the Kelly-Springfield Tire Co., New York City, has for over two decades played an important part in the financial and commercial development of this conspicuously successful firm. Born in New York City in 1862, he received his education at the Swarthmore Preparatory School and Swarthmore College, from which he was graduated in 1883.

On leaving college he became assistant to the receiving teller of the Tradesman's National Bank, and in 1886 secretary to the New York & New Jersey Globe, Gas & Light Co. In 1899 he associated himself with the Kelly-Springfield Tire Co. as secretary and assistant treasurer. The following year he became secretary and treasurer, in 1919 vice-president and secretary, and in 1920 served as president. At the last annual meeting he was elected first vice-president.

Frederick A. Seaman

He is a member of the University Club, Lotus Club, New York Athletic Club, Morris County Golf Club, Stamford Yacht Club, The Rubber Association of America, Motor & Accessory Manufacturers' Association, and the Society of Colonial Wars.

THE RUBBER TRADE IN NEW JERSEY

By Our Regular Correspondent

TRENTON NOTES

The rubber manufacturers of Trenton and vicinity believe that all branches of the business will begin to pick up with the advent of summer, as they can see no reason at this time for a continuation of the slump. John S. Broughton, president of the United & Globe Rubber Manufacturing Co., recently returned from a business trip through the West, and found conditions there very encouraging. He said the western business interests believe that the trade will reach normal in a short time. Other Trenton rubber manufacturers are of the same opinion, but the present time finds all branches of the rubber industry far from normal. The tire situation has begun to pick up, but the mechanical end of the trade is very dull.

One branch of the rubber industry not greatly affected by the readjustment period is the manufacture of rubber heels. Clifford H. Oakley, president of the Essex Rubber Co., Trenton, states that if the rubber heels being produced by the Essex company were piled on top of each other, the height would be about one mile. More than nine tons of rubber heels are being produced daily at the Essex plant.

In order to prevent further annual losses through freshets in the Assanpink Creek, the Empire Tire & Rubber Corporation has asked the Trenton City Commissioners to take immediate action to minimize the danger. When the creek flooded its banks last winter, bringing damage to factories located along the stream, the Empire corporation sustained losses aggregating $240,000, of which amount $90,000 was wages to employes, due to the necessary closing of the plant. The Joseph Stokes Rubber Co., which is also situated along the stream, has likewise suffered severe losses.

The Joseph Stokes Rubber Co. will shortly erect a new storehouse to take the place of the one recently destroyed by fire. The new building will be fireproof.

The New Jersey Rubber Manufacturers' Association recently held its monthly meeting at the Trenton Country Club. After a business meeting a banquet was served. Talks were given by several members, who predicted better business conditions by early summer. John S. Broughton, president of the organization, presided.

Twenty-two students were enrolled in the new department of rubber technology at the Trenton School of Industrial Art, which has just closed for the season. The department proved a big success, the students comprising shopmen, foremen and superintendents from the various Trenton rubber mills. A series of twenty lectures was given by Dr. William F. Zimmerli, chief chemist of the Howe Rubber Corporation, New Brunswick, and formerly assistant professor of chemistry in charge of the course in rubber chemistry at the Municipal University, Akron, Ohio. The lectures were on the history, theory and practice of the rubber industry, and covered all branches of the business. It is planned to broaden this rubber course next season.

Students in the Trenton high school were recently given an idea of how certain kinds of rubber products are manufactured. Edmund W. Craft, purchasing agent of the Thermoid Rubber Co., gave an illustrated lecture on crude rubber before the students and explained the various processes used in the rubber industry.

At its recent annual meeting the Globe Rubber Tire Manufacturing Co., Trenton, elected the following officers: H. W. Kugler, president; R. E. Glass, vice-president; J. V. Iverson,

treasurer, and F. H. Craig, secretary and assistant treasurer.

R. H. Phillips, who resigned as sales manager of the automobile accessories and mechanical goods department of the Essex Rubber Co., has been elected secretary and treasurer of the National Tire Co., and the Reliable Tire & Rubber Co., Trenton, succeeding Albert Numbers. Mr. Phillips had been connected with the Essex company for more than twelve years.

MISCELLANEOUS NEW JERSEY NOTES

Samuel Dintenfass, trading as the Universal Tire & Rubber Co., Philadelphia, Pennsylvania, has instituted suit in the United States District Court at Trenton against the Combination Rubber Manufacturing Co., of Bloomfield, for alleged failure to live up to an agreement in the manufacture of tires for the complainant, it being alleged that they were not up to the standard. The Combination company claims that it gave no guarantee with the tires and that they were made according to the regular formulas, also that it gives no guarantee with any of its products.

The Goodyear Tire & Rubber Co., of Akron, Ohio, recently obtained a judgment against Harry Kruvant, of Newark, in a court at that place. The judgment was for $2,836.19. Kruvant, it was claimed, promised to be responsible for the bills of Louis Siegler and Albert J. Siegler, officers of the now bankrupt Ever Ready Auto Supply Co., if the Goodyear company would extend the Sieglers credit. Credit was extended to the amount sued for, but the Sieglers did nót pay.

Whitall Tatum Co., New York, has just completed the transfer of its New York assembling department to the rubber works at Keyport, New Jersey, where it will occupy a portion of the three-story addition just completed. The company is also building an experimental machine shop at its glass plant at Millville, New Jersey.

The plant of the Ewing Rubber Co., recently purchased from Archibald F. Updike, and situated in Ewing township, on the outskirts of Trenton, was destroyed by fire on March 16, resulting in a loss of several thousand dollars. All the finished stock and the big supply of crude rubber was destroyed, together with the office effects. The company manufactured automobile tubes and patches.

Seth R. Clark, formerly connected with the Republic Rubber Co., Youngstown, Ohio, in charge of development work, is now associated with the Braender Tire & Rubber Co., Rutherford, New Jersey, as production manager.

THE RUBBER TRADE IN MASSACHUSETTS

By Our Regular Correspondent

In attractiveness, attendance and wealth of handsome cars to choose from, the Automobile Show held at Mechanics' Building, Boston, from March 12 to 19, inclusive, lacked little of its former appeal. There were, however, more than 150 less exhibitors than last year, and it is to be feared that sales generally were not as satisfactory. None of the larger tire and rubber companies exhibited directly, although the products of some were noticeable in the numerous displays of accessory firms. The Green & Swett Co. featured Miller and Amazon tires; the J. P. Harriman Co., Syra-Cord tires; the Central Automobile Tire Co., tires and tubes of numerous popular makes. Special exhibits of interest to the rubber trade included Sewell cushion wheels and Lambert Troublpruf tires.

A. Schrader's Son, Inc., showed pressure gages, tire valves and accessories and the Harris Co., Inc., valve caps. L. J. Morse demonstrated Magic Rubber Mend and other rubber specialties, while tire paints and cements were displayed by the Boston Blacking Co. and J. P. Harriman Co. Rim and tire tools were featured by the Greb Co., Trexler Co. and Weaver Manufacturing Co. Air compressors and sundries were shown by the United States Air Compressor Co., C. A. Dickerson and the Curtis Pneumatic Machinery Co. Storage batteries were offered by the American Storage Battery Co., Paul M. Marko & Co., Inc., Willard Storage Battery Co., and Westinghouse batteries were included by the Jackson Electric Co. Tire chains were shown by the American Chain Co.; jacks by Edward V. Hartford, Inc., tire and wheel carriers by the New Era Spring & Specialty Co.; tire locks by the Alemite Lubricator Co. of New England.

MISCELLANEOUS MASSACHUSETTS NOTES

A trade tour of Mexico in the interest of New England manufacturers is to be made under the auspices of the Associated Industries of Massachusetts, leaving Boston March 12 and returning April 4. The roster of the party consists of forty-four names including R. Dunsford, treasurer of the Lowell Insulated Wire Co.; William B. Laighton, export manager of the Hood Rubber Products Co., Watertown; James E. McGrath, foreign department of the First National Bank of Boston.

The Crompton & Knowles Loom Works, of Worcester, is co-operating with the public school authorities in the work of immigrant education. English language classes have been organized for foreign-born employes with a present enrollment of 150 persons, including French-Canadians, Armenians, Greeks, Poles, Turks, Assyrians and Italians. Classes are held each working day except Saturday at the employment bureau in charge of a public school teacher who devotes her entire time to the work. There are five classes, each having a daily session of one hour, the first class starting at 11.30 a. m. and the last class closing at 4.30 p. m. No time is deducted from the employes while attending class.

The February 26 issue of *Industry*, the weekly bulletin of the Associated Industries of Massachusetts, contains a practical article entitled "Selling Safety in the Factory," by H. T. Martin, manager of the health and safety department of the Fisk Rubber Co., Chicopee Falls. Mr. Martin draws an interesting parallel between accident prevention work in the factory and a selling campaign to market the factory product, and shows that to succeed the former must be conducted on practically the same principles as the latter.

The tire department of the Converse Rubber Shoe Co., Malden, has begun the production of heavy duty cord tubes equipped with Whistler automatic safety tire valve gages.

The Boston Woven Hose & Rubber Co., Cambridge, was the lowest bidder on 2½-inch double jacket hose for the Boston fire department. The price quoted was 71¼ cents per foot, 10 days, and a contract for 3,000 feet was awarded.

After a two-weeks' shutdown the footwear factory of the Converse Rubber Shoe Co., Malden, will resume operations on a five-days-a-week basis, beginning April 4. This indicates a gain in activity, since a four-day week has been in effect since early in February.

Motion pictures of all processes in the making of rubber footwear have been taken recently at the factory of the Converse Rubber Shoe Co. The films show in careful detail every step in the making of various kinds of rubbers, from milling the rubber to packing the finished product, and will be used for educational and publicity purposes.

Converse Hall, a large three-story double house on Clifton street, Malden, purchased and remodeled at an expense of $25,000, now provides home comforts for thirty-five girl employes of the Converse Rubber Shoe Co. The lower floor is devoted to comfortable living and dining rooms and kitchen, the upper floors to bed-chambers and bathrooms. A laundry in the basement enables the girls to do their own washing. Board and room costs only $7 a week, a figure below that of any commercial boarding house.

The Athol Manufacturing Co., Athol, Massachusetts, has increased its capital stock from 1,000,000 shares preferred to 1,500,000, and 10,000 shares common to 20,000 shares, no par value.

BOSTON NOTES

A. L. Morton has resigned as director of the Boston office of the National Aniline & Chemical Co. and will enter the dyestuff business in Boston on his own account. Mr. Norton has been connected with the National company since the time of its reorganization.

Farley & MacNeill, Boston agents for the Cleveland-Standard fabric and Tiger-Foot cord tires, have leased a five-story building at 62-64 Stanhope street for the manufacture of electric storage batteries and kindred equipment. The Mac-Lite Storage Battery Co. is the firm name under which the new business is being conducted, its product being known as the Maclite "High Test" battery.

The New England Blacking Co., 24 Binford street, has been reorganized with Ralph L. Pope as president, D. P. Palmer as treasurer, while George Wachtler, who has been with the concern over twenty years, will continue as production manager. Mr. Pope was for several years vice-president of the Northeastern and Northwestern Leather Companies. The firm manufactures high-grade blackings, dressings, stains, cements, waxes, polishes and other specialties for shoe manufacturers and tanners. It proposes to develop and increase its business in rubber cement for the shoe manufacturing trade, and will establish a service department to aid the manufacturer in solving his problems.

Donald T. Hood, of the Hood Rubber Co., Watertown, is a director of the newly organized Boston National Bank, with a capital of $200,000 and a surplus of $50,000, which will open in Hanover street, Boston, on February 1. The bank has been formed by a group of representative Boston business men and Italian-American bankers, so that citizens of foreign birth or descent in Boston and vicinity may have banking facilities on the soundest basis that the banking system of the country provides.

The staff of the Boston office of the Swinehart Tire & Rubber Co. was banqueted recently at the home of the manager, J. C. Stoner, celebrating the close of the most successful year since the opening of the branch. The greatest sales increase has been in cord and cushion truck tires.

The annual meeting of the Franklin Rubber Co., 134 Federal street, Boston, Massachusetts, was held February 2, 1921. The following officers were reelected: Asa C. Merrill, president; Everett L. Fuller, treasurer; Lorin L. Fuller, assistant treasurer. Following the custom of the past few years, it was again voted that the employes of the company be given a bonus on their earnings of 1920, payable April 1, 1921. The Franklin Rubber Co. manufactures rain-proof and rubber goods and has its factory at Malden, Massachusetts.

F. Abbott Goodhue, vice-president of the First National Bank of Boston, has been chosen president of the International Acceptance Bank, Inc., of New York, which has been organized to finance American trade abroad. Daniel G. Wing, president of the First National Bank of Boston is also a director of the new organization. It will have a fully subscribed capital of $10,000,000 common stock, 250,000 shares of special stock, having no par value, and a subscribed surplus of $5,000,000. The bank will function mainly by granting short-term acceptance credits to aid American firms in developing foreign trade.

At the recent annual meeting of the Boston Belting Co. the following officers and directors were elected for the ensuing year: William E. Hardy, president; Fred H. Rice, treasurer; Lee M. Friedman, clerk; Harry H. Whitesel, George H. Corey, David W. Gray, Percival H. Peckham. The president reported that the factory had run full time for the year 1920 and had sufficient orders to insure continuation of operation. The treasurer's report showed current assets slightly more than four times current liabilities after allowing for an inventory write-off at cost or market, whichever was lower. The inventory approximates 16 per cent of the gross sales for the year, which totaled $1,411,000. Since the reorganization of the company in October, 1919, and after deducting for preferred dividends paid, reserves for taxes and dividends payable April 1, 1921, there remains $11.50 per share for the common stock issue.

Wallace O. Durell has been appointed representative of the Quaker City Rubber Co., Philadelphia, Pennsylvania, in the Boston territory. Mr. Durell's wide acquaintance among automobile men in this section should result in many Quaker tires appearing on New England cars this spring.

VICE-PRESIDENT, THE B. F. GOODRICH CO.

Charles Beebe Raymond, vice-president of The B. F. Goodrich Co., Akron, Ohio, was born in Akron, February 12, 1866, and has always lived there.

His education was received in the Akron High School and Amherst College, Amherst, Massachusetts, from which he graduated in 1888. In 1918 Amherst College conferred on him the degree of M.A.

Charles B. Raymond

He began his business career in September, 1888, as secretary of the Akron Woolen & Felt Co., Akron, Ohio. In 1891 he accepted a position with the Goodrich Hard Rubber Co., Akron, Ohio, and has ever since been identified with the rubber industry. When this company became a part of The American Hard Rubber Co., in 1898, he was made manager and director of the Akron plant. This position he held until 1905 when he resigned to become assistant secretary of The B. F. Goodrich Co.; in 1907 he was advanced to secretary, in 1916 to second vice-president and in 1919 to vice-president.

Mr. Raymond is a director of the First-Second National Bank, Akron, Ohio; trustee of Kenyon College, Gambier, Ohio; was president of the Akron Chamber of Commerce, 1910-1912, and has been president of the Board of Trustees, Akron City Hospital, since 1910.

THE RUBBER TRADE IN OHIO

By Our Regular Correspondent

AKRON NOTES

While the month just passed has been devoid of spectacular features of any kind in Akron rubber circles, it has been characterized by rumors that the waiting period is practically at an end and improvement in production is about to be realized. In the face of indefinite postponement of the meeting to complete its financial reorganization, the Goodyear company has speeded up to 60,000 tires a week. This is a little less than 30 per cent of the production of last July, which was beyond question the best month in the company's history.

The manner in which tire manufacturers have curtailed production during the past few months is shown by figures published in Akron and known to be authoritative.

In December of last year 350,071 tires were sold to manufacturers for new equipment and 977,082 to dealers for replacement. In addition to this, 39,278 tires were exported, making a total for the month of 1,366,431. During the same period only 506,111 tires were manufactured, showing that sales exceeded 860,320 tires. During November 649,742 tires were manufactured, and although figures for sales are not given, it is stated that they ran about in the same proportion as during the previous month.

Authoritative reports gave the number of tires in the hands of the manufacturers at the beginning of the year as 4,648,060. The first indication that the factory surplus was about used up came when it became known that The Miller Rubber Co. was rushing tires from distant branches to meet urgent orders at the factory. Other companies have not issued the same reports, but if the dealers persist in living from hand to mouth it is certain that the manufacturers will not put high-priced materials into manufactured goods and wait until the consumer gets ready to make his purchases.

If the first few weeks in April indicate that the dealer is ready to place orders for stock, the companies will speed up production accordingly. If, however, the hand to mouth policy continues, two months will see a clamoring for goods, in the opinion of rubber manufacturers.

The Firestone Tire & Rubber Co. reports that the monthly business of the company will probably run very close to $6,000,000. This spurt is taking place with labor costs decreased both by a 30 per cent increase in labor efficiency and a 20 per cent reduction in wages, so that the business will be very profitable. The factory is working two eight-hour shifts and will step up production with definite assurance on the part of the trade that buying has started. The company has notified dealers of a decrease in the price of tires, the percentage not being announced. The increase in the Firestone business followed the increased production at the Ford automobile plant in Detroit, Michigan, with which the Firestone plant is closely connected.

The Miller Rubber Co., in spite of the passing of the preferred dividend, has added a few men in the tire department following the reemployment of 500 men two months ago for the sundry and heel department. With $2,000,000 on deposit and only $10,000,000 preferred stock outstanding, the company believed it wise to conserve liquid capital resources by deferring payment of the preferred dividends. Few of the stockholders in Akron took exception to the action, because the statement was clean cut throughout, and they know the conservative policy of the company. The fact that an inventory shrinkage of $3,409,037 was written off makes it clear that the same policy of thoroughness ruled in this action.

The company now has current assets of $14,000,000, and aggregate current liabilities of $8,676,000.

The net loss for 1920, following the write-off, is given by William Pfeiffer as $617,878. The net profits before inventory write-off were $2,791,158.94, all earned during the first six months of the year. The sales during the past year jumped $4,000,000 not quite as large an increase as previous years have shown. from approximately $27,000,000 for the previous year. This is During 1920 the company retired the old first and second preferred and issued $10,000,000 of the new 8 per cent preferred stock.

The Portage Rubber Co. has doubled its production to 600 tires a day, to take care of orders received from unexpected quarters in the East. The company has enough orders on the books to keep going for several months.

Walter W. Evans has been made manager in charge of mechanical goods development for The B. F. Goodrich Co., with headquarters in Akron.

The largest single shipment of tires this year is said to have been made by The B. F. Goodrich Co. to the Ford Motor Co. The shipment contained 30,000 tires.

W. N. Fitch, former Goodrich safety man, heads the Chamber of Commerce committee, which will establish a safety club. The campaign for members will be unique in that membership certificates will be sent prospective members in the first letter. permitting the prospects either to sign or destroy their membership cards.

E. C. Shaw, formerly vice-president of The B. F. Goodrich Co., and for the past few years a leader in health work in Akron and Summit County, has been made a member and later elected chairman of the Ohio Board of Administration, which will have control of all penal and corrective institutions under a reorganized plan of state government.

More than $20,000,000 worth of public work ready to be resumed or undertaken with the coming of warm weather, together with the men put on in the Akron rubber plants, will clear the streets of unemployed men and women. Every effort is being made, however, by city and rubber company officials to prevent an influx of men into Akron. Chances for single men to obtain work in Akron will be very limited in the future. It will be the policy of the manufacturers to assist in building a stable city by the exclusive employment of married men as far as possible.

The Amazon Rubber Co., Akron, announces that production has been increased by at least 60 per cent, and that within the near future the plant will be back on its normal production basis.

The McAdoo-Akron Co., Akron, manufacturer of rubber gloves and sundries, was recently placed in receivership under Walter Akers, an Akron insurance and business man.

Scott D. Kenfield, Akron attorney and former city solicitor, has been named receiver for the Supreme Cord Tire & Rubber Co. The receivership was asked following the alleged absconding of a company official with one thousand dollars, according to court records.

Robert S. Wilson, formerly manager of the truck tire department of The Goodyear Tire & Rubber Co., Akron, has been named manager of the Chicago division of the sales department following the death of Herbert Ziegler, who was for many years in charge of the office. George E. Bruner, manager of the service department, has been named successor to Mr. Wilson. E. J. Samuels, manager of the organization division, has been appointed to take charge of inside sales at New York.

George C. Winchel, M. E., consulting and designing engineer, 600 Second National building, Akron, Ohio, graduated from Carnegie Tech, of Pittsburgh, Pennsylvania. He has been associated with The B. F. Goodrich Rubber Co. and The Goodyear Tire & Rubber Co. as designer, plant engineer and research engineer for a total of twelve years. His last industrial connection was as mechanical engineer with the Woodard Machine Co., Wooster, Ohio, manufacturer of rubber plant machinery and equipment. Mr. Winchel does not intend to specialize in any particular work, but will handle all branches of rubber plant design pertaining to buildings and equipment.

The State Savings & Trust Co., Akron, and the Merchants National Bank, Massillon, Ohio, receivers for The Biltwell Tire & Rubber Co., Barberton, Ohio, report considerable loss on account of the shrinkage in inventory and general expense of maintaining the company under the receivership. The company is considered in bad shape financially.

At the annual meeting held February 14, 1921, of The Mohawk Rubber Co., Akron, the following officers were reelected: R. M. Pillmore, president; S. S. Miller, vice-president and factory manager; C. W. McLaughlin, vice-president and treasurer; M. E. Mason, vice-president and sales manager; P. H. Goodall, secretary; W. J. Cope and R. E. Bloch, assistant treasurers. The directors were as follows: R. M. Pillmore, J. K. Williams, M. E. Mason, C. W. McLaughlin, S. S. Miller, H. L. Rose, George A. Parker and Francis Seiberling.

Recently The Akron Industrial Salvage Co., Akron, changed its charter from the type of a cooperative company, capitalized at $25,000, each stockholder being allowed one vote only, and each stockholder being allowed to hold not in excess of ten shares, to a capital of $500,000 without the above restrictions. The reason for the large increase is that the company contemplates the pur-

chase or building of a permanent home. Its operations are now being carried on in rented property. In November last the company paid a 10 per cent cash and 100 per cent stock dividend.

The recently elected officials of The Oldfield Tire Co., Akron, are: Barney Oldfield, president; J. M. Dine, vice-president and general manager; B. M. Robinson, secretary; H. L. Allsopp, treasurer, and M. E. Moffett, assistant treasurer.

The new factory of the Kelly-Springfield Tire Co., at Cumberland, Maryland, will probably be ready for operation on April 1. The company does not expect to discontinue manufacturing at Akron, Ohio, in the near future.

Gove & Co., Inc., crude rubber broker of 25 Beaver street, New York, has opened an office in the Central Savings and Trust Building, Akron, Ohio. H. S. Vorhis, well known in the rubber trade through his connection with association work, will be in charge representing the firm in the western territory.

AKRON'S FOREIGN TRADE PROSPECTS

Reports from all of the Akron rubber companies which do export business indicate that the economic conditions in most foreign countries are improving, so far as the rubber industry is concerned and the belief generally held among export managers is that foreign trade has seen its worst days and within the next few months will gradually come back to a more normal basis.

Orders received by cable from the various branch offices of the Akron companies indicate that January and February show a marked improvement over December. The improvement in exchange has materially increased business in Australia and will open the field in England, France and Belgium as soon as purely local economic conditions have been worked out.

The business in Argentina has not been as seriously affected by the economic conditions, which have been very bad in that country during the past few months, as was anticipated.

The orders received from Cuba during the past two months amount to at least half the original normal figure, in spite of the moratorium which is still in effect. The fact that the Cuban business is done on a strictly cash basis has made it very desirable.

Orders are being received in large numbers from Japan. These are looked upon as the first indication that the effects of the break in the silk market of last year are rapidly being effaced and a good business in that quarter of the Orient is anticipated.

The greatest surprise in the export business during the present year is an order for more than 100,000 automobile tires from Mexico, with full guarantees for payment. The change in administration, together with this large order, is making Akron manufacturers study this field with closer scrutiny.

In Germany the rubber companies have just started to make tires of the better grade, and the indications are that they will prove to be real competitors of the American manufacturers. At present their output is small, because of the limited number who are in a position to purchase tires, but it is believed the production will be increased as the demands of the country expand, and this will come with their ability to pay.

The American exporter in Germany, however, has to his advantage better sales methods and delivery systems if he establishes warehouses, it is believed, and, therefore, the Akron manufacturers are not forgetting the number of tires that country purchased in the past.

The shifting of export managers, the trips made and planned abroad, and the establishment of a branch of the foreign trade department of the government in the Chamber of Commerce, all indicate that foreign trade will be a larger factor in Akron business in the future than it has been in the past.

The Miller Rubber Co. has sent a letter to all salaried employes announcing decreases in salaries. The amount of the decreases is not specified, although it is understood that they will range from 10 to 25 per cent.

The B. F. Goodrich Co. is the only one of the four large companies which has not made similar announcements. Goodyear and Firestone salaries were decreased some time ago. Goodyear decreases ranged from 10 to 20 per cent and Firestone's a flat 10 per cent.

Alfredo Serretos, formerly Minister of War of Mexico, is now in the foreign trade department of The Miller Rubber Co. He has recently returned from Mexico, where he made a complete survey of the possibilities of trade expansion.

CLEVELAND NOTES

The Southwark Foundry & Machine Co., Philadelphia, Pennsylvania, has opened a district office at 804 Swetland building, Cleveland, where their direct representative, Stewart Bolling, a sales engineer, who has been with the company for seven years, will handle all rubber manufacturing machinery in the Cleveland territory. H. D. Andress will represent the firm on forged steel tire molds.

L. B. Timmerman will take charge of the Cleveland office of The Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin. He will also act in the capacity of assistant to A. G. Pierce, manager of the central district.

MISCELLANEOUS OHIO NOTES

Harvey J. Woodard has resigned as vice-president in charge of sales of The Republic Rubber Corporation of Youngstown, Ohio, and as president of The Canton-Blackstone Co., of Canton, Ohio, an affiliated subsidiary. He became associated with these companies in 1917, after serving the Diamond Rubber Co. for twelve years, from 1903 to 1912 acting as district sales manager in New York. Later he was sales manager for the Knight Tire & Rubber Co., Canton, Ohio.. Mr. Woodard's withdrawal from his present activities in the rubber industry will be regretted by all who have been associated with him.

The Master Tire & Rubber Co., Dayton, Ohio, announces the reelection of the following officers: W. B. Ruston, president and general manager; G. H. Witsaman, vice-president and factory manager; H. G. Egbert, treasurer, and J. T. Nielson, secretary. The new board of directors consists of the officers and George Kramer, George Marshall, Jr., and Edward Luthman.

During the months of November and December the company is said to have closed $1,250,000 worth of business. After being shut down for six weeks, operations were resumed on January 3, 1921, and shifts were increased to two a day on February 1. The factory at present is approximately thirty days behind on deliveries. The company has closed large contracts in Cuba, India, Mexico and in South America.

The Columbia Tire & Rubber Co. has removed its general offices from Columbiana to Mansfield, Ohio, to occupy the new office building adjacent to the new plant. The new plant will be known as Plant No. 1, while the Columbiana, Ohio, plant will be Plant No. 2. All general business of the company will be transacted through the Mansfield offices, though both plants will be in operation as business warrants operations on a 100 per cent basis. The new plant is expected to begin operations April 15.

The Victor Rubber Co., Springfield, Ohio, announces the election of H. S. Berlin as president and general manager. Mr. Berlin was formerly in an executive capacity with the Firestone Tire & Rubber Co., Akron, and has been connected with the rubber tire industry for several years. H. H. Durr, as secretary and treasurer; Frank R. Talbott, factory manager; C. A. Swinehart, sales manager; J. J. Anzalone, comptroller, and P. C. Leffel, purchasing agent, will assist Mr. Berlin in the management of the company.

For 21 years the Victor Rubber Co. has produced rubber carriage tires and sundry products, and during the last seven

years has manufactured high quality automobile tires, of black tread cord and fabric in non-skid, ribbed and plain tread designs. Because of increased trade demand for Victor tires, it is said that full factory capacity will be reached as soon as practicable.

The American Zinc Oxide Co., Windsor avenue, Columbus, Ohio, a subsidiary of the American Zinc, Lead & Smelting Co., is marketing its products through the American Zinc Sales Co., distributer, which has been incorporated in Maine and licensed to do business in every state where offices are maintained. It is owned and controlled by the American Zinc, Lead & Smelting Co. and managed by the same officers. L. E. Wemple is manager in Columbus.

B. H. Loveless, 80 South Third street, Columbus, Ohio, has been appointed receiver for The Rotary Tire & Rubber Co., Zanesville, Ohio, in compliance with the application of the stockholders. It is stated that, in the opinion of the attorneys, claims can be successfully defended to the end that there will be $3 in assets to each $1 liability of the company. The receiver has been appointed chiefly to protect the estate against claimants whose positions are not legally tenable. Negotiations are now pending looking to the operation of the plant in the very near future.

The Portage Country Club, the gathering place of rubber and Akron business men, the scene of many gatherings which have made history in the rubber industry, was recently badly damaged by fire, the loss being placed at approximately $125,000. It has not been decided whether to build an entirely new building or repair the one that was damaged. A large unfinished apartment house across the street from the club grounds will probably be used as the temporary home of the club.

The Mason Tire & Rubber Co., Kent, Ohio, at a recent stockholders' meeting reelected the following directors: O. M. Mason, R. W. MacKinnon, William A. Cluff, W. R. Green, D. M. Mason, John H. Diehl and E. G. Tillotson.

Sales of this company showed about a 10 per cent increase in February, 1921, over those of February, 1920. The entire plant is said to have gone on a twenty-four-hour basis beginning March 14, in an effort to take care of the accumulating orders. The textile division, producing cord fabric, has been operating twenty-four hours a day for some time. Tire sales during recent weeks are showing very marked improvement. It is believed that consumer demand between April 1 and July 1 will be one-third greater than in any previous period.

The Cincinnati office of The Cutler-Hammer Manufacturing Co., Milwaukee, will become a part of the central district, with R. I. Maujer as branch manager.

Fred Rufenacht, New Philadelphia, Ohio, has contracted for the purchase of the entire properties of The Bucyrus Rubber Co. After extensive repairs and additions to machinery and equipment, Mr. Rufenacht will operate the plant under the name of the Rufenacht Rubber Co. It is expected the plant will be in operation at a very early date. A fabric tire in the 3½-inch size will be made at first, and later a cord tire in all the popular sizes.

At a recent stockholders' meeting of The Allsteel Ridewell Tire & Rubber Co., Dayton, Ohio, specializing in the manufacture of "Artyr" sectional metal steam bags and collapsible endless metal steam bags, the following were elected directors: A. Huetter, Henry Knapp, Joseph Jakob, S. Habodasz, Joseph Novak, N. Mikesell and R. O. Shank. The officers reelected were: A. Huetter, president and general manager, and H. Knapp, secretary-treasurer.

At a meeting of the stockholders of The Eclat Rubber Co., Cuyahoga Falls, Ohio, in February, the old board of directors were reelected. They are: W. H. Stillwell, C. C. Crumrine, C. E. Reiss, J. A. Seabold, E. F. Ast, W. A. Heffelman, S. W. Sweet and W. E. Weldon. The officials elected were: W. H. Stillwell, president; J. A. Seabold, vice-president; C. C. Crumrine, treasurer, and E. F. Ast, secretary.

The McKone Tire & Rubber Co., Canton, Ohio, has purchased the plant and equipment of The Forster Tire & Rubber Co., Millersburg, Ohio. Pending the time operations are commenced, it is having its tires made by The Tuscan Tire & Rubber Co., Carrollton, Ohio.

EXCLUSIVE RUBBER GLOVE MANUFACTURER

The Wilson Rubber Co., Canton, Ohio, was incorporated under the laws of Ohio, July 18, 1916, by Fred Wilson, John S. Willis and Wendell Herbruck, with a capital of $40,000, that has been successively increased to $75,000, $150,000 and on January 22, 1921, to $500,000. The company manufactures rubber gloves for electricians, surgeons and household purposes, and it is said to be the largest exclusive rubber glove manufacturer in the country.

The company leased the plant formerly occupied by the Canton Manufacturing Co., Canton, Ohio, when commencing business, and in 1918 built a new factory on Garfield avenue, where an

THE WILSON RUBBER CO., CANTON, OHIO

addition 50 by 100 feet, three stories high, is now being constructed with foundation strong enough to permit the addition of two more stories if business justifies. The present addition will cost $75,000, and a like amount will be required for equipment.

It is reported that since the company began operations in 1917 there has not been a time when they were caught up on orders and that it has been necessary to turn down all new business during the past year. The new addition shown on the left of the picture is expected to take care of this increased business.

The following officers were reelected for this year: John S. Willis, president; F. J. Wilson, vice-president and general manager; and Wendell Herbruck, secretary and treasurer.

THE RUBBER TRADE IN THE MID-WEST

By Our Regular Correspondent

The Mid-West Rubber Manufacturers' Association has adopted a resolution calling the attention of the public to the detrimental effect on the rubber industry that would result from any substantial curtailment of carbon black production.

George J. Kirkgasser & Co., 1734 First National Bank Building, Chicago, is handling the advertising for The Cutler-Hammer Manufacturing Co., the Pawling & Harnischfeger Co., Wetmore Reamer Co., and Frank D. Chase, Inc., industrial engineers. Although specializing in work for industrial concerns, the agency is not limiting itself entirely to technical fields. Services include organization work, development of cooperation between selling and advertising departments, advertising, merchandising and publicity.

Mr. Kirkgasser was in the advertising department of Force Food Co. for a year and a half; and with The Cutler-Hammer Manufacturing Co. from 1910 to 1914 as assistant advertising manager, then assuming the duties of advertising manager. He

previously did electrical engineering and inspection work in the East. With him are associated F. C. Smith, previously connected with the McGraw-Hill Publishing Co. and the Manufacturers Publicity Bureau, and Miss A. A. Buchholtz, formerly office manager of the advertising department of The Cutler-Hammer Manufacturing Co.

The Ardmore-Akron Tire & Rubber Co., Ardmore, Oklahoma, has opened a factory branch at Springfield, Missouri, to care for the southern Missouri trade. Shipments will be made to Springfield in carload lots and distributed from there to dealers. Barney Sittel is branch manager in charge.

G. S. Crane, formerly manager of the Cleveland office of The Cutler-Hammer Manufacturing Co., will become manager of controller sales at the main office in Milwaukee, Wisconsin.

The clutch department of The Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin, has been moved from the main works to a recently acquired plant in West Allis, about seven miles away. The new plant increases the total floor space by 100,000 square feet.

The Miller Tire & Rubber Co., Akron, Ohio, has opened direct factory tire branches at 1405 Fourteenth street, N. W., Washington, D. C., and 1329 Union avenue, Kansas City, Missouri.

The Black Hawk Tire & Rubber Co., Des Moines, Iowa, had an attendance of about 200 stockholders at the second annual stockholders' meeting on February 15. The following officers and board of directors were reelected: William Moran, president; E. J. O'Malley, treasurer; E. A. Lewis, secretary; A. J. McColl, John C. Kirby, Fred German and John L. Nedderson. It is the present plan of this company to put out a new line of cord tires to be known as the "Black Hawk Chief." Tube production has increased 100 per cent, and in the near future tire output will be doubled, it is expected.

The Reed Motor Supply Co., St. Paul, Minnesota, has been appointed distributer of Syra-Cord tires, manufactured by the Syracuse Rubber Co., Inc., Syracuse, New York. The officers of the Reed company are: Henry H. Orme, president, and Edgar A. Reed, secretary-treasurer and general manager.

The National Auto Supply Co., Chicago, Illinois, of which W. C. Erkert is president, announces that it has been appointed the exclusive sales rights in the Chicago territory for Syra-Cord tires, a product of the Syracuse Rubber Co., Syracuse, New York.

Earl L. Woods has been elected a director and vice-president of the Horse-Shoe Rubber Co., of Missouri, 1705 Grand avenue, Kansas City, Missouri, and will direct the Kansas City branch. Before going with the Horse-Shoe Rubber Co. he was a director of Wallis Tractor Sales for the J. I. Case Plow Works Co., Racine, Wisconsin, and sales manager for the Samson Tractor Co., of California.

The India Tire & Rubber Co., Akron, Ohio, announces that F. W. Abbott, of Minneapolis, has been selected to look after its interests in that district. The sales of the company are rapidly picking up and during last month exceeded those of any other month in the history of the company with the exception of one.

The first annual meeting of the Barva Heel & Tire Factory, Inc., Fort Wayne, Indiana, was held recently at which the following directors were elected: B. R. Barva, F. T. Wichman, J. B. Franke, Allen J. Vesey and M. A. Mason. Officers elected were B. R. Barva, president; J. B. Franke, vice-president; and F. T. Wichman, secretary and treasurer.

The Armstrong Rubber Co., Garfield, New Jersey, has opened a factory branch at 1414 South Michigan Boulevard, Chicago, under the management of F. A. Winship, who was formerly sales manager at the New York office, 2 West 61st street. A model tire store is being fitted up in Chicago with everything needed to make it up to date in every respect.

A NATIONAL ASSOCIATION OF TIRE DEALERS

The National Tire Dealers' Association was organized February 2 at a formative meeting held at the Morrison Hotel, Chicago, Illinois. Cleveland, Ohio, was selected as the national headquarters and officers were elected as follows: President, Thomas F. Whitehead, Chicago, Illinois; vice-president, R. F. Valentine, Cleveland, Ohio; secretary, Phillip O. Deitsch, Cleveland, Ohio; treasurer, H. O. Stenzel, Milwaukee, Wisconsin. The directors, in addition to Messrs. Whitehead, Deitsch and Stenzel, are Edward P. Farley, Minneapolis, Minnesota, and A. B. Clark, Kansas City, Missouri, for one year; Joseph Roberts, St. Louis, Missouri, R. J. Walters, Baltimore, Maryland, and R. R. Woolley, Cincinnati, Ohio, for two years.

The purpose of the association, according to the constitution, is to advance and safeguard the business interests of tire dealers and to promote a cooperative relationship between the manufacturer, tire dealer and buying public. That an effort will be made to place the retail tire trade on a higher ethical plane is evidenced by two resolutions adopted at the organization meeting. The first defines the legitimate tire dealer, one of the principal qualifications being policies not dictated by any manufacturers. The second aims to stop fraudulent rebuilding of worn-out tires by recommending that members cut in two all junk tires before disposing of them to any one. Membership in the association is composed of such local associations of ten or more members as are recognized by the national association.

The key-note of the entire organization session was the willingness evidenced by the dealers to enlist the absolute cooperation of the manufacturer, and executives of the large rubber companies who attended the closing banquet declared that the new association would be an important factor in the advancement and future governing policies of the tire industry.

MUCH ZINC OXIDE IN SIGHT

The recent blowing in of the first unit of the new zinc oxide plant of the American Zinc, Lead & Smelting Co., which has been under construction during the past year at Columbus, Ohio, marks another milestone in the company's development.

This company started business in 1899 as a small zinc ore producer, with mines in Joplin, Missouri, and has progressively developed, until today its properties consist of three large zinc smelters, one lead smelter, extensive ore mines in Tennessee, Wisconsin and Joplin, Missouri, and other assets totaling over $18,000,000. The development of the mining properties in Tennessee showing a large tonnage of lead-free zinc ore, led to the

American Zinc, Lead & Smelting Co.'s Columbus Plant

decision five years ago to embark in the zinc oxide business, and they erected the first plant adjacent to their large spelter and acid plant at Hillsboro, Illinois.

Columbus, Ohio, was selected as the location for the new zinc oxide plant because of the central location of the mines, the abundant railroad facilities and nearness to the central consuming markets. The latest improvements in metallurgical construction and equipment for handling materials are embodied in this plant, and thoroughly experienced men are in charge of operations.

The plant consists of a 75 by 240-foot reinforced concrete and steel furnace building, accommodating 24 furnaces. Close by is

the mix-room, where fuels and flux are combined with the ore preparatory for smelting. The zinc oxide is drawn from the furnaces through large cooling chambers and flues, and blown into innumerable long cloth bags. The very light zinc oxide is retained by the bags, while gases and air are permitted to escape. The zinc oxide is mechanically collected from the baghouse, reprocessed and refined into a uniform product of over 99 per cent purity.

Comprising the additional equipment are a concrete and steel trestle 500 feet long, having a storage capacity for over 25,000 tons of ore and fuel unloaded from railroad cars by gravity; several miles of industrial track for conveying raw materials; machine repair shop; operating supplies storehouse; plant for crushing ores and fuels; cooper shop for making shipping barrels; storage warehouse for packed oxide; a 300,000-pound capacity track scale for weighing incoming and outgoing materials and a change house for white and colored labor.

The 50 by 75-foot reinforced concrete and brick building at the Windsor avenue entrance, houses on the first floor the administrative and accounting offices, and on the second the chemical, research paint and research rubber laboratories, each completely equipped for the small-scale manufacture of various finished products containing zinc oxide, and the determining of the most satisfactory methods of using zinc oxide for the customer's benefit.

THE NEW SECRETARY OF THE MID-WEST RUBBER ASSOCIATION

James P. Matthews, who assumed the duties of secretary and general manager of the Mid-West Rubber Manufacturers' Association on March 1, brings to that office a remarkably varied practical experience in the rubber industry and other lines of work which will be valuable in his new activities.

James P. Matthews

Born in 1872 at Onondaga, Michigan, he graduated from the high school of Cedar Rapids, Iowa, attended the normal college at Valparaiso, Indiana, and later took an extension course at Chicago University, acquiring a good knowledge of Spanish, French, Bohemian and Malay.

His business career was begun in the engineers' department of the Chicago, Rock Island and Pacific Railway. Then came six years as a teacher in the public schools of Iowa, Michigan and North Dakota, followed by ten years in the office of the Cedar Rapids Pump Co. For three years he was assistant manager and then advertising writer of the Des Moines, Iowa, branch of the Crane Co. This latter work led him into the newspaper field in 1911, when he became private secretary to United States Senator R. M. Johnston, editor of the *Houston Daily Post*, going two years later to the *Milwaukee Daily News* as an editorial writer.

In 1916 Mr. Matthews became identified with the rubber industry, joining the forces of The Mason Tire & Rubber Co., Kent, Ohio, as purchasing agent. Since that time he has acted in various capacities for this company, and in 1920 he was made representative of the Mason company at Singapore, Straits Settlements. His investigation of the crude rubber position included the rubber districts of Sumatra, Ceylon, Java, Malaya and the Straits Settlements.

Mr. Matthews is a Republican, a member of the National Union Assurance Society, Musicians' Union, and the American Malaya Association, while his fraternal orders include the Odd Fellows, Knights of Pythias, Elks and Tribe of Ben Hur.

THIRTY-FIVE YEARS IN THE RUBBER TRADE

Richard H. Geier, secretary of W. H. Salisbury & Co., Inc., Chicago, Illinois, manufacturers and distributors of mechanical rubber goods, etc., was born in Hamburg, Germany, March 28, 1870. In 1871 he came to Chicago, with his parents, and was educated in the public schools and a business college of that city.

Richard H. Geier

In 1886 he entered the employ of W. H. Salisbury & Co., Inc., as an errand boy, and was successively advanced from the shipping room to bill clerk, order clerk, assistant buyer, buyer, manager of the mechanical rubber goods department, and for the past seven years has filled the position of secretary. He is also a director of the company.

Mr. Geier's home is in Oak Park, Illinois, and he is a member of the Hardware Club of Chicago, the Chicago Motor Club, and for several years has been on the ways and means committee of the Chicago Association of Commerce.

THE RUBBER TRADE ON THE PACIFIC COAST

By Our Regular Correspondent

SAN FRANCISCO

A decidedly improved tone to business is noted by dealers in automobile tires in both the central and southern sections of California. Many car owners who had put off getting renewals until Spring are now entering the market, and as a result stocks are being noticeably lessened. Dealers talk in a much more cheerful tone than a month ago, and they look for a real revival soon.

With R. L. Brown as president and general manager, the California Rubber Co. has been incorporated in San Francisco to manufacture a high-grade cord tire, inner tubes, hose, tubing, and mechanical rubber goods. John R. Jones, an attorney, is secretary, and Henry P. Adams, for many years associated with the San Francisco Chamber of Commerce, is treasurer and assistant to the president. Offices are in the Oceanic Building, and a factory, it is reported, will be either built or bought in the very near future.

The San Francisco Tire Co., a subsidiary of the Keystone Tire & Rubber Co., has been put in the care of I. Brenner, administrator of the Keystone stores in New York city, and the concern has moved into larger quarters on Van Ness avenue near Eddy street.

The Pacific Rubber Co., distributer of Horseshoe tires, has, in addition to its branches at Los Angeles and Oakland, established one at Fresno to serve trade in central California.

R. L. Block has been appointed branch manager of The Spreckels "Savage" Tire Co., San Diego, at San Francisco, succeeding A. E. Kelley, promoted.

C. W. Dennison has been appointed Pacific Coast manager of The Mason Tire & Rubber Co., Kent, Ohio, with headquarters in San Francisco.

The Pioneer Rubber Mills, San Francisco, announces that it has awarded a contract to Cahill & Vensano Co., 110 Sutter street, for a new one-story plant at Pittsburg, California. The new

unit involves an investment of approximately $250,000. It is to be used for the production of continuous length molded garden hose, and will have an annual capacity of approximately 15,000,000 feet.

Milton M. Katz has been appointed office manager of the San Francisco warehouse of The Federal Rubber Co. of Illinois, Cudahy, Wisconsin.

J. F. Damon, formerly with The B. F. Goodrich Co., Minneapolis, is now special factory representative of the Samson Tire & Rubber Corporation, Los Angeles, with San Francisco headquarters.

LOS ANGELES

J. Elden Shaw, former sales manager of the Savage Tire Sales Co., of Des Moines, has returned to the Pacific Coast, where he is now district manager of the Standard Four Tire Co.'s coast business, with headquarters in Los Angeles. He had been with the Spreckels "Savage" concern six years. F. R. Eyer will be general sales manager for the Standard Four coast branch.

G. C. Williams, branch manager, has opened the Stephens Tire Store at 1224 South Grand avenue, Los Angeles, for the distribution of the products of the A. J. Stevens Rubber Co., Kansas City, Missouri, makers of tires, tubes, blow-out patches, etc.

The Samson Tire & Rubber Corporation, Compton, California, the main office of which is at 333 West Pico street, Los Angeles, of late has been running full capacity and overtime. The annual report shows assets five times in excess of liabilities, and that its crude rubber is being carried at 1921 prices. Last year Samson tire dealers increased 715 per cent and sales 315 per cent. The company is "running strong" on its cord tire in various sizes. In the middle of February the State of California officially adopted the Samson cord and fabric tires, also the red tubes, for its fleet of vehicles.

The West American Rubber Co., 400 North Avenue A, Los Angeles, which has been making several improvements recently in its plant, has been specializing lately on rubber supplies for oil drillers and various novelties for the motion picture and general theatrical business. The concern also does much vulcanizing of giant truck tires and extra large work for repairmen.

A. C. Lester, former manager of the Los Angeles branch of The Spreckels "Savage" Tire Co., San Diego, has been made Pacific Coast district manager. He is succeeded by Paul R. Stockton.

The Mason Tire & Rubber Co., Kent, Ohio, has opened a direct factory branch at 1232 South Grand avenue, Los Angeles, with J. M. McCoy in charge.

SOUTHWESTERN NOTES

A. E. Kelley, formerly San Francisco branch manager of The Spreckels "Savage" Tire company, has been made manager of the company's export department at San Diego.

J. C. Collins has been advanced from the accounting department of the Spreckels company to the post of branch manager at Dallas, Texas.

The Ardmore-Akron Tire & Rubber Co. was incorporated February 17, 1917, under the laws of the State of Oklahoma, with authorized capital stock of $1,000,000 divided into 10,000 shares of the par value of $100 each, fully paid and non-assessable, of which $500,000 is 7 per cent cumulative preferred stock and $500,000 common stock. The incorporators were John C. Harmony and Charles A. BeSaw, both of Canton, Ohio, and Elmer S. Wood, Fort Smith, Arkansas. The plant is located at Ardmore, Oklahoma. The building was begun in 1917, with a floor space of 27,000 square feet and a capacity of 500 tires and tubes per day. One unit of the plant has been in operation for some time and the second unit will be operating shortly. Orders on hand will necessitate the manufacture of from 250 to 300 tires a day within the next sixty days.

The officers of the company are: Fox Wood, president and general manager; Elmer S. Wood, vice-president; Roy G. Wood, secretary; Arthur C. Wood, treasurer and J. E. Harris, sales manager. Mr. Harris brought to the company a complete sales organization and it is said the entire output of the plant for 1921 has already been sold.

NORTHWESTERN NOTES

The Hood Rubber Co., Watertown, Massachusetts, has made Seattle its Northwest distributing point, having bought the business of the West Coast Rubber Co., 214 South Second avenue. This concern has distributed Hood products for the past eight years. H. L. Hansen, manager of the old concern, will be manager of the new factory branch.

P. W. Hall, formerly with the Mid-Continental Tire Co., is now district manager of the Samson Tire & Rubber Corporation, Los Angeles, with headquarters at Seattle, Washington.

George G. Vogt, head of the Rubber Service Co., 1023 Pike street, Seattle, has taken the local agency for Kelly-Springfield tires.

The B. F. Goodrich Rubber Co. has removed its Portland, Oregon, branch from the old headquarters at Broadway and Burnside street to its new $45,000 building at Twelfth and Glisan streets. Wholesale business only will be handled. Carl B. Cadwell is Goodrich Portland manager, his territory including all of Oregon and the Columbia river counties of Washington.

The Mason Tire & Rubber Co., Kent, Ohio, has opened a branch establishment at 82 North Broadway, Portland, Oregon, with Catlin L. Wolfard in charge.

CANADIAN NOTES

The Dunlop Tire & Rubber Co. Limited, Toronto, Ontario, announces the appointment of S. C. Mitchell, for many years sales representative in the Saskatoon territory, as divisional manager for the company with headquarters at Regina, Saskatchewan.

The K. & S. Tire & Rubber Goods, Limited, Toronto, Ontario, has recently completed its tire and tube factory and is now manufacturing about 200 tires and 300 tubes daily. The company anticipates doubling the output within a few months, as there are sufficient orders on hand to warrant working 24 hours a day until the end of the tire season. The druggists' rubber sundries department is working on a 24-hour-day basis.

The Kaufman Rubber Co. Limited, Kitchener, Ontario, has secured the Great West Rubber & Footwear, Limited, recently organized in Lethbridge to carry on a wholesale footwear business, as its representative for "Life-Buoy" rubbers in the territory adjacent to Lethbridge, Alberta.

F. B. McIlroy, president and general manager of The McIlroy Belting & Hose Co., Hammond, Indiana, a short time ago organized The McIlroy Belting Works of Canada, Limited, having headquarters at Kingsville, Ontario, with a capital of $50,000. Mr. McIlroy who is the sole owner of the stock, is also the president, treasurer and general manager of the company, the vice-president, and secretary will be elected at the first meeting of the stockholders to be held shortly. The products manufactured by the Canadian company will be the same as those of the Hammond, Indiana, company, namely, "Rubber-ite" solid woven and stitched canvas belting, and fire hose. It is the intention of the Canadian company to sell to the Australian and South African trade, also to large jobbing houses in Canada.

The Nanyo Gomu Takusho Kaisha, a Japanese company engaged in the cultivation of rubber in Johore, Malay Peninsula, and capitalized at 2,000,000 yen (1 yen equals normally $0.4985 in United States currency), has declared an 8 per cent per annum dividend and a net profit for the past term of 21,388 yen. This season's crop showed an increase of 17,600 pounds over that of the previous term.

THE RUBBER TRADE IN RHODE ISLAND

By Our Regular Correspondent

The month of March witnessed a partial resumption of activities by the manufacturers of rubber goods of every description in Rhode Island, although many of them only operated their plants to about one-half their normal capacity.

After a shut-down of nearly three months, the National India Rubber Co., at Bristol, resumed operations in all of the various departments of the concern on Monday, March 7. During the weeks that the plant had been idle some repairing and renovation were done and several important changes in the personnel of the department heads were decided upon. These were particularly noticeable in connection with the foremen, inspectors and other executives of the different rooms and these men all assumed their new positions when the factory resumed.

The reopening of the National Rubber Co.'s plant was welcomed by the more than 4,000 operatives and their families, particularly those who had been out of work since the factory first began to curtail the latter part of last December. Fortunately for some of the employes, there had been a little work that kept a few in during January, and some in February, but those who had been out of employment since December had found it to be a great hardship. The hope of steady employment was short-lived, however, for about the middle of the month came rumors of another curtailment.

In some instances girls have asked whether it would be possible to get a leave of absence this Summer in order to do work outside of the factory. In all such cases the management has said it would be glad to grant leave of absence to any person in good standing provided that the exact length of leave be specified and it will be understood that any persons taking such leave may return to the factory after the leave has expired and resume their present status with the company.

On daylight saving, the factory will follow the decision of the Bristol Town Council, which has voted to start daylight saving on Sunday, March 27, at which time all clocks should be moved forward one hour.

The wire division of the National rubber plant did not shut down when the shoe departments were closed, but has been operating for several weeks past on a short time schedule. It is expected, however, that within a few weeks there will be sufficient improvement in conditions to call for a full-time schedule.

The announcement was made March 23 that neither the Alice Mill at Woonsocket, nor the Millville plant at Millville, the footwear division of the Woonsocket Rubber Co., would reopen for six or eight weeks longer. The Alice Mill has been idle since February 19 and that at Millville since December 10. Some 2500 operatives are affected. It had been indicated previously that the plants might reopen early in April but the announcement of March 23 stated that orders have not been received in sufficient volume to warrant starting up the mills at a reasonable capacity for an extended period, but that it is now expected that within six or eight weeks enough business will be on hand for resuming operations. The official announcement also provided further curtailment of the working force effective April 1. This affects some 75 or 80 persons, including clerks, mechanics, watchmen, etc., who have been retained while the mills have been closed.

All the rights and patents of Charles A. Gonzenbach, late of Warren, Rhode Island, deceased, relating to machines for distending and turning tubular fabrics, were sold at public auction in the District Court room at Warren, by order of the administrator. The purchase was made by the Swiss Textile Co., of Assonet, Massachusetts, formerly of Warren. Mr. Gonzenbach was one of the organizers of the Swiss Textile Co., and he invented practically all of the machines which were used in the business which he was connected with up to the time of his death.

Superintendent Kennedy, of the Tubular Woven Fabric Co.'s plant at South Woodlawn, states that business at the present time is somewhat slow and that such orders as are being received are being filled in part from an accumulated stock. He was very optimistic, however, and said that he looked for an early return of normal business conditions and an increase from the present curtailed force of approximately 200 workmen to a complete equipment and full time schedule.

BROADENING SAFETY WORK IN RUBBER FACTORIES

That the field for safety work may be considerably broadened so as to benefit the rubber industry, as well as most other industries, was the point stressed by A. A. Frank, factory manager of the Federal Rubber Co., Cudahy, Wisconsin, at the Ninth Annual Safety Congress in Milwaukee, Wisconsin.

Good industrial relations, he declared, are fundamental to safety in industry. A plant with a good morale is generally one with a low accident record. In safety he would include not only all precautions against injury to an operative while at work, but also clean surroundings, fair wages, efficient work, proper home protection, recreation, and personal interests. He insisted that efficiency is more essential to safety than safety to efficiency, as most executives believe.

Nothing helps so much in successfully carrying through an accident prevention campaign as agreeable industrial relations, said Mr. Frank, and nothing helps so much to promote such relations as imbuing employes with implicit confidence in the employing concern. He welcomed the new experiments in industrial democracy, shop committees, etc., being tried out by leading rubber and other manufacturers. Instead of allowing foremen to lay out their departments, locate machinery, and plan the movement of material, such work is done more efficiently by a department or a competent individual, who considers not merely the utmost advantage of the plant but the maximum safety of the operatives as well. Standardizing trucks and training men to handle trucks only, have reduced accidents notably in one large plant. In his own plant he remarked that accidents were fewer among piece workers than day workers, the former often consciously or otherwise acquiring a habit of operating in the simplest and yet the least hazardous way. A study of such operations, he believed, was worth the attention of industrial engineers.

Not only is labor turnover one of the most costly items in industry, said Mr. Frank, but experience has shown that accident losses always rise as turnover increases. Here is where an efficient employment man can help in safety and in promoting better industrial relations. He emphasized the importance of foremen being tactful as well as energetic in managing the production department employing 75 per cent of the men, so that not merely would work be expedited but all the safety rules be easily carried out. All departments should and could cooperate, he said, so as to easily insure the maximum of health, safety, and efficiency among workers.

GUMMED SEALING TAPES THAT ADVERTISE

Gummed sealing tape is well known in the packing room for quickly sealing cartons, bags and paper wrapped packages, to the manufacturer of textiles as a successful "slasher" tape, holding every thread in place, and in the storeroom for patching broken packages. Aside from these, Liberty tape has a service to perform for the tire manufacturer. A ¾-inch-wide tape on which the tire manufacturer's name is printed is used around the circumference of the tire after it has been paper wrapped. The roll of gummed tape is attached to a standard on the wrapping device, and as the operation of paper wrapping is done, the tape is unrolled over a rubber moistening roller and stuck onto the wrapper. A 3-inch-wide tape on which can be printed the name, address and trade-mark of a manufacturer, is used principally on corrugated and fiber shipping cases, and in the tire industry for sealing up cases of inner tubes.—**Liberty Paper Co., Inc., 52** Vanderbilt avenue, New York.

Activities of The Rubber Association of America

MEETINGS

The Executive Committee of the Rubber Sundries Division, met at the Union League Club, New York, on the evening of Tuesday, March 8. A Rubber Band Committee, a Membership Committee, a Merchandise Committee and a Packing and Shipping Committee, were appointed to give special attention to the subjects indicated by their titles. It is hoped that through the medium of these committees a livelier interest on the part of all members in the affairs of the divisions will be promoted. A decision was also reached to institute in the Rubber Sundries Division a plan for the compilation of statistics concerning the monthly inventory, production, sales, shipments, etc.; or some other method suitable to the need of the Division. Preliminary action has been taken to put the plan into operation.

The Specification Committee of the Mechanical Rubber Goods Manufacturers' Division met March 12 in the Association offices with a sub-committee of the Committee on Specifications and Tests for Material of the American Railroad Association, when detailed consideration was given to the matter of standard specifications for rubber goods used by railroads. A regular meeting of the Specification Committee was held on the following day, when routine matters were given attention. A very lengthy docket was presented which completed many of the subjects the committee has been working on during the past year.

The Executive Committee of the Mechanical Rubber Goods Manufacturers' Division met March 15 and a very interesting meeting was had. Matters of general interest to mechanical rubber goods manufacturers were discussed. The schedule of meetings was changed to the fourth Tuesday in each month instead of on the third, as heretofore.

The Executive Committee of the Tire Manufacturers' Division met in the Association office, March 16. Cooperation with the National Tire Dealers' Association, the support by tire manufacturers of "good roads" projects, and several other important matters were discussed.

Meetings of the Rubber Clothing Division and the Rubber Proofers' Division of the Association were held at the Copley-Plaza Hotel, Boston, Massachusetts, March 30.

A meeting of the Executive Committee of the Foreign Trade Division was held in the Association offices, Tuesday, March 29.

ASSOCIATION PUBLISHES BULLETIN

The first issue of *The Rubber Industry*, a printed bulletin which will be distributed semi-monthly by the Association will be sent to all members within a few days. The use of the printed bulletin will eliminate to an extent the necessity for distributing multigraphed letters as has been the case heretofore, although the intention is to continue the use of bulletins whenever necessary.

QUESTIONNAIRE NO. 104

The statistics obtained as a result of the Association's Questionnaire No. 104 covering the second six months of 1920, will be compiled and distributed to all rubber manufacturers, members of the Association, at an early date. It is felt that a perusal of the figures contained therein with the figures covering the business during the first six months of 1920, will afford a clear outline of the change in conditions during that year.

PROTECTION AGAINST PRICE DECLINE

The attention of tire and footwear manufacturers is called to the formal announcement by the Federal Trade Commission that it will take no definite stand for or against the practice of guaranteeing to the distributor or dealer protection against loss on goods unsold in the event of a decline in prices.

In view of the large number of complaints received by the Commission against the practice, and in view of the inquiry instituted by the Commission, resulting in expressions from more than 350 manufacturing and selling concerns including trade associations whose represented membership must be more than double the number of individual statements, the results shown may be taken, the Commission believes, to be representative of the difference in business opinion on the subject.

The Commission, therefore, has decided to consider each case of complaint of this character upon the facts shown in the specific case, applying the legal tests thereto, and its attitude will be developed by its disposition of the large number of complaints now pending on the docket.

SURVEY OF INDUSTRIAL WASTE

The Federated American Engineering Societies under the presidency of Herbert Hoover has arranged for the organization of a preliminary survey of the weaknesses of the industrial productive system and its efficiency with relation to maximum production.

A committee of sixteen members, including Mr. Hoover, were appointed to the Committee on Elimination of Waste in Industry, and the industries selected for study are: textile, automobile, garment, rubber, metal trades, railroading, bituminous coal mining, printing, paper, shoes and building construction.

A member of the committee has been placed in charge of each of the surveys covering the industries above mentioned. C. E. Knoeppel, New York, member of the Society of Mechanical Engineers, and the Society of Industrial Engineers, has been charged with the responsibility of covering the rubber field.

An unbiased analysis of some of the representative plants is contemplated. All information secured will be treated in strict confidence. The industries and plants will be designated by letters and numbers so that any information secured cannot be traced to individual plants.

REPORT OF THE TAX COMMITTEE

The National Industrial Conference Board's Tax Committee, of which The Rubber Association is a member, made its final report in January to the Executive Committee of the Conference Board which ordered the report printed for publicity and discussion at the third tax conference held by the Board in New York, January 21 and 22 of this year.

Two features of the Federal taxation system stand out with particular prominence as requiring immediate consideration, (1) the repeal of the excess profits tax law, (2) the reduction of surtaxes on individual incomes. Nothing convincing can be said in favor of either.

Many organizations and individuals are supporting a general sales tax in one form or another and The Rubber Association should aid in supporting a sales tax since experience has proved that it is the easiest of interpretation for business, simple in administration for the Government, a businesslike system since it provides revenue for the Government monthly out of current business, fair to the public as it can be passed on in its entirety and without inflation and even if it cannot be passed on in the price to be obtained for the article, in this respect it is no more harmful than the present law providing for the taxation of corporate income.

In conclusion the committee recommends: (1) the repeal of the excess profits tax law; (2) the reduction of surtaxes on individual incomes; (3) the elimination of all unnecessary expense in the operation of the Government; (4) the adoption of a more adequate tariff measure; (5) the retention of the income tax on corporate income at a rate not to exceed 10 per cent; and (6) the adoption of a general form of sales tax, at least with reference to all manufactured goods finished in a state for final use or consumption.

ANNUAL MEETING, CHAMBER OF COMMERCE OF THE UNITED STATES

F. A. Seiberling will represent the Association as national councillor, and J. A. Lambert as alternate, at the Ninth Annual Meeting of the Chamber of Commerce of the United States, to be held at Atlantic City, New Jersey, April 27-29. The other delegates are A. L. Viles and one to be appointed later.

TIRE BUNDLING SPECIFICATIONS REVISED

The Traffic Committee recently appeared before the Consolidated Freight Classification Committee requesting revision of the specifications for wrapping tires in order to include additional types of paper. As a result of this hearing, the following revised wrapping specifications have been adopted and will appear in supplement No. 1 to Consolidated Classification No. 2, effective on or about May 1, 1921. Pending the effective date, shipments wrapped in accordance with these specifications will be accepted by the carriers in official classification territory.

VEHICLE PARTS: TIRES, N. O. I. B. N.

Section 1. Single tires must be completely protected by machine one-third overlap wrapping in (a) waterproof paper having a resistance of not less than 60 pounds per square inch, Mullen test, or (b) crinkled waterproof paper having a resistance before crinkling of not less than 60 pounds per square inch. Mullen test.

Section 2. Bales or bundles of two or more tires, other than individually wrapped tires, must have wrapping overlap not less than one-third its width and bales and bundles must be protected (a) by completely wrapping in burlap, or (b) by overlap wrapping in waterproof paper having a resistance of not less than 100 pounds to the square inch, Mullen test, or (c) by overlap wrapping in crinkled waterproof paper having a resistance before crinkling of not less than 100 pounds per square inch, Mullen test, or (d) by overlap wrapping in two thicknesses of waterproof paper fastened together with a waterproof composition and reinforced with yarn or wire not more than one inch apart, the combined material having a resistance of not less than 60 pounds per square inch, Mullen test, or (e) by machine overlap wrapping with waterproof paper and cloth the combined material having a resistance of not less than 60 pounds per square inch, Mullen test, or (f) by machine overlap wrapping with waterproof paper having a resistance of not less than 60 pounds to the square inch, Mullen test, or (g) by machine overlap wrapping with crinkled waterproof paper having a resistance before crinkling of not less than 60 pounds per square inch, Mullen test.

Section 3. All bales or bundles must be securely tied in not less than three places with rope not less than ¼-inch in diameter, or three metal bands not less than U. S. Standard Gage No. 29, ½-inch in width, securely fastened and properly spaced.

RUBBER EXECUTIVES PREDICT EARLY BUSINESS RECOVERY

That the rubber industry is unquestionably on the up-grade once more, and that nothing short of a commercial cataclysm can check its steadily forward course, is the consensus of opinion of leading executives of five of the largest rubber manufacturing companies in Akron. The industrial captains interviewed are not of the class given to self-deception, and by reason of their large interests, keen business sense, extensive experience, and ample and intimate acquaintance with trade conditions, unusual interest attaches to their views.

It is pointed out that, aside from the stimulus to the tire trade expected from the gradual improvement in the industries and commerce of the country, a condition that cannot fail to redound soon and considerably to the advantage of tire manufacturers is that during the past six months tire consumption has outrun tire production. The bottom, it is claimed, was touched last December, when but 506,111 tires were manufactured. In the same month 350,071 tires were sold to manufacturers for original equipment, 977,082 to dealers for replacements, and 39,278 were exported. Comparing this total of 1,366,431 with the month's production of 506,111, there is a shortage of 860,320 tires. It is unthinkable, say the leaders in the industry, that a reaction from such a condition should not soon ensue, especially when the passenger cars and motor trucks of the country number at least 8,500,000, needing about 30,000,000 tires a year, or 2,500,000 a month. Prospective buyers' spares must soon give out, original equipment demands are growing, and stabilized prices will encourage early purchases.

W. A. Johnson, manager of pneumatic tire sales for The B. F. Goodrich Rubber Co., estimates that by May 1, production is bound to increase, and development from then on will be steady, but not phenomenal. The Goodrich company, which has been affected less by the business lull than probably any other company he says, sees better times in the early future for the rubber industry in general.

William F. Pfeiffer, secretary and treasurer of The Miller Rubber Co., says that his company is experiencing increased business in all its lines, some of them having almost returned to normal, and in a few cases even making a better showing than for the corresponding period in 1920. He regards the halting, conservative buying by dealers at this time as a favorable sign and as tending ultimately to help sound trade.

Harvey S. Firestone, president of the Firestone Tire & Rubber Co., says that while he does not look for a quick rebound from the recent depression, there will be, and there is now in progress, a real, though gradual improvement in nearly all lines. As indicating what tire makers may expect, he states that nearly all automobile makers report increasing business, one concern showing gains over the low point in December of from 50 to 250 per cent weekly.

William F. O'Neill, vice-president and general manager of The General Tire & Rubber Co., also figures on a marked change for the better by about May 1, and that soon after that date most of the Akron concerns will be making tires at a normal rate. Inasmuch as the price of rubber, he says, is not likely to go above 40 cents a pound for a long time to come it will make possible the production of hundreds of articles from rubber which hitherto have been made of other materials, and a wide field of endeavor opened up that will mean much to rubber mill-owners and operatives, and supplement the tire business which is daily improving.

W. C. Behotegny, manager of automobile tire sales for The Goodyear Tire & Rubber Co., says that no one in the trade expects an early repetition of the business experienced during the "peak" period a year ago, and that it may even be a few years before that condition repeats itself, but changes for the better are positively in progress. He estimates that by the middle of spring, dealers' business will be about 75 per cent normal and manufacfacturers' about 50 per cent. Owing to the extensive use of motor cars during the mild winter, tires have been largely consumed and for this reason alone, apart from generally improving business conditions, a noticeable change for the better in tire manufacturing can be predicted for the early spring, and there is even a possibility of an actual tire shortage.

RUBBER DEPRESSED IN BURMA

Labor is the main difficulty of the present depression in the tin and rubber markets of Burma. The tin miners are largely Chinese, but the rubber tappers are Tamils from India. If the depression is prolonged these laborers will have to be sent home as they cannot find employment in other industries. This will demoralize trained organizations, making it difficult to resume. There seems to have been overproduction for current needs in both tin and rubber, and prices are about half of what they were during the war. It is reported that the Government has asked banks not to accept rubber or tin shares as security even for small loans.

The unprecedented increase in the price of rice in Ceylon has given rise to considerable discontent on the part of the laboring classes. By the end of 1919 the price had more than doubled, while there had been no perceptible increase in wages between 1914 and the end of 1919. The rubber estates have been adversely affected as they found it necessary to furnish rice to the laborers at a reduced cost—the only alternative to a general increase in wages. The rubber estates are said to have been well able to stand the increased cost of production, as net profits for 1919 ranged from 20 to 50 per cent.

The Rubber Trade in Great Britain

By Our Regular Correspondent

Trade matters continue in much the same humdrum condition. One or two firms have passed their dividends, and speculation is naturally rife as to what other shareholders will perforce have to suffer. The wage question has not yet become acute, but it rather looks as if the rubber trade will have to fall in line with other industries in a temporary reduction, even if the hands do not take the initiative, as has been done in other cases. According to Lord Inchcape, the banking and shipping magnate, the boom of a year ago was killed because nobody, either the Government, the manufacturer or the working man, appeared to bother about costs. A maximum wage, he added, was never too much to pay for a maximum output, but a maximum wage, coupled with a minimum output, irrespective of individual capacity, intelligence or industry, would inevitably lead to ruin. This utterance might well be pondered over by labor leaders.

A FEW FAVORABLE TENDENCIES

Manufacturers have hailed with satisfaction the announcement that the excess profits duty is shortly to come to an end, especially those firms which were founded after 1915 or have been largely developed since then. Another favorable point is the fall in price of coal. Owing to the stagnation of trade, there has been a large accumulation of the qualities used for steam raising. Cost control came to an end on March 31, and the trend of future prices is at present shrouded in obscurity. A good many of the chemicals used in the trade are now easier in price, foreign imports making themselves felt. Zinc oxide is billed as one of the key industries in the bill now before Parliament, and it will be interesting to see how much, if any, protection is to be given to the home production which is now of some magnitude. German ultramarine is now obtainable as of yore at a price much lower than that of the British article, and, moreover, almost entirely devoid of the free sulphur which proofers find so objectionable.

CAOUTCHOUCINE

This product of destructive distillation has never had more than scientific interest since the long past days—about 1860, I think—when Greville Williams fractionated various bodies from the oils yielded by the distillation of rubber. I did something myself a good many years ago, and prepared various distillation products as exhibits for one of our large exhibitions. I have read that oil of caoutchouc was suggested from a German source as an excellent rust preventive, but have no idea as to the extent it was used, if indeed it was used at all. The substance, however, has now come into notice again, as it has been proposed as a denaturant for alcohol to be used for power purposes. The Empire Motor Fuels Committee, which acts as a sort of link between the Department of Scientific and Industrial Research and the various manufacturers of motor cars, petrol and benzol companies, etc., has the matter in hand and arrangements have been made at the Royal College of Technology in London for a series of researches and tests on caoutchoucine and other suggested denaturants, such as bone oil. Qualitative and quantitative chemical tests are to be worked out, and a provisional specification for quality and testing is to be drawn up. If adopted as a denaturant, caoutchoucine will hardly be able to solve the surplus rubber problem, but still any new use has an interest at the present time.

ARTIFICIAL LEATHER

The high price and scarcity of leather have naturally given a fillip to the manufacture of the various leather substitutes. The position, however, has recently undergone a change owing to the fall in the price of leather. There is now no shortage of leather, the large holdings of the Government being gradually put upon the market. Leather boots are now very much down in price, although most of the better class shops are still holding out for prices which are really much too high. As far as my inquiries go the rubber firms specializing in rubber heels and composition soles are still working full time, forming an exception to the rubber trade generally.

An industry not, perhaps, very well known, but one in which orders not infrequently run to £10,000, is that of best leathers of boxcalf. During the period of leather scarcity and high price, large quantities of artificial leather of certain well-known brands were used, but now that the price has broken the tendency is to get back to real leather, and manufacturers regard dolefully the unused stocks of the substitutes in their warehouses. Leather substitutes not being raw material have shown no appreciable fall in price, though, no doubt, as certain of their ingredients get cheaper they will be able to follow the lead of leather to some extent. Meanwhile the low price of rubber has promoted the production of certain forms of decorative and upholstery material into which rubber enters to some extent, and these compounds are now in a better position to compete with the leather substitutes which consist solely of oxidized or nitrated oils.

INDIA RUBBER MANUFACTURERS' ASSOCIATION

At the annual meeting held at the end of January, Stuart A. Russell, of the India Rubber, Gutta Percha & Telegraph Works Co., Limited, was reelected chairman, and E. Healey, of W. & A. Bates, Limited, reelected vice-chairman. In addition to the better known names on the new general committee are D. C. Campbell, Campbell, Achnach & Co., Limited; Colonel Gardiner, the Rubber Co. of Scotland, Limited, and E. Hemsworth, the Ioco Rubber & Waterproof Co., Limited. Describing himself as not a pessimist, the chairman said he believed that if all concerned worked together in the way of reducing prices trade would revive, but he thought that for some time to come it would be found very difficult to get a market for their products at prices which would yield a reasonable profit, or indeed any profit at all unless the labor cost per unit of production was reduced and the burden of taxation lightened. The question of reducing the cost of production by improved methods of manufacture and greater production for a given wage would need the very careful attention of all the members in the present year, but he saw no reason why these problems should not be solved in a way which would enable their factories to be kept fully employed and the amount of unemployment be reduced to a low figure.

The question of giving support to the proposed rubber club came before the general committee, it is understood, a month or two ago, with the result that no expression of opinion for or against was given, it being held that the matter was one for each member to decide for himself. Another matter that has been discussed is the proposed new factory legislation with regard to the cold cure and use of lead compounds. Representations in the matter have been addressed to the Secretary of State by the association as a body and not by individual manufacturers. Such representations will doubtless have more weight than individual ones, but would it not have been better for the government authority to have put the matter before the Association as representative of the trade before proceeding to draw up its somewhat obscure regulations?

THE DUNLOP MEETING

Despite the fact that the meeting passed off fairly harmoniously, the value of the old shares fell some, afterwards to 10*s.* and the new, 22*s.* 6*d.* paid, to 2*s.* Sir Guy Granet, late general manager of the Midland Railway Co., and Sir A. W. Fait, the chartered accountant, have joined the board, while Sir H. McGowan and Sir Henry Dalziel, the old directors, will remain, with F. A. Szarvasy

as chairman. There appears to be a bank overdraft of over £4,000,000, and it is apparently intended to issue either 5 or 6,000,000 of debentures at what was rather euphemistically termed "a moderate rate of interest." As regards the American company, it will be necessary to provide further working capital to the amount probably of $14,000,000, out of which the existing bonds will be reduced, and the necessary additional working capital provided. It is incorrect to assume, as many have done, that the troubles of the Dunlop company are entirely due to the American enterprise, as assistance is also required to finance the British company's forward rubber and cotton commitments. There are now altogether twelve subsidiary companies, including the rubber plantations and cotton mills, the total capitalization exceeding £5,000,000. The cotton mills in Lancashire have only quite recently been finished and the recent sale of the Nile & Ross spinning mills by the Amalgamated Cotton Co., Limited, was due to the fact that they were no longer required.

With respect to the profits of the current year, the chairman assumed that sales will be reduced by about 45 per cent, as compared with last year, and that a simultaneous fall in selling prices will also occur. This somber forecast may, of course, be altered if the Government turns a willing ear to the appeal of the company to make applicable the duty of 33⅓ per cent on American tires imported in the United Kingdom. The value of tires from all sources imported in 1920 was £5,500,000, against £2,500,000 in 1919. It cannot be said that the meeting did much to rehabilitate the shares in public favor, the ordinary at the time of writing being quoted at 10*s.* and the new, issued at 30*s.* and 22*s.* 6*d.* paid, being 1*s.*

NEW USES FOR RUBBER

The result of the prize competition conducted by the Rubber Growers' Association is still awaited. Meanwhile only the further development of rubber roadway is heard of in London, which cannot be said to be at all novel. A recent patent application is for rubber-studded concrete to be used on railway platforms, staircases, etc., to prevent slipping. It is claimed that the additional cost of this type of pavement will be repaid by the increased life of the concrete.

FINANCIAL NOTES

The Greengate & Irwell Rubber Co., Limited, has declared a final dividend of 5 per cent on the ordinary shares, making 7½ per cent for 1920. £10,000 is put to reserve, and £17,681 carried forward. It will be recalled that this company is a recent amalgamation of I. Frankenburg & Sons, Limited, and the Irwell & Eastern Rubber Co., Limited, which have always had a close financial connection. The flotation was a very successful one in respect to applications from the public.

Vickers, Limited, shares have fallen to 11*s.* compared with almost 40*s.* reached at one time last year, and it is generally believed that in order to tide over the present period of depression a further issue of debentures will be necessary in the near future. The change over from government work to purely industrial work has unfortunately coincided with a period of labor disputes, contracted trade and the inability of foreign customers to pay their debts. It will be recalled that among the subsidiary companies controlled by Vickers are the Ioco Proofing & Rubber Co., Limited, and W. T. Glover & Co., Limited, cable maker, while the company is also closely connected with the American bakelite patents which are being exploited at another of the subsidiaries.

With regard to the bankruptcy proceedings in the case of British Rubber Manufacturers, Limited, the Committee of Inspection has accepted an offer by S. van den Bergh, one of the directors, to purchase the company's interest in the assets for a sum sufficient to pay all the expenses of the liquidation, and a dividend of 2*s.* 6*d.* on the pound sterling to the unsecured creditors. The liabilities are £82,062, against assets estimated at £45,160.

EUROPEAN RUBBER NOTES

FRANCE

The Société Chimique du Caoutchouc has recently been formed at Paris, with head office at 9 rue d'Aguesseau, Paris, and warehouse and factories at 1 and 3 rue Henri-Murger at La Plaine-Saint-Denis, Seine. The company, which is capitalized at 1,700,000 francs, will manufacture and sell regenerated rubber, special chemical products, "Activit," an organic accelerator, and cloth for waterproofing and rubberizing, and will also prepare fabrics for clothing. The first administrators are Jacques Schwab, René Hermann and Gustave Bernstein, all of Paris.

Le Caoutchouc et la Gutta-Percha announces that Dr. W. C. Geer, of The B. F. Goodrich Co., Akron, Ohio, and Professor G. Stafford Whitby of the chemistry department of McGill University, Montreal, Canada, are among their new collaborators.

The Société Manufactures Françaises Réunies de Cuirs, Peausseries, Courroies et Caoutchouc has been formed at Paris. This new concern is the result of the fusion of two companies, Société Ulysse Roux et Cie., and Manufacture des Caoutchoucs de la Drôme. These two concerns have tanneries, belting factories, and a rubber factory at Romans (Drôme). The capital of this firm has been fixed at 10,000,000 francs.

GERMANY

On March 16 of this year, the commercial agreement made between Germany and Sweden on May 2, 1911, will come to an end, in accordance with a notice given to Germany by Sweden. Like many another country, Sweden is going through an economical crisis and the Government is anxious to curb imports from foreign countries by means of a new tariff.

It seems that Sweden has no intention of according to Germany most favored nation treatment in the new tariff. The low rate of the mark permits Germany to place goods on foreign markets at a lower price than that demanded by local manufacturers, and Swedish business men accuse Germany of dumping. The opinion in Germany seems to be that Sweden is more in need of the German market than Germany is of the Swedish market.

What is considered of more importance here is the clause in the Versailles peace treaty by which Alsace-Lorraine, now a part of France, will send certain quantities of goods, free of duty, into Germany, for a period of five years. The quantities are to be based on the average annual amounts of goods delivered to Germany by Alsace-Lorraine from 1911 to 1913. For the period January 11, 1921, to January 10, 1922, the quantities of rubber goods and rubber waste which must enter duty free, total 353,000 kilos (kilo = 2.2 pounds).

It is claimed in Germany that Alsace-Lorraine never sold such quantities of goods, raw, partly manufactured and manufactured, as are mentioned in the list given out by the French Government.

NEW FIRMS

Firma Georg Kaletsch, Obermenzing-München, representation and sale of rubber goods.

Westdeutsche Regenmantelfabriken Kattenburg & Co., Bocholt. Manufacture and sale of raincoats.

Kongo Gummi-Gesellschaft Chormann & Tornquist m. b. H., Hamburg. Sale of "Kongo" rubber soles and heels put on the market by Westdeutsche Gummi-Compagnie H. Chorman, Dusseldorf, all business connected therewith and sale of allied goods.

Erste Ostpreussische Koutschuk-und Metallstempelfabrik E. Erlatis, Königsberg, Prussia. Manufacture of rubber and metal stamps.

Gummi-Handelsgesellschaft "Liga" Baetzner & Co., Stuttgart.

Antonie Rustbacher, Vienna. Sale of rubber goods.

Katherina Breuer, Vienna. Dealer in rubber goods.

Oskar Bauer, Vienna. Dealer in rubber goods.

Herman Klose, Leipzig-Gohlis. Representation of rubber goods firms.

FOREIGN TARIFFS

CHILE

A new law of February 23, 1921, raises Chilean import duties 100 per cent on children's toy balls and toys of rubber. On balls the duty has been increased from 0.12-peso per kilo to .25-peso per kilo, while on rubber toys (item 1764) the increase is from 2.50 pesos to 5 pesos per kilo.

It is proposed that among other articles tires should be exempt from the increase in customs tariff rates for Chile.

POLAND

Ex Tariff No. 89, rubber driving belts, rubber hose, with or without fabric, with or without spring inside, without metal covering on the outside; rubber for packings and technical articles of rubber, not combined with fabric. A Polish order of November, 1920, provides that customs duties on the above articles may be paid in paper currency with an "agio" of 200 per cent, at the rate of three paper marks for each gold mark prescribed by the Customs Tariff.—*Board of Trade Journal.*

FINLAND

Licenses for rubber goods imported by Finland are no longer required, with the following exceptions.

Tariff No. 317

Tissues and other textile materials covered with rubber or stuck together with rubber solution or lining of rubber; also elastic textile goods, all kinds containing rubber threads—all these, of textile materials of pure or mixed silk.

Tariff No. 335

Braces, belts and garters, suspenders for clothing, sleeve holders and other similar articles, of pure or mixed silk materials.

Tariff No. 708

Wheels with rubber tires for vehicles except automobiles for carrying goods, automobiles and tired wheels therefor.

LUXEMBURG

A Grand Ducal decree of December 8, 1920, withdraws the restrictions, imposed in August, 1916, on the exportation of india rubber and india rubber wares from Luxemburg.

The Rubber Trade in the Far East

By Our Own Correspondent

MALAYA

Preliminary figures covering the trade of Malaya during 1920 indicate that the value of rubber exports amounted to approximately $145,000,000, United States currency. Below is an interesting table giving the production of rubber, the average price per pound and the value—in pounds sterling—from 1906. The figures for 1920 are estimated:

	Tons	Average Price per lb.	Total value £
1906	430	5/–	240,800
1907	885	4/6	446,040
1908	1,629	4/–	729,892
1909	3,340	7/–	2,618,560
1910	6,504	6/–	4,370,688
1911	11,500	4/–	5,172,000
1912	21,305	4/–	9,548,901
1913	35,352	3/–	11,872,224
1914	50,404	2/3	12,701,808
1915	70,214	2/6	19,180,215
1916	99,063	2/6	25,938,360
1917	130,000	2/–	28,991,182
1918	135,000	1/3	18,900,000
1919	176,000	2/–	39,324,000
*1920	180,000	1/6	30,240,000

*Estimated.

The highest price for rubber quoted at Singapore in 1920 was 114½ cents on February 5. The best price on December 22 was 30 cents.

It is agreed, says *The Straits Budget,* that the all-in cost of producing rubber here is about 1*s.* 2*d.* per pound. If the average cost of bringing an acre to maturity is taken as £80 (£1 equals $4.866 normally), and 15 per cent is accepted as a fair rate of interest on the capital, and 350 pounds is taken as an average yield per acre, a paying price will be 1*s.* 2*d.* plus 8*d.*; equal to 1*s.* 10*d.*, or 78½ cents, in Straits currency. Standard smoked sheet sold in Singapore recently at 28½ cents (Straits) per pound, which is 50 cents below a true paying price, and 21½ cents below actual cost of production.

These figures explain the gravity of the situation here. Rigid economy is the order of the day, but companies that have spent thousands in recruiting labor do not wish to discharge their coolies, for when the industry takes a favorable turn, difficulties in obtaining labor are anticipated. In spite of this, large numbers of coolies are being discharged and not a little fear is expressed at the probable results of letting loose numbers of coolies who are unable to maintain themselves. The question of European unemployed is also vexatious; however, it is understood that the Government will employ as many as possible, while outside efforts will be made to aid the others.

IMPORTANT MEETING AT KUALA LUMPUR

An important meeting of about 75 representatives of every planting interest of Malaya, was held at Kuala Lumpur, December 29. Certain proposals, which had previously been drawn up by a special committee, formed at the suggestion of the acting chief secretary of the Federated Malay States Government, were unanimously adopted. The main points in the scheme are:

Legislation to enforce restriction of collection or prohibition of exports from January 1, 1921, to June 30, 1921, by 50 per cent, no exemptions to be made in favor of small holdings.

Financial assistance for mature areas to be granted conditionally on cessation of all production for six months from the date on which the loan is granted. This aid not to exceed $3 per acre per month. No dividends to be declared until loans are repaid.

Government to start relief work for discharged estate labor.

General temporary reduction of wages is recommended.

No further areas of land to be alienated for rubber until statistics are available from which a reliable forecast of the future of the rubber industry can be formed.

Statistics carefully compiled in Singapore show that the world's stocks at the end of December, 1920, totaled 310,000 tons, of which 120,000 tons in America; 50,000 tons in London; 40,000 tons afloat (less than normal, owing to restricted output); 80,000 tons in the East (Singapore, 25,000 tons; Colombo, 5,000 tons; Netherlands Indies, 15,000 tons; estates, 35,000 tons); and about 20,000 tons in Europe, Japan, Canada, Australia, South America and Africa. Stocks at the end of 1919, when business was active, were estimated at 240,000 tons. Under present conditions of trade the normal stock for the world might be put at 175,000 tons. On this assumption the world stocks at the end of 1920 are 135,000 tons greater than they should be.

Considering that Malaya, with an estimated area of 1,600,000 acres (about half the world's planted acreage), produces 175,000 to 200,000 tons annually, which, together with what Ceylon, South India and Burma produce, brings the total percentage of plantation rubber produced in British territories to 75 per cent, while the Netherlands East Indies, with an annual output of about 85,000 to 90,000 tons, contributes 25 per cent, it would seem that control was an easy matter. However, the main difficulties here are ignorance of planting matters among directors in England and Holland, and lack of organization in Malaya. But now that Malayan planters have shown at the Kuala Lumpur meeting that they are capable of whole-hearted cooperation, it is possible that a sound organization will not be lacking in the future.

RUBBER PAVING IN SINGAPORE

Permission has been granted to the Municipal Engineer-in-Chief to try experiments in paving local roads with rubber.

The chief engineer considers that vulcanizing rubber to concrete piles would be much cheaper than vulcanizing to steel plates, as was done in Southwark, England.

NETHERLANDS EAST INDIES

The publication of the proposed additional taxes on various products, including rubber and tea, in the Netherlands East Indies has resulted in representatives of foreign capital sending in vigorous protests to the authorities. The British Chamber of Commerce for the Netherlands East Indies, the Rubber Growers' Association and many prominent rubber exporters have sent protests to the Netherlands House of Representatives. These latter companies, representing the foreign rubber interests in Sumatra, point out that the new taxes will make taxation in the Netherlands East Indies higher than in any other rubber producing centers; that the cost of production in Sumatra is already higher than in other rubber countries; and that the total taxation should not be higher than that of the world's chief rubber cultivating countries.

GENERAL SITUATION

Expenses are being reduced on rubber estates in the East Coast of Sumatra by the curtailment of staff and labor. It is learned that The Goodyear Tire & Rubber Co. has reduced the salaries of assistant planters by one-third. It is evident from local publications that the degree of distress in rubber producing circles is less in Sumatra than in Ceylon and Malaya.

The situation in Java seems to be fairly steady, as planters have not had to go to the expense of recruiting labor from neighboring lands. The island produces practically all the food the people—at least the natives—require, and consequently has not experienced the trouble about rice that Ceylon, Malaya and even parts of Sumatra have had. Perhaps the most important point in Java's favor is that it is not a land of one or two main products, like Malaya or, to a certain extent, Ceylon. To be sure, rubber is an important article in Java, but sugar, tobacco, coffee, tea, cocoa, oils (mineral and vegetable), quinine, spices, are all prominent in her export list.

Some years ago a hot debate was waged in the pages of the *Nederlandsch-Indisch Rubbertijdschrift* over the relative advantages and disadvantages of estates with single crops or with many crops. It would be interesting to know what the opinions on this subject are today.

At all events Java planters are trying more new crops and jute and palm oil are being seriously considered. In fact, we learn that the government's caoutchouc estate, at Langsa, which was about to be sold, will now be extended and partly planted with gutta percha and oil-palms.

RECIPROCITY WITH GERMANY

It is learned that Batavia brokers are proposing to establish an institute which will exchange crude rubber for the manufactured product of German rubber factories, as the Germans need rubber, but cannot buy much owing to the adverse rate of exchange.

NETHERLANDS INDIES' LONDON EXHIBIT

The Netherlands East Indies will be represented at the London rubber exhibition. The director of the government's Institute at Delft, Mr. van Rossem, has taken the leadership upon himself. The general experiment station of the Avros (East Coast of Sumatra Rubber Planters' Association) at Medan, will also cooperate. It is planned to send a fine exhibit relating to rubber and oil-palm culture. The Central Rubber Station will be represented by its director, Dr. de Vries. The exhibit from this station will concern preparation mainly. East Java will be represented by Messrs. Hartjens and Vollenhoven.

NETHERLANDS INDIES RUBBER PRODUCTION INCREASES

Since 1913 reports have shown a large and steady increase in the production of Dutch rubber planting companies. The figures in the following table cover the reports of companies having offices or connections in Amsterdam, the chief market for their product. The figures represent half kilos. One-half kilo equals 1.1 pounds.

Companies	1918	1919	1920
Algemeene Belgisch-Javasche Cultuur Maatschappij .... *half-kilos*	....	539,866	497,050
Amsterdam Tananceli Rubber Cultuur Maatschappii	240,000	300,000	369,000
Batoe Sumatra Rubber-Mij........	47,200	84,308	105,000
Belgisch-Nederlandsche Cultuur Maatschappij	719,848	812,788	773,550
Cultuur Mij. "Bajabang"........	609,000	611,800	494,700
Cultuur Mij. Boekit Lawang........	74,200	93,000	115,700
Cultuur Mij. "de Lampongs"........	....	212,161	248,994
Cultuur Mij. Salatri Plantations........	34,788	66,873	84,816
Cultuur Mij. Soerowinangoen........	135,800	259,500	301,700
Fransch-Nederl. Koloniale Cultuur Maatschappij	534,600	419,300	433,100
Oost-Borneo Maatschappij	76,257	71,636	102,850
Rubber Cultuur Maatschappij "Soengey Raja"	....	219,621	233,662
Rubber Mij. "Basilam"........	338,300	411,600	449,200
Rubber Maatschappij Tjibantjet........	124,240	140,919	140,541
Sumatra Caoutchouc Mij........	1,041,964	1,132,469	1,361,435
Tabak Mij. "Krapoh"	82,557	103,020	138,886
Zuid-Preanger Rubber Mij........	323,493	378,201	411,416
Totals	4,382,247	5,857,062	6,261,600

RUBBER COMMERCE OF CEYLON, 1918-1919

Imports of raw rubber into Ceylon for the year 1919 were 4,644,507 pounds, valued $2,272,311, as against 5,507,346 pounds in 1918, valued $2,080,607. Exports of rubber during these years were 22,738 tons in 1918, valued $22,226,268, while in 1919 the quantity increased to 47,406 tons, valued $55,492,495. Although Ceylon's commerce in rubber is still controlled by the London market, about 66 per cent of the amount exported in 1919 went to the United States direct, 20,885,382 pounds, valued $7,536,326, being exported to the United States in 1918, and 71,386,377 pounds, valued $24,891,754 in 1919. The United Kingdom took 33 per cent and the remainder was distributed among other countries.

Approximately 45,000 long tons of rubber were exported during 1919, exceeding the 1918 exportation by about 120 per cent. The foreign demand was good for all grades during the year. Owing to restrictions on the importation of rubber into the United States during 1918, Canada became a direct importer of Ceylon rubber. In that year 2,500 long tons of rubber were shipped directly from Ceylon to Canadian ports. The exportation practically disappeared in 1919, as Canada again obtained her requirements from shipments originally destined to the United States.

THE RUBBER TRADE OF SIAM

According to declared values at the port of Bangkok, rubber goods imported into Siam in 1919-20 included 6,875 kilos of bicycle tires, valued 43,160 ticals (one tical equals $0.3709); 29,645 kilos of motor car tires, valued 253,839 ticals; 20,354 kilos of other tires, valued 54,262 ticals; and 27,224 kilos of other rubber goods, valued 170,030 ticals. In 1919-18 miscellaneous rubber goods led rubber imports into Siam, 32,069 kilos being imported, at a value of 207,724 ticals; motor car tires were second, with 31,011 kilos, valued 195,357 ticals; 7,159 kilos of bicycle tires, valued 39,246 ticals, were imported, and 42,735 kilos of other tires, valued 117,938 ticals. Both years show a considerable increase over the pre-war fiscal year 1913-14, when import figures were: Bicycle tires, 4,906 kilos, valued 34,934 ticals; motor car tires, 19,551 kilos, valued 129,928 ticals; other tires, 17,550 kilos, valued 51,320 ticals; and other rubber goods, 30,167 kilos, valued 106,812 ticals.

Rubber exports from Siam in 1919-20 were 61 short tons, valued 67,684 ticals, nearly twice the amount of 1919-18, which totaled 33 short tons, valued 30,212 ticals. In the pre-war fiscal year 1913-14, 103 short tons were exported, valued 90,355 ticals.

Imports of rubber goods from the United States into Siam have greatly increased from 1913-14, when the value of these imports was $741. In 1916-17 the value increased to $11,002; in 1917-18, $13,648; in 1918-19, $29,531. Figures for 1919-20 show a slight drop to $27,235.

BALATA IN BRITISH AND DUTCH GUIANA

Balata growers and gatherers in British Guiana are awaiting with anxiety the report of the commission appointed by the Governor to consider the balata industry and to recommend, if need be, legislation that will promote its commercial success. Stringent regulations have long been in force about how and when the trees may be bled, but such government control has not helped much either to increase the output or to enhance the price. In fact, there is a general impression that the industry has been over-regulated, and that in view of the reduced output and the greater difficulty and cost of getting balata the bars must be let down somewhat, or the industry may soon face a real crisis. Regret is expressed, too, that the balata industry has not had the benefit of the great research work which has been carried on in connection with every phase of the rubber industry, although realizing that considerable scientific study of balata, as compared with rubber, has not been warranted because of the minor commercial importance of balata.

Some balata men even fear the extinction of the industry, at least in the Guianas, as they remark that there are but few, if any, uses for balata for which rubber may not be substituted. They are not encouraged even by the relatively good prices of *3s. 7½d.* a pound in 1919, compared with *2s. 6d.* a few years ago, for the cost of getting balata is increasing, with no relief in sight.. Excess bleeding has practically exhausted the easily available supply, thus compelling the gatherers to go deeper into the forests to get at good bullet trees, all of which adds to the expense. The bushmen expect better pay than those working near the towns or settlements, and labor is short at best. The Government is none too sanguine about the outlook for balata, the chief forest industry, and which has yielded a large part of the public revenues. Officials fear that any considerable drop in the price will mean the doom of balata as a territorial product.

CONSOLIDATED RUBBER & BALATA ESTATES, LIMITED

At the recent annual meeting in London of the shareholders of the Consolidated Rubber & Balata Estates, Limited, which has large interests in British Guiana, the chairman reported that the directors had decided to pass the 1920 dividend, as was done in 1919, and to carry forward the surplus of £9,010. The company, it was stated, had been hit hard by the drought of the summer of 1918 and the spring of 1919, higher labor costs, increased freight rates, and a loss on exchange of £2,194. The company's balata turnover for 1917 was 1,088,498 pounds; in 1918, 891,841; and in 1919 but 621,268 pounds. From its Aruka plantation in the northwest district the company got but 4,073 pounds of rubber, the trees there as in all the low-lying plantations having suffered severely from the "die back" disease. Experts in the Lands Department frankly state it as their belief that British Guiana is not a suitable country for the cultivation of rubber. Some hope, however, is held out for fair results from the young trees planted on the higher levels.

A. F. White, since 1911 general manager at Demerara for the Consolidated Rubber & Balata Estates, Limited, has resigned on account of ill-health and gone back to England. His assistant, Mr. Tout, succeeds him.

BALATA IN DUTCH GUIANA

Somewhat better conditions in the balata industry are said to prevail in Dutch Guiana, although here, as in British Guiana, growers and gatherers are troubled with several adverse circumstances. The cost of getting balata is steadily mounting, owing largely to the fact that gatherers must go a longer way into the hinterland to find trees worth bleeding. The cost of transportation is getting higher, and this condition will get worse when the Government carries out its expressed intention of dismantling the railroad beyond a point located 150 kilometers from Paramaribo because it is losing money. The labor shortage, higher taxation, and unfavorable exchange also give much concern. However, most growers are content to wait for higher prices, and there is little talk of growing more marketable products, as in British Guiana.

According to Government statistics, the 1920 crop of balata was 287,747 kilograms. Of this amount the largest contribution was made by the Balata Company Suriname (founded by Henry Benjamins, styled the father of the balata industry in Dutch Guiana); and, while the company suffered quite a setback in 1920, it is still hopeful for the coming year. In 1918 the company paid 20 per cent dividend, but in 1919 not only was the dividend passed, but a loss of 42,000 florins was shown. A good turnover is expected for 1920, however, from balata purchased at low prices.

A large operator who has done fairly well during the year is A. F. C. Curiel, said to be financed by Middleton & Co., of New York. C. Kersten & Co., a concern said to be well intrenched financially and whose headquarters are in Germany, has also made a good showing for 1920, considering the many drawbacks with which the industry has been handicapped.

BRAZIL SUBSIDIZES THE RUBBER INDUSTRY

The Brazilian Ministry of Agriculture has been authorized to grant to rubber factories established in Brazil within three years from date, in which exclusively Brazilian rubber is employed, guaranteed interest of 6 per cent per annum on a capital of not less than 2.000:000$ or over 10.000:000$ for a period of three years in addition to favors granted in 1912. These rubber factories will be exempt from duties, and a premium of 200:000$ will be given to all those established within the three years stipulated.

The sum of 3.000:000$ is to be disbursed for the transport of agricultural laborers from Europe to any Brazilian state, the receiving state paying half the expenses. Furthermore, 370:000$ are to be expended on the Brazilian representation at the rubber exhibition which will take place this year in London.

An agreement will be entered into with rubber producing states of the Union to reduce annually the export tax on rubber to a parity of that charged from the Acre Territory. Rubber machinery for use in local factories will be allowed to enter the country free of duty and last, but not least, an expert is to be sent to study the cultivation of rubber in the East.

The Brazilian budget for 1921 further provides that all exemptions and reductions of customs duties be abolished except for material contracted for by the government and machinery and instruments for agriculture, mining and cattle raising industries.

BRAZIL'S CENTENNIAL

Considerable interest is being taken by the rubber industry in the preparations being made for the celebration by Brazil on September 7, 1922, of its hundred years' existence as a nation. Plans will soon be formulated for cooperation in the United States with the American Chamber of Commerce for Brazil in raising a fund of $500,000 for a suitable memorial at Rio de Janeiro to symbolize the friendship of the United States for its esteemed sister republic, the greatest of all South American countries, its population being greater than all Latin-America combined; with 5,000 miles of coast line and an area 200,000 square miles larger than the United States, yet mostly undeveloped. With its government and many of its institutions patterned after those of the United States and importing from this country more than half of its necessities and luxuries, while sending back half of its surplus products, Brazil has long entertained for the United States a feeling of fellowship equalled by few other nations. As one evidence of such regard is noted the sending of the Brazilian fleet after our own into the North Sea during the World War.

Recent Patents Relating to Rubber

THE UNITED STATES

GRANTED FEBRUARY 1, 1921

No. 1,366,897 Abdominal supporter with elastic straps. I. N. Beery, Jr., Harrisonburg, Va.
1,366,963 Tire valve. M. C. Schweinert, West Hoboken, and H. P. Kraft, Ridgewood—both in N. J.
1,367,011 Resilient tire. R. B. Bostwick, Duquesne, Pa.
1,367,084 Dust cap for inflating valve stems. E. M. Overbey, Creighton, Mo.
1,367,225 Inflatable life belt. W. H. Barker, New Brighton, assignor to C. W. Wright, New York City—both in N. Y.
1,367,255 Fountain pen. H. S. Hasselquist, Chicago, Ill., assignor by mesne assignments to The Wahl Co., Wilmington, Del.
1,367,395 Demountable rim for tires. E. E. Jameson and T. Kameron, assignors of one-third to E. Jones, all of Schlater, Miss.
1,367,436 Hydrometer. L. J. Stern, Boston, Mass.
1,367,474 Garter. J. A. Hewes, Melrose, Mass.
1,367,490 Automatic alarm for partially deflated tires. A. J. Michelin, Paris, France.
1,367,495 Hydrometer syringe. E. Neerup, Chicago, Ill.

GRANTED FEBRUARY 8, 1921

1,367,544 Body treatment machine with series of rollers. J. P. Gardner, Chicago, Ill.
1,367,620 Rack for chemicals and other purposes with rubber-lined receptacles. M. Mendel, New York City.
1,367,624 Fountain pen. A. L. Ogden, New York City.
1,367,746 Ear shield. W. I. Kent, Brooklyn, N. Y., assignor to The Mechanical Rubber Co., a New Jersey corporation.
1,367,747 Bath brush. G. B. Keplinger, Chicago, Ill.
1,367,751 Bias-woven selvage-edge fabric. H. I. Morris, assignor to The Savage Tire Co.—both of San Diego, Calif.
1,367,758 Fountain sponge. G. F. Strieff, Watertown, N. Y.
1,367,815 Tire valve. R. H. Henemier, New York City, assignor to A. Schrader's Son, Inc., Brooklyn—both in N. Y.
1,367,826 Tire valve or the like. E. V. Myers, East Orange, N. J., assignor to A. Schrader's Son, Inc., Brooklyn, N. Y.
1,367,994 Vehicle tire. E. Sterns, St. Louis, Mo., assignor by mesne assignments to Surety Tire & Rubber Co., Wilmington, Del.
1,367,995 Vehicle tire. E. Sterns, St. Louis, Mo., assignor by mesne assignments to Surety Tire & Rubber Co., Wilmington, Del.
1,368,025 Electrical insulating tape. H. I. Diamond, Atlanta, Ga.
1,368,063 Inner tube for tires. C. S. Sights, La Harpe, Ill.
1,368,068 Hose coupling. L. Stein, New York City, and L. Brumer, Brooklyn both in N. Y.
1,368,093 Hard rubber separator for store battery plates, having soft rubber strips vulcanized on each face. J. M. Allen, assignor to J. M. Allen, F. P. Smith and F. D. Tucker, trustees for The Smith-Allen Battery Co.—all of St. Louis, Mo.
1,368,199 Automobile wheel with resilient sectional tire having overlapping rubber casing. G. W. Sell, Portland, Ore.

GRANTED FEBRUARY 15, 1921

1,368,235 Demountable split rim for tires. W. N. Booth, assignor to Kelsey Wheel Co., Inc. both of Detroit, Mich.
1,368,254 Resuscitator. A. N. Habberly, Melrose, Mass.
1,368,304 Tire construction. A. C. Terrell, Kansas City, Mo.
1,368,307 Earpiece with walls of sponge rubber. F. D. Waldron, Brooklyn, assignor to Western Electric Co., Inc., New York City—both in N. Y.
1,368,401 Game apparatus. H. E. Kettle, Hamilton, Ont., Can.
1,368,419 Demountable rim for tires. E. K. Baker, assignor to Universal Rim Co.—both in Chicago, Ill.
1,368,498 Flutter valve tester. R. M. Graham, Sidney, O.
1,368,511 Combined tire test-gage and valve. K. F. Lees, New Haven, Conn.
1,368,512 Tire test-gage and valve. K. F. Lees, New Haven, Conn.
1,368,513 Combined tire valve and gage. K. F. Lees, New Haven, Conn.
1,368,566 Inflatable belt. T. J. McNeary, New York City.
1,368,642 Clip for bead-wires. T. Midgley, Springfield, assignor to The Fisk Rubber Co., Chicopee Falls—both in Mass.
1,368,723 Valve cap. G. O. Helvig, Dawson, Minn.
1,368,782 Massage vibrator. C. H. Beach, Racine, Wis., assignor to Moore Electric Corporation, Chicago, Ill.
1,368,835 Raincoat. C. H. Place, New Rochelle, assignor to New York Mackintosh Clothing Co., New York City—both in N. Y.
1,368,864 Hat protector. E. Turner, Chicago, Ill.
1,368,895 Ear protector. L. Cenerini, Bristol, R. I.
1,368,902 Detachable rubber heel. L. Cuvelier, Halifax, Nova Scotia, Can.
1,368,937 Inflatable device for use in learning to swim. G. Jordahn, Palm Beach, Fla.
1,368,982 Windshield cleaner. A. B. Beitman, East Cleveland, assignor to The Outlook Co., Cleveland both in O.

GRANTED FEBRUARY 22, 1921

1,369,139 Parachute and safety belt. L. B. Sperry, Massapequa, N. Y.
1,369,181 Cushion wheel. J. Mitrosky and J. Bogdan, Perth Amboy, N. J.: said Mitrosky assignor to said Bogdan.
1,369,184 Fountain pen. R. E. Perkins, Joplin, Mo.
1,369,185 Fountain pen. R. E. Perkins, Joplin, Mo.
1,369,257 Inner tube for pneumatic tires. T. O. Markell, Cleveland, O.
1,369,273 Cord for tires. A. P. Eves, Chicago, Ill.
1,369,389 Rubber spring. G. I. Browne, Lancaster, Pa.
1,369,394 Cushion tire. J. C. Busche, Highland Park, Mich.
1,369,395 Parachute. E. R. Calthrop, assignor to E. R. Calthrop's Aerial Patents Ltd., both of London, Eng.
1,369,410 Blow-out patch and holder therefor. C. L. Durham, Kansas City, Mo.
1,369,529 Detachable heel. W. A. Maloney, Needham, Mass.
1,369,549 Tire core binder. E. G. Rupert, assignor of one-half to D. W. Rupert, both of Trenton, N. J.
1,369,584 Demountable rim for tires. W. S. White, Chattanooga, Tenn.
1,369,631 Nasal guard. T. A. De Vilbiss, assignor to The De Vilbiss Manufacturing Co.—both of Toledo, O.
1,369,669 Wearing apparel for diving and swimming. M. Kamenos, Washington, D. C.
1,369,725 Electrical tire signaling device. F. Bergier, Manhattan, Kans.
1,369,755 Hose clamp. W. T. Rutledge, Santa Ana, Calif.

THE DOMINION OF CANADA

GRANTED FEBRUARY 1, 1921

208,054 Inner tube. J. M. Dirienzo and J. A. Dirienzo, coinventors—both of Madison, Wisc., U. S. A.
208,067 Waterproof garment. B. A. Bittan, Philadelphia, Pa., U. S. A.
208,126 Game ball. R. H. Hazeltine, New York City, U. S. A.
208,167 Dirigible balloon. J. F. O'Grady, Sisseton, S. Dak., U. S. A.
208,185 Resilient tire. J. B. D. Sicotte, Montreal, Que.
208,201 Reliner for pneumatic tires. A. E. Wolter, Everett, Wash., U. S. A.

GRANTED FEBRUARY 8, 1921

208,407 Endless belt. The Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, assignee of The Goodyear Tire & Rubber Co. of Canada, Ltd., Toronto, assignee of A. M. Hardy, Bowmanville all of Ontario.
208,408 Balloon valve. The Goodyear Tire & Rubber Co., assignee of R. H. Upson—both of Akron, Ohio, U. S. A.
208,421 Milking machine teat cup. The Ridd Co., Ltd., assignee of A. Ridd—both of New Plymouth, New Zealand.
208,424 Air bag. The Smith One Heat System, assignee of C. L. Smith, and E. S. Webster, coinventors—all of South Bend, Ind., U. S. A.

GRANTED FEBRUARY 15, 1921

208,555 Ventilated Garment. H. Siegel, Chicago, Ill., U. S. A.
208,582 Parachute. The E. R. Calthrop's Aerial Patent, Ltd., assignee of E. R. Calthrop—both of London, Middlesex, Eng.

GRANTED FEBRUARY 22, 1921

208,627 Driving belt or chain with rubber-covered links. J. H. Smith, London; R. H. Brand, Ascot, Co. of Berkshire—both in Eng., and T. G. Leith, Oyne, Aberdeen, Scotland, coinventors.
208,646 Combination pneumatic tire. R. Blakoe, London, W. I., Eng.
208,663 Portable urinal with inflated cushioned opening and having removable stopper. C. E. Davies, Lethbridge, Alta.
208,713 Shim plate for demountable tire rims. H. J. Hick, Alliance, Ohio, U. S. A.
208,730 Elastic garment supporter. C. W. Kinsman, Northfield, Vt., U. S. A.
208,742 Diaper with waterproof shield. C. LeMoine, Sioux City, Iowa, U. S. A.
208,777 Cushion tire rim. E. T. Phelan, Jackson, Mich., U. S. A.
208,813 Brassière with elastic belt and shoulder straps. Z. Wardalla, London, W., England.
208,891 Inner tube. Z. Kornis and T. E. Pride, assignee of a half interest—both of Decatur, Ala., U. S. A.

THE UNITED KINGDOM

PUBLISHED JANUARY 12, 1921

152,991 Balloon valve. The Goodyear Tire & Rubber Co., assignee of A. G. Maranville, 103 Russell avenue—both of Akron, Ohio, U. S. A. (Not yet accepted.)
153,039 Rubber heel with revoluble portion contained in metal cup which nails to heel seat. E. L. Robertson, 344 West 59th street, New York City, U. S. A.
153,150 Rubber-covered spring tire. A. Chambers, 110 New Road, Copnor, Portsmouth.
153,311 Balloon valves. Luftfahrzeugbau Schutte-Lanz, Reinau, Mannheim, Germany. (Not yet accepted.)
153,328 Teat cups for milking machines. W. F. Turk and S. Nielsen, Bowen street, Brisbane, Australia. (Not yet accepted.)
153,422 Apparatus for detecting and closing punctures in tires. Dunlop Rubber Co., 1 Albany street, Regent's Park, London, and J. Parker, 47 Shildon street, Darlington.
153,441 Pneumatic tire filled with inflatable rubber balls, each with automatic valve. W. H. Richards, Knoxville, Tenn., U. S. A.

PUBLISHED JANUARY 19, 1921

153,461 Tire liner for repairing pneumatic tires, made from worn tire cover. W. H. A. Theed, Alveston Motor Garage, Roland Gardens, South Kensington, and A. T. Phillips, 7 Bothwell street, Lillie Road, Hammersmith—both in London.
153,474 Rubber protectors for soles and heels. W. B. Ferguson, 9 Cyprus Park, Bloomfield, Belfast.
153,508 Tire rim. J. Donkin, 5 Pembroke Square, Kensington, London.
153,517 Tire with rubber core having annular recesses at sides. M. E. Baxter, 116 West Fifth street, East Liverpool, Ohio, U. S. A.
153,763 Tire with internal helical ribs and continuous circumferential ribs. A. Witzel, Ludwigsburg, Wurttemburg, Germany.
153,801 Tire tread. C. Wright and Racine Auto Tire Co., 1215 State street, Racine, Wisc., U. S. A.
153,849 Powder-puff formed of two portions coated with rubber and pressed together while the rubber is still plastic, etc. A. S. Mosheim, 81 Harrison street, East Orange, New Jersey, U. S. A.
153,901 Fountain pen. R. Bosch, Aktien-Gesellschaft., 4 Militärstrasse, Stuttgart, Germany. (Not yet accepted.)
153,902 Fountain pen. R. Bosch Aktien-Gesellschaft., 4 Militärstrasse, Stuttgart, Germany. (Not yet accepted.)

PUBLISHED JANUARY 26, 1921

154,032 Garters. C. S. Bisson, 32 New street, Jersey, Channel Islands.
154,081 Curved rubber tip for heels. W. F. Cowle, 156 York Road, Bedminster, Bristol.
154,085 Rubber sole protectors. W. Willoughby, 9 George's avenue, Blackrock, Co. Dublin.
154,206 Cord fabric tire construction. F. S. Dickinson, New York City, and I. Springer, Atlantic Highlands, N. J.—both in U. S. A. (Not yet accepted.)

Chemical Patents will be found on page 497. Machinery Patents on pages 501-502.

154,435 Demountable split rim for tires. C. W. Shaefler, 140 N. Dearborn street, Chicago, Illinois, U. S. A.
154,485 Glove with elastic strap across front of wrist and elastic gusset near the thumb to hold flap covering an opening across the palm, for extruding the fingers. J. W. Lynn, 2 Hatherly Place, Lansdowne, Cheltenham, Gloucestershire.

PUBLISHED FEBRUARY 2, 1921

154,525 Tire inflater with rubber gland to push over tire valve. R. S. Burn, The Poplars, Wylde Green, Birmingham
154,556 Fountain pen. Klio-Werk Gesellschaft, Hennef-on Sieg, Germany. (Not yet accepted.)
154,578 Dirigible balloon with separate compartments for air and gas and inflatable ballonets. Goodyear Tire & Rubber Co., 1144 East Market street, assignees of R. H. Upson, 219 Shawnee Path—both of Akron, Ohio, U. S. A. (Not yet accepted.)
154,710 Rubber-coated endless conveyor for window displays. E. A. Dieterich, 910 Cauldwell ave., Bronx, New York. U. S. A.
154,712 Fountain pen. S. Leonard, The Cabin, Riverview Gardens, Strawberry Hill, London.
154,753 Tire comprising one or more solid rubber treads with integral side flaps forming covers for pneumatic tubes or sponge rubber fillers. J. B. Moore, 151 Park avenue, Wibsey, Bradford.
154,769 Wheel tires with segmental air tubes each fitted with combined valve and security bolt. A. H. Mann, Cairncroft, Dovercourt Road, East Dulwich, London.
154,917 Fountain pen. A. Bergmann and W. Schmidtmann, Carthausen, Westphalia, Germany. (Not yet accepted.)
154,919 Leather cover with anti-skid tread for pneumatic tires. P. Alvermann, 8 Viktoriastrasse, Dortmund, Germany. (Not yet accepted.)
154,987 Sock-suspender with parts of vulcanite and elastic. A. E. Clauson, P. O. Box 81, East London, South Africa.

PUBLISHED FEBRUARY 9, 1921

155,079 Reinforced inner tube. R. Surridge, 58 George street, Camberwell, London.
155,079 Maternity corsets with elastic inserts and shoulder straps. L. A. C. Robertson and W. B. Robertson & Co., 6 King street, Glasgow.
155,148 Rubber sleeve for electric insulation. J. B. Hamilton, 1110 Park avenue, Hoboken, New Jersey, U. S. A. (See The India Rubber World, May 1, 1920, page 366.)
155,185 Golf tee. M. E. Morgan, Le Brees, Mayals Blackpill, Swansea.

GERMANY

PATENTS ISSUED, WITH DATES OF ISSUE

333,276 (November 1, 1919.) Valve for pumps and compressors with blast-pipe-shaped lock brim of rubber or similar material. Kurt Scheene, Adolphstrasse 74, Hamburg.
333,280 (May 1, 1919.) Resilient tire, Richard Bohe, Weinmeisterstrasse 12, Berlin.
333,433 (April 24, 1918.) Pneumatic tire. Naamlooze Vennootschap Berendonck's Syndicaat voor Banden, Deelen, Holland. Represented by Hans Heimann, Berlin.
332,847 (October 24, 1919.) Elastic heel. Johannes Mordhorst, Massmannstrasse 17, Kiel.
335,049 (January 10, 1920.) Tire with elastic insert. Leonhard Sauemheimer, Kloster, Heilsbronn, Mittelfranken.

TRADE MARKS

THE UNITED STATES

SERIAL NUMBERS PUBLISHED FEBRUARY 4, 1921*

No. 125,802 The words Red Clover Chewing Gum accompanying the representation of a group of clover leaves and blossoms with bees above—chewing gum. F. R. Perkins, Chicago.
128,396 Master Cord—tires. The Master Tire & Rubber Co., Dayton, O.
128,439 Representation of an electric device held by a hand, the cord enclosing the word Portable, and accompanied by the name R. G. Haskins in white letters against a black rectangular background—portable machinery, including buffers, die filing equipment, flexible shafts, etc. R. G. Haskins Co., Chicago.
131,652 Rusco—suspenders, hose supporters, garters, elastic braids, cords, belts and beltings, baseball and cadet webs, etc. The Russell Manufacturing Co., Middletown, Conn.
138,740 A three-pointed shield with rounded sides, bearing a monogram composed of the letters "AA"—rubber-covered wire for electrical use. A A Wire Co., Inc., Newark, N. J.
138,821 Representation of a tire through which is thrust a hand wearing a rubber glove and holding an instrument—rubber sponges. The Miller Rubber Co., Akron, O.
140,765—Du Pont Fabrikoid within an outline oval—imitation or artificial leather. Du Pont Fabrikoid Co., Wilmington, Del.

SERIAL NUMBERS PUBLISHED FEBRUARY 10, 1921*

135,064 Rusco—tire tapes, auto-top webs, and elastic webbings. The Russell Manufacturing Co., Middletown, Conn.
135,067 Rusco Products within a rectangle accompanied by the representation of a parrot perched on a ring and the words They Speak for Themselves—tire tapes, auto-top webs, webbings, etc. The Russell Manufacturing Co., Middletown, Conn.
135,554 Clipper—golf balls. Dunlop America Limited, Buffalo, N. Y.
137,939 Michigan Shoemakers on a pendant hanging from Maltese cross which in turn bears the words Wolverine Glove & Shoe from Hide to You and the head of a wolverine—shoes of leather, rubber, and fabric and of combinations of these; also gloves of leather, rubber, and fabric. Hirth Krause Co., Rockford, Ill.
139,360—Tire Dealers News on representation of a scroll across a tire—monthly trade publication. Monroe Tire Corporation, Chicago.
139,361 Tire Dealers News—monthly trade publication. Monroe Tire Corporation, Chicago.
139,652 Tiregram—monthly periodical. The Gardner, Moffat Co., Inc., New York.

SERIAL NUMBERS PUBLISHED FEBRUARY 17, 1921*

127,693 Conventional design composed of a keystone superimposed on a white disk against a 14-pointed sun—elastic surgical hosiery, surgeons' operating rubber gloves, etc. Keystone Surgical Supply Co., Conshohocken, Pa.
132,561 Laurel—elastic webbings. The Russell Manufacturing Co., Middletown, Conn.
135,068 The words Rusco Products within a rectangle accompanied by the representation of a parrot perched on a ring and the words They Speak for Themselves—woven beltings, asbestos brake linings, etc. The Russell Manufacturing Co., Middletown, Conn.
137,080 The word Fuller in white letters on a black oval outlined by extension of strokes of the letter F—holding racks for rubber tubes, bath brushes, etc. The Fuller Brush Co., Hartford, Conn.
138,603 Tirex—insulated wire and insulating materials. Simplex Wire & Cable Co., Boston, Mass.
139,797 The Slido Garter—garters. C. J. Hausen, New York.
140,175 The words Good Year within a double-outlined rectangle having ornamental geometric figures arranged at the ends—automobiles and motor trucks. The Goodyear Tire & Rubber Co., Akron, O.
141,062 Navajo—tire patches. Conrad Wilkey & Co., Casper, Wyo.
141,212 Paragon—garters. Crescent Garter Co., New York.

SERIAL NUMBERS PUBLISHED MARCH 1, 1921*

130,091 Representation of the bust of Pericles, Prince of Tyre—rubber or gutta percha tires for automobiles, motorcycles, or bicycles. The Dunlop Rubber Co., Limited, London, Eng.
133,328 Carey—asbestos and asbestos and rubber textiles, for waterproofing, etc. The Philip Carey Manufacturing Co., Lockland, O.
137,945 The word Lee within an enclosure having an arrowhead at each end—pneumatic tires. Lee Tire & Rubber Co., Whitemarsh Township, Montgomery County, Pa.
139,256 Arch Belt—men's, women's and children's boots and shoes of leather, rubber, or fabric construction. The Emerson Shoe Co., Rockland, Mass.
141,902 The Tire News—monthly periodical. The Goodyear Tire & Rubber Co., Akron, O.

GRANTED FEBRUARY 1, 1921

Under Act of February 20, 1905†

139,236 Alligator—tire patches. Alligator Grip Co., Dallas, Tex.
139,248 Merlin—tires and tubes. The Batavia Rubber Co., Batavia, N. Y.
139,250 Steam Cured and spray of thistles—dress shields. J. J. Beyerle Manufacturing Co., New York.
139,265 The Cavalier—hose supporters. R. J. Cavalier, Oswego, N. Y.
139,306 Antelope—rubber and fabric hose. The B. F. Goodrich Co., New York.
139,307 Dirubco—rubberized fabric hose and belting. The B. F. Goodrich Co., New York.
139,308 Elk—hose and pump valves. The B. F. Goodrich Co., New York.
139,309 Lynx—fabric and rubber belts. The B. F. Goodrich Co., New York.
139,364 O'N—tires and inner tubes. The Owen Tire & Rubber Co., Cleveland, O.
139,402 Hickory—garters and hose supporters. A. Stein & Co., Chicago.
139,403 Dr. Parker's Waist and Garters—combined waist and garters. A. Stein & Co., Chicago.
139,419 Monotwin—solid tires. United States Tire Co., New York.
139,424 WS and a shield—tires, tubes, tire-boots and patches. Washington Tire & Rubber Co., Spokane, Wash.
139,432 Conventionalized star design—elastics, etc. George Williams Co., New York.
139,436 Kno-Bind—garters. D. M. Wirth, Bucyrus, O.

Under Act of March 19, 1920, Section 1 (b)†

139,440 Adams Spearmint—chewing gum. American Chicle Co., New York
139,442 Whistler—tire valve. Automatic Safety Tire Valve Corporation, New York.

GRANTED FEBRUARY 8, 1921

Under Act of February 20, 1905†

139,480 Lox-On—tire valves. Automatic Safety Tire Valve Corporation, New York.
139,515 Rhino—golf balls. Cupples Company Manufacturers, St. Louis, Mo.
139,648 Tirometer—tire and tube valve and gage combined. Tirometer Valve Corporation of America, Charleston, W. Va.

GRANTED FEBRUARY 15, 1921

Under Act of February 20, 1905†

139,717 Habirshaw—electric cable. Habirshaw Electric Cable Co., Inc., New York.

Under Act of March 19, 1920, Section 1 (b)†

139,736 Representation of a label lettered in white against a dark background as follows: This Tube Hermetically Sealed by Steam. Guaranteed Never to Leak.—Inner tubes. Dural Rubber Corporation, Flemington, N. J.

GRANTED FEBRUARY 22, 1921

Under Act of February 20, 1905†

139,823 Sanital—belting, hose and packing. Imperial Belting Co., Chicago.
139,876 Re-Nu-R—leather and rubber fabric dressing. George W. Roth, Minneapolis, Minn.
139,879 Sandersoled—retreaded rubber and fabric tires. D. A. Sanders, Nyack, N. Y.
139,886 Skogum—rubber fruit-jar rings. Smalley, Kivlan & Onthank, Boston.
139,904 Lax-Gum—chewing gum. Triangle Laboratories Co., Marion, O.
139,907 Vulca-Patch—self-vulcanizing tire patch. Vulca Laboratories.
139,914 Winner—heel plates for rubber heels, etc. Winner Manufacturing Co., Rochester, N. Y.

Under Act of March 19, 1920, Section 1 (b)

139,953 Racine—tires. Racine Rubber Co., Racine, Wis.

*Notice of opposition must be filed with the Commissioner of Patents, Washington, D. C., within thirty days after this date.

†See The India Rubber World, February 1, 1921, page 576, "Two Kinds of Trade Marks Now Being Registered."

THE DOMINION OF CANADA

REGISTERED

27,907 Boston Garter—garters. George Frost Co., Boston, Mass., U. S. A.

27,914 Good Luck—rubber jar-rings. Boston Woven Hose & Rubber Co., Cambridge, Mass., U. S. A. (See The India Rubber World August 1, 1919, page 638.)

27,942 Rubbadubdub—rubber toys. J. G. Franklin & Sons, Limited, 17 Colverstone Crescent, Dalston, London, E. 8, England. (See description elsewhere in this issue.)

27,974 Error-No—copyholders with rubber rollers and rubber foot. Error-No. Inc., Rochester, New York, U. S. A. (See description elsewhere in this issue.)

27,981 Eberhard Faber as facsimile signature displayed on yellow panel showing diamond-shaped figure enclosing a star, and the words Eberhard Faber New York Oldest Pencil Factory in America—rubber erasers, rubber bands, pencils, etc. Eberhard Faber, New York, U. S. A.

27,998 Patte cross design—respirators, masks, hoods, etc. American La France Fire Engine Co., Inc., Elmira, New York, U. S. A.

DESIGNS

THE UNITED STATES

No. 57,032 Rubber heel. Patented February 1, 1921. Term 14 years. G. W. Bulley, St. Joseph, Mich.

57,040 Tire tread. Patented February 1, 1921. Term 3½ years. E. C. Gordon, New York.

57,059 Non-skid tire tread. Patented February 1, 1921. Term 14 years. R. Muir, assignor to Hood Rubber Co.—both of Watertown, Mass.

57,065 Tire tread. Patented February 1, 1921. Term 14 years. F. Trautwein, Freeport, assignor to Trautwein Corporation, Brooklyn—both in New York.

57,070 Tire. Patented February 8, 1921. Term 14 years. E. F. Altenburg, Columbiana, O.

57,071 Tire. Patented February 8, 1921. Term 14 years. M. J. Atkinson, Mimico, Ont., Can.

57,072 Tire. Patented February 8, 1921. Term 14 years. A. L. Breitenstein, Akron, assignor to Rubber Products Co., Barberton—both in Ohio.

57,073 Tire. Patented February 8, 1921. Term 7 years. W. Dunbar, assignor to Allen Tire & Rubber Co., Allentown—both in Pennsylvania.

57,077 Tire tread. Patented February 8, 1921. Term 3½ years. F. E. Holcomb, assignor to The Williams Foundry & Machine Co.—both of Akron, O.

57,079 Tire tread. Patented February 8, 1921. Term 14 years. W. E. McCormish, Akron, assignor to The American Tire Corporation, Cleveland—both in Ohio.

57,116 Tire. Patented February 22, 1921. Term 14 years. C. H. Desautels, Springfield, assignor to The Fisk Rubber Co., Chicopee Falls—both in Massachusetts.

57,118 Non-skid tire. Patented February 22, 1921. Term 14 years. W. E. Duersten, New Castle, Pa.

57,120 Tire. Patented February 22, 1921. Term 14 years. A. C. Fisher, Butler, assignor to Corona Cord Tire Co., East Butler—both in Pennsylvania.

57,122 Tire. Patented February 22, 1921. Term 14 years. H. A. Githens, Milwaukee, Wis.

57,123 Tire. Patented February 22, 1921. Term 14 years. H. A. Githens, Milwaukee, Wis.

57,124 Tire. Patented February 22, 1921. Term 14 years. H. A. Githens, Milwaukee, Wis.

57,125 Tire. Patented February 22, 1921. Term 14 years. H. A. Githens, Milwaukee, Wis.

THE DOMINION OF CANADA

4,978 Tire. Patented January 25, 1921. Regal Tire & Rubber Co., Limited, Sherbrooke, Que.

4,979 Tire tread. Patented January 25, 1921. Van der Linde Rubber Co., Limited, Toronto, Ont.

4,983 Tire. Patented February 1, 1921. Dunlop Tire & Rubber Goods Co., Limited, Toronto, Ont.

4,984 Tire. Patented February 1, 1921. Dunlop Tire & Rubber Goods Co., Limited, Toronto, Ont.

GERMANY

DESIGN PATENTS ISSUED, WITH DATES OF ISSUE

760,666 (November 4, 1920.) Tube. Albert Krautzberger, Holzhausen near Leipzig.

760,753 (November 16, 1920.) Rubber sole. Schmidt's Gummiwarenfabrik. Arthur Schmidt, Stade.

760,862 (September 29, 1920.) Rubber tooth cleaner and polisher. Carl Paul Schultz, Holzstrasse 5, Munich.

761,004 (November 24, 1920.) Tire of elastic material. Schmidt's Gummiwarenfabrik. Arthur Schmidt, Stade.

761,071 (November 22, 1920.) Rim for solid tire. Fassoneisen Walzwerk. L. Mannstaedt & Cie. Akt. Ges. Troisdorf near Cologne on Rhine.

761,264 (November 16, 1920.) Elastic tire. Schmidt's Gummiwarenfabrik. Arthur Schmidt, Stade, Hann.

761,351 (July 1, 1915.) Tire substitute for trucks. Mitteldeutsche Gummiwarenfabrik. Louis Peter, A. G. Frankfort-on-the-Main.

761,483 (November 9, 1920.) Rubber tread for bicycle tires. Deutsch Kabelwerke A. G. Abt. Gummiwaren Fabrik, Berlin.

761,662 (October 18, 1920.) Solid rubber suspenders. Schaffner & Co., Hersfeld.

761,766 (November 18, 1920.) Elastic tire. Gerhard Klemm, Fürstenwalde, Spree.

761,817 (October 5, 1920.) Holder for artificial teeth with rubber that remains soft. Otto Thomas Mayer, Ochsenhausen, O.-A. Biberach.

761,825 (October 23, 1920.) Fastening button for the rubber sucker of plates of artificial teeth. Hans Weltzler, Geleitstrasse 14, Offenbach a. Main.

761,826 (October 27, 1920.) Rubber cattle irrigator tube in two parts. Curt Schellbach, Seiferitz-Meerane, i. s.

761,839 (November 18, 1920.) Rust protecting insert for pneumatic fellies. Richard Freudenberg, Oberfriedersdorf.

761,841 (November 19, 1920.) Tip mounting for crutches, etc., with ball and socket joint rubber case. Georg Herrle, Grafenaschau b. Murnan.

762,064 (December 2, 1920.) Rim for solid tires. Faconeisen-Walzwerk L. Mannstaedt & Cie., A. G. Troisdorf.

762,734 (November 26, 1920.) Syringe. Constantin Walter, Friedrich Karl strasse 24c, Stettin.

762,736 (November 29, 1920.) Heel pad of sponge rubber. Supinator-Compagnie, Frankfurt a. Main.

762,868 (November 19, 1920.) Rubber heel holder. Josef Kersting, Benderstrasse 102, Düsseldorf-Gerresheim.

762,936 (September 24, 1920.) Rubber sucker with beaker-shaped receiver. Karl Wägerle, Dammstrasse, Heilbronn.

762,950 (November 9, 1920.) Non-skid pneumatic tread. Paul Repenning, Prinzenstrasse 9, Rendsburg.

763,019 (October 27, 1920.) Viber rubber plate. Friedrich Thielman, Waldstrasse 54, Frankfurt a. Main-Niederrad.

763,323 (December 16, 1920.) Artificial leg with rubber foot. Paul Kellberg Ferdinandplatz 1, Dresden.

763,414 (November 26, 1920.) Anti slipping rivet for rubber soles and heels. August Allgair, Blumenstrasse 5, Hanover.

763,429 (December 16, 1920.) Pneumatic tire protector. A. Pick, Nordstrasse 21, Dusseldorf.

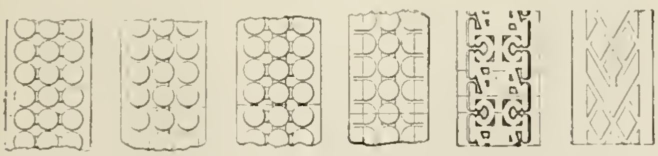
763,431 (December 17, 1920.) Running band for cycles. Brunonia Gummi-Werke Richard Hagemann, Braunschweig.

57,065 57,059 57,118 57,071 57,040 57,131 57,136 57,120 57,073 57,072 57,138 57,077 57,070

57,131 Tire. Patented February 22, 1921. Term 14 years. J. T. Johnson, Akron, assignor to The Portage Rubber Co., Barberton—both in Ohio.

57,136 Tire. Patented February 22, 1921. Term 14 years. H. M. Lambert, Portland, Oreg.

57,138 Tire. Patented February 22, 1921. Term 7 years. E. L. Lawlor, Youngstown, O.



57,122 57,123 57,124 57,125 57,079 57,116

57,150 Rubber heel. Patented February 22, 1921. Term 14 years. W. A. Ream, Morgantown, W. Va.

57,151 Toy balloon. Patented February 22, 1921. Term 14 years. E. T. Richert, Canton, O.

57,179 Garment protector. Patented February 22, 1921. Term 14 years. G. K. Guinzburg, assignor to I. B. Kleinert Rubber Co.—both of New York.

763,531 (November 10, 1920.) Repair strip material for automobile, motorcycle and bicycle tires. L. Runge, Edewechterdamm near Edewecht i. O.

763,717 (March 12, 1920.) Felloe for rubber tires. August Wittig, Klosterstrasse 45, Dusseldorf.

764,467 (December 13, 1920.) Pessary. Eugen Knödler, Karlstrasse 22, Stuttgart-Cannstatt.

764,611 (December 24, 1920.) Urinal. Asmus Zeichner, Vogelweide 9, Hamburg.

765,511 (February 22, 1918.) Anti-skid device. Irvine Brook, Yorkshire, England; represented by A. Elliot, Berlin, S. W. 48.

765,516 (November 4, 1919.) Tire. Richard Ludwig, Auma i. Thu.

765,970 (January 6, 1921.) Rubber suspender. Rudolf Thume, Planitzstrasse 128, Chemnitz.

766,061 (January 12, 1921.) Catheter with corkscrew-like end for insertion. Dr. Albrecht Meyerberg. Potsdamerstrasse 72 b.; Berlin.

766,361 (July 29, 1918.) Rubber stopper for milk bottle. Frederick Richard Graham-Yooll, Dulham Towers; represented by R. Geissler, Berlin, S. W. 11.

766,451 (May 12, 1920.) Rubber sole. William Gollombeck, Lazarusstrasse 19, Spandau.

766,750 (January 17, 1921.) Intra-uterine pessary with various ring inserts. Ernst Jakob, Obertürkheim.

766,772 (January 20, 1921.) Artificial leg with rubber foot. Paul Kellberg, Ferdinandplatz 1, Dresden.

766,802 (November 15, 1920.) Dental and surgical ball syringe. Eugen Lampe, Ifflandstrasse 53, Hamburg.

766,832 (January 19, 1921.) Demountable injection syringe. Wilhelm Heinrich Gerard van der Ven, Rees-on-Rhine.

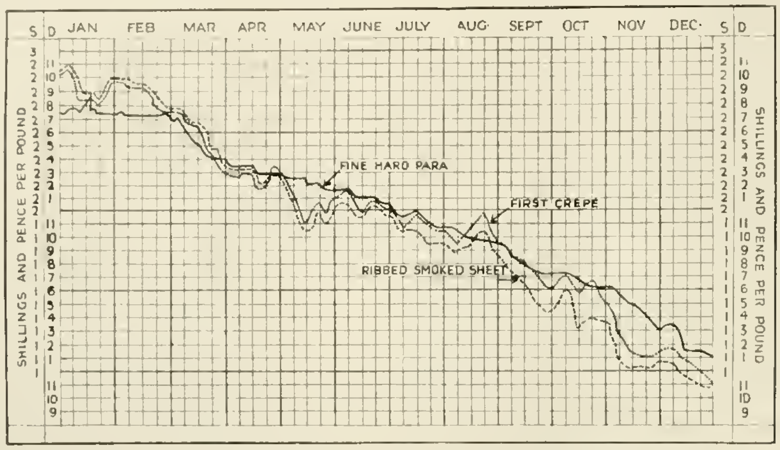
766,872 (March 23, 1920.) Pneumatic tire protector. Georg Krisch, Wildbad, Württ.

The London View of the 1920 Crude Rubber Market

SUPPLY EXCEEDS DEMAND

The distinguishing feature of 1920 was the great actual and enormous potential supply of crude rubber and the lessened demand for it, especially since March. The rubber trade has experienced the worst crisis in its history, but the prospects are that the situation will improve during the present year. The large amount of rubber which American manufacturers bought at the end of 1919 and the beginning of 1920 was made into manufactured goods in anticipation of a generally overestimated European demand. As a result, manufacturers were left with large quantities of manufactured goods, yet still had to buy considerable quantities of crude rubber at high prices. But for this, prices would not have reached the unjustified high level of last Winter.

During the past two years supply has exceeded demand. This has been chiefly plantation rubber. The 1920 supply of wild rubber, except for 28,000 tons from Brazil and Amazonas and about 2,500 tons from the Congo, has been negligible and toward the end of the year almost unsalable, except fine hard Pará. The reclaiming of old rubber has decreased considerably because of the low prices of crude. Forward sales by estates over 1921 are much less than usual, and there is no doubt that after contracts at high prices have been liquidated the position as regards new buying powers will have improved. In Europe, though the use of automobiles is small, there is a considerable increase in bicycles, and Germany has bought a little rubber.



London Spot Fluctuations of Fine Hard Para First Crêpe and Ribbed Smoked Sheet During 1920

THE MARKET

The high prices (highest 2*s.* 10½*d.* in January for both standard crêpe and ribbed smoked sheets) with which the year began, partly owing to a market operator's shortage, continued until March, when the price fell to 2*s.* 2½*d.* and continued with small fluctuations until July, when 1*s.* 9*d.* was reached. The most serious fall came in the Autumn. The price of 1*s.* 9*d.* at the beginning of September dropped two months later to 1*s.* 1*d.*, and the market closed at the end of the year with standard crêpe at 11¼*d.* and ribbed smoked sheets at 10¼*d.* The agreement made in October by members of the Rubber Growers' Association to curtail plantation output by 25 per cent was without effect, and it was not until early in 1921, when it was reported that the Malay Government would probably advocate legislation restricting output and export by 50 per cent, that the market improved, the advance on January 15, 1921, being about 4½*d.* above the lowest prices of last year.

The price of fine hard Pará has dropped almost continually throughout the year, starting in January at 2*s.* 7½*d.* and closing in December at 1*s.* 0½*d.*, an unprecedented low figure. Trading has been very small. The demand for negroheads has almost ceased and caucho ball sells for 11*d.* per pound.

The prices in the last three years on December 31 have been as follows:

	Fine Hard Pará	Negrohead Scrappy	Negrohead Island	Caucho Ball
1920	1*s.* 0¼*d.*	10½*d.*	7*d.*	11*d.*
1919	2*s.* 7¼*d.*	1*s.* 7*d.*	1*s.*	1*s.* 8*d.*
1918	2*s.* 7*d.*	1*s.* 7*d.*	1*s.*	1*s.* 8*d.*

Jelutong has been in less demand, its value being £40 per ton c. i. f. Compressed jelutong is worth 6*d.* per pound. Balata has continued high with small fluctuations. Sheet on the spot has been about 4*s.* 6*d.* most of the year and is now quoted at 4*s.* 2*d.* for shipment c. i. f. Block has been very firm and high although business has been small and the demand has fallen off. Its spot value is 3*s.* 9*d.*, forward shipment c. i. f. 3*s.* 8*d.* Owing to the scarcity, gutta percha has realized high prices.

PLANTATION RUBBER
PREPARATION AND PACKING

There has been an unusual number of claims for quality, particularly from New York on ribbed smoked sheets. Part of the inferior condition of the rubber has been caused on the voyage by improper stowage or damage by the elements, but it is believed that considerable rubber has not been so carefully prepared nor so well dried as formerly. Buyers have suffered losses in consequence, although allowances have been heavy and disappointing to shippers. In this connection and otherwise the Rubber Growers' Association and the Rubber Trade Association have been of great service during the year.

Close pressed packing in bales and cases has been discontinued owing to the objections of manufacturers. Quite a large percentage of rubber has arrived in cases not sufficiently strong, which has entailed additional expense to importers.

ACREAGE OF PLANTATION RUBBER

The only increase of moment in planted areas has been in Malaya and Malacca, where the advance has been some 300,000 acres. Planting has increased slightly in India, Burma and the Mergui and is being extended somewhat, but the East African plantations of Ceará are not progressing and scarcely any shipments have been received. The plantations, chiefly of Castilloa, in Mexico, West Indies, Central and South America, have almost ceased producing. The estimated plantation acreages for the past three years follow:

	1918	1919	1920
Ceylon ...... *acres*	300,000	300,000	300,000
Malaya, Malacca	800,000	800,000	1,100,000
Borneo	50,000	50,000	50,000
Dutch East Indies	700,000	700,000	700,000
India and Burma	55,000	55,000	55,000
Former German Colonies:			
Samoa, East and West Africa	8,000	8,000	8,000
	1,913,000	1,913,000	2,213,000
W. H. Rickinson & Son estimates:			
Acres in bearing	2,021,750	2,181,050	2,293,750
Area under plantation rubber	2,759,950	2,910,750	3,020,750

SOUTH AND CENTRAL AMERICAN RUBBER

The year 1920 was very disappointing to shippers of South American rubber. The supply from Amazonas showed little change, but that from Brazil decreased. Doubtless New York stocks of fine hard Pará held over from the previous crop totaled 3,000 tons, but with normal trade this would have been insignificant. In consequence shipments from Brazil, Bolivia and Peru fell off some 6,000 tons, whereas Peruvian and caucho shipments were only some 300 tons less than the previous year. Total shipments for the past three years have been:

	1918	1919	1920
Brazil, Bolivia and Peru.....*tons*	34,350	34,200	28,160
Including Peruvian and Caucho	8,400	6,800	6,471

Medium descriptions generally have again been very much reduced, and except for supplies awaiting shipment at the ports of producing countries, have practically ceased. Bolivia has sent fine hard Pará, and caucho ball has come from the Amazon tributaries, but almost nothing from Mollendo and very small amounts from Matto Grosso. The quantities of Ceará and Maniçoba were practically negligible.

Central American descriptions have almost ceased to appear in the market. Guayule imports into New York were 1,050 tons.

The following table shows the annual receipts and shipments at Pará during the past three years:

	1918	1919	1920
Receipts of Pará....................*tons*	23,000	27,385	21,690
Receipts of caucho	8,600	6,800	6,471
Shipments to Europe	6,035	11,308	10,761
Shipments to the United States	19,350	27,275	18,262

AFRICAN RUBBER

The quantity of African rubber on the market has decreased considerably. West Coast African imports from all districts have fallen off largely. Congo supplies are less, Antwerp imports being about 2,400 tons. There have been a few small shipments from Madagascar and Mozambique, also some old parcels of Manihot from East Africa which were difficult to sell.

EAST INDIAN RUBBER

The Asiatic districts of Rangoon and Assam sent practically nothing, and small shipments from Penang have been only partly sold. Java and Sumatra have sent practically no cultivated red Ficus rubber, and no wild rubber has come from Borneo. Balata imports have fallen off, especially block. Gutta percha has been scarce.

BRITISH STOCKS

British stocks on December 31 were 56,499 tons of which 620 tons were Pará or caucho and 55,879 tons were plantation rubber. British imports of all sorts for the year were 103,095 tons, and deliveries 71,046 tons. Of these 7,285 tons imported and 7,435 tons delivered were Pará or caucho. During the whole of the past year British manufacturers have practically been living on the 1919 stocks.

DUTCH STOCKS

Complete Dutch statistics for 1920 are not yet available. Plantation imports up to October 31 were 8,899 tons, and exports, 4,628 tons. Stocks of all descriptions totaled 4,918 tons. Imports were rather larger during the last two months of the year and stocks December 31 were estimated at between 7,000 and 8,000 tons.

AMERICAN IMPORTS

Imports of all descriptions into the United States were estimated by The Rubber Association of America to total 234,663 tons in 1920 against 231,510 tons in 1919. Of the 1920 imports 196,972 tons were plantations; 18,391 tons Parás; 3,881 tons Africans; 713 tons Centrals; 1,037 tons guayule; 86 tons Maniçoba and Matto Grosso; 481 tons balata; 8,113 tons miscellaneous gum. The official statistics of the United States show total imports exclusive of rubber scrap, amounting to 590,464,159 pounds in 1920 against 565,931,299 pounds in 1919.

WORLD'S RUBBER PRODUCTION

Numerous attempts have been made to estimate the world's production, distribution and consumption of crude rubber during the past year with widely divergent results, owing to the absence of entirely reliable or authoritative statistics and differences in methods of estimation.

The world's production of crude rubber of all kinds for the year 1920 is variously estimated by authorities at 305,000 to 368,000 tons. Stocks in the East, England, America and afloat were believed to have increased about 80,000 tons on January 1, 1921, but there was much less afloat than at the same time last year, a reliable estimate being 30,799 tons against 37,340 tons the year previous.

W. H. Rickinson & Son estimate production as follows:

	1918	1919	1920
Plantation ....*tons*	200,950	*340,225	304,816
Brazil	30,700	34,285	30,790
Rest	9,929	7,350	8,125
Totals ....*tons*	241,579	381,860	343,731

*Including 55,000 tons from 1918.

Symington & Sinclair estimate production thus:

	1919	1920	1921 Estimated
Malaya ....*tons*	180,000	190,000	130,000
Ceylon and India	35,000	40,000	25,000
Dutch East Indies	75,000	85,000	55,000
Other Eastern Countries	10,000	15,000	10,000
Total Plantations	300,000	330,000	220,000
Brazil	32,000	31,000	20,000
Wild	7,000	7,000	5,000
Totals ....*tons*	339,000	368,000	245,000

S. Figgis & Co. estimate total production at 305,000 tons, 255,500 tons plantation, 28,160 tons Brazilian and the balance wild rubber.

DISTRIBUTION AND CONSUMPTION

W. H. Rickinson & Son estimate distribution as follows:

	1918	1919	1920
America ....*tons*	142,772	236,977	235,000
Great Britain	30,104	42,520	56,972
Russia	2,000	1,500	300
Germany and Austria	1,000	4,000	9,300
France	18,000	22,000	14,500
Italy, etc.	9,800	14,000	7,000
Scandinavia	5,000	7,000	7,700
Japan and Australia	7,400	12,000	6,000
Canada	8,300	9,500	11,000
Belgium	....	5,000	3,500
Totals ....*tons*	224,376	354,497	351,272

Symington & Sinclair estimate consumption thus:

	1919	1920	1921 Estimated
United States ....*tons*	230,000	220,000	225,000
United Kingdom	33,000	25,000	24,000
France	22,000	14,000	12,000
Italy	14,000	6,000	3,000
Canada	9,500	11,000	12,000
Australia and Japan	10,000	9,000	9,000
Germany, Austria, Russia	5,500	9,000	9,000
Scandinavia	3,500	6,000	6,000
Belgium	2,000	2,000	2,000
Other Countries	3,500	1,000	1,000
Totals ....*tons*	333,000	303,000	303,000

With a few exceptions the crude rubber imports of consuming countries may be taken as their consumption. British consumption is readily ascertained by deducting exports and domestic deliveries from the sum of stocks and imports. Belgium and Holland, in addition to their transit trade, have small markets in Antwerp, Amsterdam and Rotterdam, where at present moderate stocks are carried. Bordeaux, France, and Hamburg, Germany, both important pre-war markets, have not yet recovered. The real difficulty in estimating consumption is the figure for the United States, the largest consumer and hence the most important. While American imports for 1920 were 235,000 tons, consumption probably did not exceed 220,000 tons. On this assumption the world's 1920 consumption was about 303,000 tons, and taking 368,000 tons as the production for the year, there was an unconsumed surplus of production of 65,000 tons, exclusive of any carry-over from 1919.

Symington & Sinclair estimate the total visible supply of crude rubber at the end of 1920 at 207,000 tons. This is exclusive of manufacturers' stocks which are known to be generally heavy. They point out, however, the distinction that should be made between a real surplus and the necessary visible supply to safeguard the industry, owing to the long voyage from producing to consuming countries. On the basis of a world's consumption of 300,000 tons per annum, a four months' supply means 100,000 tons. To this must be added some 35,000 tons for necessary stocks in the New York and London markets and allowances for normal shipments awaiting sailings at various producing

markets. This total of 135,000 tons deducted from the total visible supply of 207,000 tons leaves a real estimated surplus of 72,000 tons, which it is believed will be reduced to about 14,000 tons by the end of this year.

Much of the information contained in the above review was supplied by S. Figgis & Co., London, England.

THE ANTWERP 1920 CRUDE RUBBER MARKET

As soon as possible after the Armistice was signed Antwerp importers of rubber became active, and first Congo and later Malayan rubber began to arrive in increasing quantities, finding during 1919 and the first part of 1920 ready sale at very favorable prices, due to the advance in price and the increase in value of the pound sterling. However, this condition was soon followed by a period of stagnation when rubber which at the beginning of 1920 obtained *2s. 10d.* a pound dropped to *10d.* a pound.

Prices at the close of December, 1920, showed a decrease of 15 to 25 per cent in Congo grades as compared with prices at the end of December, 1920. The decrease for plantations was about 37 per cent and for fine Pará about 58 per cent. Thus, red Kassai 1, which, at the end of 1919, sold at 5.75 francs, dropped to 4.75 at the close of 1920; red Kassai, grade Loanda II, brought 3.75 as against 4.85 the year before. Black Kassai was quoted at 5 francs as against 5.75. White rubbers, Equator, Ikelemba, Lopori, etc., ordinary upper Congo, and Aruwimi, Uelé, all showed declines from 5.75 to 5 francs. Red Congo Wamba was only 3.60 as compared with 4.70. Fine Pará came down from *2s. 7d.* to *1s. 1d.* and plantation crêpe 1, from 9.50 francs to 6 francs.

The futures market suffered from the general conditions. At the beginning of January, 11.35-11.25 francs were quoted, then the rise in exchange gradually brought the figure higher until about the middle of May, the market for futures was 14.75-14.55 francs. After this, prices gradually and steadily declined until at the end of the year the decrease was about 50 per cent. The market was very restricted and transactions did not amount to more than 3,700,000 kilos.

Imports for the year 1920 amounted to 2,304,162 kilos, Belgian Congo and others, against 2,233,889 kilos in 1919 and 3,006,470 kilos in 1913. The amounts of plantation grades were 621,088 in 1920, 49,883 in 1919 and 2,033,039 in 1913, giving for all kinds totals of 2,925,250 kilos in 1920, compared with 2,283,772 kilos in 1919 and 5,039,509 kilos in 1913. As will be noted, there is a slight increase in the amounts of 1920 over those of 1919, but both are still a good deal behind the figures for 1913.

The decrease in Congo rubbers is ascribed to lower output due to the fact that during the war the planters paid more attention to other products and also to the fact that preference is being given to plantation rubbers. The quality of Congo rubbers continues to be regular and satisfactory. Lots of Congo plantation rubber, generally well-prepared sheet or biscuit, found ready buyers at prices equivalent to those obtained by Eastern plantations.

CEYLON RUBBER IMPORTS AND EXPORTS, 1919-1920

IMPORTS

	January 1 to December 31	
	1919	1920
Crude rubber:		
From Straits Settlements ... *pounds*	2,755,106	2,722,724
India	1,885,634	1,697,463
Burma and other countries	3,436	42,768
Totals	4,644,176	4,462,955

EXPORTS

Crude rubber:		
To United Kingdom ... *pounds*	32,973,661	44,717,774
Belgium	65,351	259,150
France	383,400	777,113
Germany	11,050	1,062,362
Holland	13,476	165,794
Spain	26	......
Victoria	98,755	391,991
New South Wales	171,812	499,417
United States	65,473,466	38,233,874
Canada and Newfoundland	931,034	580,304
India	2,899	2,176
Straits Settlements	474	44,800
Japan	267,427	326,345
Italy	......	230,720
Norway	......	4,480
Western Australia	......	56
Totals	100,392,831	87,296,356

CEYLON RUBBER EXPORTS DURING THE PAST TEN YEARS

Total export from 1st Jan. to 31st Dec., 1920 ... *pounds*	87,296,356
Total export from 1st Jan. to 31st Dec., 1919	100,392,831
Total export from 1st Jan. to 31st Dec., 1918	47,219,128
Total export from 1st Jan. to 31st Dec., 1917	71,351,629
Total export from 1st Jan. to 31st Dec., 1916	54,698,729
Total export from 1st Jan. to 31st Dec., 1915	46,566,187
Total export from 1st Jan. to 31st Dec., 1914	35,318,269
Total export from 1st Jan. to 31st Dec., 1913	25,433,551
Total export from 1st Jan. to 31st Dec., 1912	15,001,075
Total export from 1st Jan. to 31st Dec., 1911	7,154,658

Compiled by the Ceylon Chamber of Commerce.

RUBBER EXPORTS FROM PENANG FOR THE YEARS 1919 AND 1920

	January 1 to December 31	
	1919	1920
To Great Britain:		
Para rubber ... *piculs*[1]	$232,393	$259,971
India rubber	47	2,911
Totals, Great Britain	$232,440	$262,882
To Europe:		
Pará rubber	....	$3,796
Totals, Europe	....	$3,796
To United States:		
Pará rubber	$147,554	$145,177
India rubber	433	694
Gutta rambong	....	166
Totals, United States ... *piculs*	$147,987	$146,037
Grand totals ... *piculs*	$380,427	$412,715

[1]One picul equals 133⅓ pounds.

PLANTATION RUBBER EXPORTS FROM JAVA*

	November		Eleven Months Ended November 30	
	1919	1920	1919	1920
To Netherlands ... *kilos*	620,000	486,000	2,646,000	4,593,000
Great Britain	880,000	720,000	7,033,000	8,063,000
Germany	....	20,000	....	109,000
France	....	20,000	215,000	43,000
Belgium	....	....	....	117,000
Italy	....	17,000	....	42,000
Other European destinations	....	....	....	....
United States	909,000	751,000	16,541,000	11,536,000
Singapore	414,000	645,000	5,008,000	4,189,000
Japan	....	10,000	183,000	194,000
Australia	....	44,000	245,000	234,000
Other countries	....	....	169,000	....
Totals ... *kilos*	2,823,000	2,713,000	32,040,000	29,120,000
Ports of origin:				
Tandjong Priok ... *kilos*	1,359,000	1,604,000	16,267,000	13,730,000
Samarang	44,000	44,000	504,000	475,000
Soerabaya	1,414,000	825,000	14,161,000	13,827,000

*September figures, 1919 and 1920, revised.

ANTWERP RUBBER ARRIVALS

February 11. By the S. S. "Anversville," from the Congo.

Société Anonyme Bungé (Cie du Congo belge) ... *kilos*	115
Société Anonyme Bungé	359
Société Anonyme Bungé (Comptoir Colonial Belgika)	2,720
Société Coloniale Anversoise (Compagnie du Kessai)	11,630
Société Coloniale Anversoise (Lomami)	1,125
Société Coloniale Anversoise (S. A. B.)	1,880
Société Coloniale Anversoise (C. F. H. C.)	23,490
Various	1,766
Total ... *kilos*	43,085

Compiled by Grisor & Co., Antwerp.

UNITED STATES CRUDE RUBBER IMPORTS FOR 1921 (BY MONTHS)

1921	Plantations	Parás	Africans	Centrals	Guayule	Maniçoba and Matto Grosso	Balata	Miscellaneous Gum	Waste	Totals 1921	Totals 1920
January ... *tons*	12,819	1,312	43	3	.....	.....	41	173	1,071	15,462	22,401
February	7,913	432	269	2	223	...	25	216	37	9,117	33,984
Totals, 2 months, 1921	20,732	1,744	312	5	223	.....	66	389	1,108	24,579	.....
Totals, 2 months, 1920	47,480	5,076	1,379	376	34	.....	132	1,248	660	.....	56,385

Compiled by The Rubber Association of America, Inc.

Review of the Crude Rubber Market

NEW YORK

The generally quiet conditions that have ruled in the market during the past month are said to be largely due to the belief of factory buyers that ample supplies are available at any time at reasonable prices. This theory, however, would not hold good in the event of an unexpected buying movement that may occur at any time.

During the second week of the month, plantation July-December positions which had been firm at 23 to 24 cents were sold freely and the market weakened, spot being offered at 16 to 17 cents by dealers for direct factory business. Then other futures became easier, April-June selling at 18½, and July-September at 20 cents.

Considerable selling developed about the middle of the month between dealers and factories, in fact the best trading known for some time but later, weakness developed and the market tendency was lower, spot plantations selling as low as 16 cents. Stimulated by reports of renewed activity in automobile manufacturing, the market firmed up, spot and April-May being quoted 17½ to 18 cents, April-June, 18 to 18½ cents, and July-September 19 to 20 cents. In all positions these prices could have been shaded on all good factory business.

The actual demand noticeable the latter part of the month was from small factories and western concerns who had liquidated their high priced stocks, and from those who are manufacturing tires on orders. These indications point to a gradual increase in demand for the crude material from now on, with prices around present levels due to existing stocks. Futures should be more active considering the gradual improvement in market and exchange conditions.

Imports during February were 8,839 tons of all grades, compared with 32,994 tons a year ago. February plantation arrivals were 7,913 tons, compared with 29,681 tons last year. Total imports for the first two months of 1921 were 23,016 tons compared with 54,346 tons for the same period in 1920.

Spot and future quotations on standard plantation and Brazilian sorts were as follows.

Plantations. March 5, spot first latex crêpe, 19½ cents; April-June, 20 cents; July-September, 22½ cents; July-December, 24½ cents.

March 26, spot first latex crêpe, 18½ to 19 cents; April-June, 19½ to 20 cents; July-September, 21 cents; July-December, 22 to 23 cents.

March 5, spot ribbed smoked sheets, 17½ cents; April-June, 18¾ cents; July-September, 21 cents; July-December, 23 cents.

March 26, spot ribbed smoked sheets, 17 cents; April-June, 17½ to 18 cents; July-September, 19 to 20 cents; July-December, 20½ to 21 cents.

March 5, No. 1, amber crêpe, 16 cents.

March 26, No. 1, amber crêpe, 15½ cents.

March 5, No. 1, rolled brown crêpe, 11 to 12 cents.

March 26, No. 1, rolled brown crêpe, 12 cents.

South American Parás and Caucho. March 5, upriver fine, 17½ cents; islands fine, 17½ cents; upriver coarse, 11½ cents; islands coarse, 11 cents; Cameta, 11 cents; caucho ball, 12½ to 14½ cents.

March 26, upriver fine, 17¼ to 17½ cents; islands fine, 17 to 18 cents; upriver coarse, 11 to 11½ cents; islands coarse, 12 cents; Cameta, 10½ to 11 cents; caucho ball, 12 to 14 cents.

NEW YORK QUOTATIONS

Following are the New York spot quotations, for one year ago, one month ago, and March 26, the current date:

	April 1, 1920	March 1, 1921	March 26, 1921
PLANTATION HEVEA			
First latex crêpe	$0.46½ @ .47	$0.20 @ .20½	$0.18½ @ .19
Off latex crêpe	@	@	.17 @ .18
Amber crêpe No. 1	.46 @	.16¼ @ .16½	.15½ @ .16
Amber crêpe No. 2	.45½ @	.15¼ @ .15½	.14½ @ .15
Amber crêpe No. 3	.44½ @	.14¼ @ .14½	.13½ @ .14
Amber crêpe No. 4	.42½ @	.13½ @ .14	.12½ @ .13
Brown crêpe, thick and thin	.43 @	.13 @ .13½	.13½ @ .14
Brown crêpe, specky	.41 @	.11 @ .12	.11 @ .12
Brown crêpe, rolled	.40 @	.12½ @ .13	.12 @
Smoked sheet, ribbed	.46 @	.18½ @ .19	.17 @
Smoked sheet, plain	.45 @	.17½ @	.15 @ .16
Unsmoked sheet	@	.16½ @	.15 @
Colombo scrap No. 1	.33 @	.12 @	.11 @
Colombo scrap No. 2	.31 @	.10 @	.09 @
EAST INDIAN			
Assam crêpe	@	@	@
Assam onions	@	@	@
Penang block scrap	@	@	@
PONTIANAK			
Banjermassin	.13 @	.07 @ .08	.07 @
Palembang	@	@	.09 @
Pressed block	.25 @	.11¾ @ .12¼	.11¾ @
Sarawak	@	.06½ @	.06 @
SOUTH AMERICAN			
PARAS			
Upriver, fine	.42 @ .42½	.17½ @ .18	.17 @ .17½
Upriver, medium	.39½ @ .40	.15 @	.14 @
Upriver, coarse	.31 @	.12½ @ .13¼	.11 @ .11½
Upriver, weak, fine	.35 @	.12 @ .13	.11 @ .12
Islands, fine	.41 @	.17½ @ .18	.17 @
Islands, medium	.39½ @ .40	.15 @	.13 @
Islands, coarse	.21 @ .21½	.11 @	.12 @
Cametá	.22 @	.11½ @ .12	.10½ @
Acre Bolivian, fine	@	.18 @ .18½	.18 @
Madeira, fine	@	.18½ @ .20	.19½ @ .20
Peruvian, fine	.40¼ @	.16 @ .17	.16 @
Tapajos, fine	@	.16½ @ .17	.16 @ .16½
CAUCHO			
Upper caucho ball	.32 @	.14½ @ .15	.14 @
Lower caucho ball	.30 @	.12½ @ .13	.10½ @
MANICOBAS			
Ceará negro beads	.36 @	*.13 @	.10 @
Ceará scrap	.30 @	*.10 @	.05 @
Maniçoba, 30% guarantee	.32 @	*.12½ @	.09½ @ .10
Mangabeira thin sheet	.30 @	*.15 @	.12 @

	April 1, 1920	March 1, 1921	March 26, 1921
CENTRALS			
Corinto scrap	.28 @ .29	.12 @	.11 @ .12
Central scrap	.26 @ .27	.12 @	.11 @ .12
Central scrap and strip	.25 @ .26	.10 @ .11	.08 @ .10
Central wet sheet	.20 @	.06 @ .07	.05 @ .07
Esmeralda sausage	.27 @ .28	.12 @	.11 @ .12
Guayule, 20% guarantee	.27 @	@	@
Guayule, washed and dried	38 @	*.26 @	*.26 @
AFRICANS			
Benguela, extra No. 1, 28%	.26½ @	@	@
Benguela, No. 2, 32½%	.23 @	.07 @	@
Conakry niggers	.35 @	@	@
Congo prime, black upper	@	*.15 @	@
Congo, prime, red upper	@	*.12 @	@
Kassai, black	.38 @	*.15 @	@
red	@	@	@
Massai sheets and strings	@	@	@
Niger flake, prime	.18½ @	*.17 @	@
Rio Nunez ball	@	@	@
Rio Nunez sheets, strings	.36 @	@	@
GUTTA PERCHA			
Gutta Siak	.29 @ .30	.17 @	.15½ @
Red Macassar	2.60 @	2.10 @ 3.00	2.25 @
BALATA			
Block, Ciudad Bolivar	.58 @ .60	.60 @ .61	.56 @
Colombia	.49 @ .50	.45 @ .46	.47 @ .48
Panama	.40 @ .46	.45 @ .46	.46 @ .47
Surinam sheet	.78 @	.69 @ .70	.68 @ .69
amber	.82 @	.84 @	.80 @ .82

*Nominal.

RECLAIMED RUBBER

During the past month a steadily increasing demand for reclaimed rubber destined for the insulated wire trade, and automobile topping particularly, has been noted. As yet this demand has not been sufficient to warrant general resumption of production on the part of reclaimers. Apparently the tide has turned and continued increase in business is looked for as the spring advances. Quotations are nominal and unchanged.

NEW YORK QUOTATIONS

March 26, 1921

Prices subject to change without notice

STANDARD RECLAIMS		
Floating	*$0.15	@ $0.18
Friction	* .15	@ .18
Mechanical	* .09	@ .11
Shoe	* .12½	@ .13½
Tires, auto	* .12	@ .13½
truck	* .09	@ .11
White	* .15	@ .18

*Nominal.

COMPARATIVE LOW AND HIGH NEW YORK SPOT RUBBER PRICES

	March 1921*		March 1920		March 1919	
PLANTATIONS:						
First latex crêpe	$0.18	@ $0.19½	$0.46	@ $0.48¼	$0.51	@ $0.56
Smoked sheet ribbed	.16¼	@ .18	.46	@ .48	.50	@ .54½
PARAS:						
Upriver, fine	.17	@ .18	.41½	@ .43	.55½	@ .58½
Upriver, coarse	.11¼	@ .12	.31¼	@ .31¾	.34	@ .35
Islands, fine	.17	@ .18	.41½	@ .44½	.47½	@ .49½
Islands, coarse	.11	@ .12	.21½	@ .22	.22	@ .22½
Cametá	.11	@	.21½	@ .22	.21	@ .23

*Figured to March 26, 1921.

SINGAPORE RUBBER MARKET

GUTHRIE & CO., LIMITED, Singapore, report under date of February 3, 1921:

The weekly rubber auction held yesterday opened with a firm tone, but owing to the early withdrawal of certain buyers demand fell away and prices declined. At the commencement of the sale standard sheet sold freely at 35 cents, but thereafter only 34 cents was obtainable. A few lots of standard crêpe sold at 35½ to 36½ cents. Off quality crêpe was difficult of sale, there being a wide margin between the prices obtained for off lots and that ruling for standard. Off quality sheet was in good demand, at 2 to 3 cents down. Brown crêpes were a strong market and advanced 2 to 3 cents, while dark and bark crêpes were readily salable at 1 to 2 cents up on the week. Six hundred and fifty-six tons were catalogued for sale, and 383 tons sold. The following is the course of values:

	In Singapore per pound[1]	Sterling Equivalent per pound in London
Sheet, fine ribbed smoked	34 @ 35c	—/11⅞ @ 1/ 0⅛
Sheet, good ribbed smoked	20 @ 32	—/ 7⅜ @ —/11¼
Crêpe, fine pale	35½ @ 36½	1/ 0¾ @ 1/ 1⅛
Crêpe, good pale	22 @ 34	—/ 9 @ 1/ 0⅜
Crêpe, fine brown	20½ @ 26½	—/ 8½ @ —/10¼
Crêpe, good brown	14 @ 20	—/ 6¾ @ —/ 8⅜
Crêpe, dark	13 @ 18	—/ 6⅜ @ —/ 7⅞
Crêpe, bark	13 @ 15½	—/ 6⅜ @ —/ 7⅛

[1]Quoted in Straits Settlements currency, $1 equals $0.567 United States currency.

AMSTERDAM RUBBER MARKET

JOOSTEN & JANSSEN, Amsterdam, report, under date of March 4, 1921:

The tone of the market this week was depressed and the movement on the London market caused a not unimportant decline here also.

Regular business resulted on the terminal market as offerings, which mostly were not pressing, found fairly ready buyers.

Also in spot crêpe and sheets some sales took place at comparatively good prices.

The close is quiet with pretty good demand and little offering at the reduced prices.

We quote:

Hevea crêpe, Fl. 61. Sheets, Fl. 54 on the spot.
Hevea crêpe, Fl. 64. Sheets, Fl. 58 April-June.
Hevea crêpe, Fl. 69. Sheets, Fl. 64 July-September.
Hevea crêpe, Fl. 74. Sheets, Fl. 69 October-December.

HAMBURG RUBBER MARKET

EFFEKTIV-ROHGUMMIMAKLER-VEREIN, Hamburg, report, February 12, 1921:

The week opened very quietly. Eastern market prices were firm and higher, but without immediately affecting the consumer's market. Toward the middle of the week business became quite active owing to demand from German consumers, as the drop in foreign exchanges made the execution of orders possible. Then prices suddenly advanced and the higher market prevented many transactions, so that the week ended considerably quieter, although the exchanges were in our favor. London also closed very quietly and ¼d. lower.

Business was done in almost all qualities. The prices moved between:

	Marks
First latex	28 @ 32
Ribbed smoked sheets	24 @ 28
Smoked sheets, lower grade	21 @ 24
Brown crêpe, clean	21 @ 24
Brown crêpe, somewhat barky	17 @ 20
Dark crêpe	15 @ 18
Hard fine Pará	27 @ 32
Caucho ball	20 @ 23
Congos	18 @ 23
Block balata	60 @ 90
No. 1 balata sheet	110 @ 130
Jelutong	13 @ 17
Bandjer soh	50 @ 60

ANTWERP RUBBER MARKET

GRISAR & CO., Antwerp, report under date of March 4, 1921:

The London market remained very quiet in consequence of the absence of orders. Rates are slightly lower. We close at the following prices: First latex crêpe, March, 1s. 0¼d., April-June, 1s. 1d.; July-September, 1s. 2d.; July-December, 1s. 2½d.; October-December, 1s. 3¼d. (buyers). Fine Pará, 11½d.

Statistics for the week were as follows: Arrivals, 1,222 tons; sales, 777 tons; stock, 59,148 tons against 20,084 in 1920. The stock consists of 16,000 tons first latex crêpe; 24,000 tons ribbed smoked sheet; 19,000 tons of inferior grades; a very large proportion of this consists of mouldy sheets.

In Antwerp the stock on hand this day amounts to 1,807 tons. The futures market here remains very quiet with prices about 50 centimes lower. At the close price were: March, 6.10; April, 6.25; May, 6.40; June-February, 6.50.

CRUDE RUBBER ARRIVALS AT ATLANTIC AND PACIFIC PORTS AS STATED BY SHIPS' MANIFESTS

PARAS AND CAUCHO AT NEW YORK

	Fine	Medium	Coarse	Caucho	Pounds Totals
February 27. By the S. S. "Lake Fandon," from Pará.					
General Rubber Co.	....	....	....	....	36,617
Poel & Kelly	27,193	6,685	....	....	33,878
Various	....	....	....	....	48,059
March 3. By the S. S. "Dunstan" from Pará.					
Meyer & Brown, Inc.	133,380*	....	....	....	133,380
H. A. Astlett & Co.	....	11,200	....	....	11,200
Paul Bertuch	420,007	....	14,387	....	434,394
March 3. By the S. S. "Dunstan," from Manáos.					
General Rubber Co.	....	....	....	....	39,091
Meyer & Brown, Inc.	56,000	....	....	....	56,000
Poel & Kelly	64,196	....	42,659	48,501‡ 27,731	183,087§
Various	....	....	....	....	141,970
March 3. By the S. S. "Dunstan," from Iquitos.					
Various	....	....	....	....	5,568
March 16. By the S. S. "St. Michael," from Pará.					
Poel & Kelly	37,729	711	45,470	16,650‡ 33,441	134,001†
General Rubber Co.	....	....	....	....	76,006
Paul Bertuch	106,704	....	....	....	106,704
March 17. By the S. S. "Socrates," from Pará.					
Thornett & Fehr, Inc.	56,000	....	....	....	56,000
Meyer & Brown, Inc.	59,360*	....	....	....	59,360
H. A. Astlett & Co.	50,000	6,000	....	22,000	78,000
Poel & Kelly	79,105	5,700	39,800	6,735‡ 600	131,940†
March 17. By the S. S. "Socrates," from Manáos.					
Meyer & Brown, Inc.	112,000*	....	44,800	....	156,800

*Includes medium. ‡Cameta.
†Includes Manáos. §Includes Pará.

PLANTATIONS

(Figured 180 pounds to the bale or case)

	Shipment from:	Shipped to:	Pounds	Totals
February 18. By the S. S. "Santa Cruz," at San Francisco.				
Fred Stern & Co.	Singapore	San Francisco	102,800	102,800
February 19. By the S. S. "Shinsei Maru," at New York.				
Chas. T. Wilson Co., Inc.	Colombo	New York	22,400	
Fred Stern & Co.	Colombo	New York	22,400	
L. Littlejohn & Co., Inc.	Colombo	New York	51,300	
Hood Rubber Co.	Colombo	Watertown	40,320	
Meyer & Brown, Inc.	Colombo	New York	112,000	
Baring Bros.	Colombo	New York	100,800	
Fisk Rubber Co.	Colombo	Chicopee Falls	22,400	371,620
February 19. By the S. S. "Karimata," at New York.				
Alden's Successors, Inc.	Soerabaya	New York	93,960	
L. Littlejohn & Co., Inc.	Soerabaya	New York	16,380	
Various	Soerabaya	New York	11,880	
Thornett & Fehr, Inc.	Batavia	New York	224,000	
Fred Stern & Co.	Batavia	New York	179,200	
Various	Batavia	New York	125,280	
Various	Tjong Priok	New York	111,780	
Various	Sebang	New York	1,141,740	1,904,220
February 23. By the S. S. "Rotterdam," at New York.				
Thornett & Fehr, Inc.	Rotterdam	New York	11,200	
Meyer & Brown, Inc.	Rotterdam	New York	291,200	302,400
February 23. By the S. S. "Costigan," at New York.				
Thornett & Fehr, Inc.	Belawan	New York	91,980	
The Goodyear Tire & Rubber Co.	Belawan	Akron	249,840	
Firestone Tire & Rubber Co.	Singapore	Akron	215,416	
The Goodyear Tire & Rubber Co.	Singapore	Akron	300,338	
Various	Singapore	New York	36,940	
Fred Stern & Co.	Batavia	New York	78,400*	
Aldens' Successors, Inc.	Batavia	New York	32,760	
Winter, Ross & Co.	Batavia	New York	14,580	
Henderson, Forbes & Co.	Batavia	New York	59,220	
Poel & Kelly	Batavia	New York	124,740	
Thornett & Fehr, Inc.	Batavia	New York	134,400	
East Asiatic Co., Inc.	Batavia	New York	60,660	1,399,274
*Includes Singapore				
February 23. By the S. S. "Norman Monarch," at New York.				
Poel & Kelly	London	New York	900	900
February 24. By the S. S. "Bardic," at New York.				
Meyer & Brown, Inc.	London	New York	99,900	
Aldens' Successors, Inc.	London	New York	38,880	138,780

PLANTATIONS—Continued

	Shipment from:	Shipped to:	Pounds.	Totals.
February 24. By the S. S. "Eastern Importer," at New York.				
Firestone Tire & Rubber Co.	Singapore	Akron	101,160	101,160
February 24. By the S. S. "M. S. Dollar," at New York.				
Goschens & Cumliffe....	Singapore	New York	135,000	
William Stiles & Co....	Singapore	New York	22,400	
Firestone Tire & Rubber Co.	Singapore	Akron	55,800	
The Goodyear Tire & Rubber Co.	Singapore	Akron	715,680	
Meyer & Brown, Inc....	Singapore	New York	112,000	
General Rubber Co.....	Singapore	New York	135,540	
Canadian Consolidated Rubber Co., Limited..	Singapore	Toronto	33,660	
Baird Rubber & Trading Co.	Singapore	New York	67,200	
L. Littlejohn & Co., Inc.	Singapore	New York	115,250	1,392,530
February 27. By the S. S. "Nemaha," at New York.				
General Rubber Co......	Colombo	New York	224,480	
Baring Bros.	Colombo	New York	302,400	
L. Littlejohn & Co., Inc.	Colombo	New York	44,800	
Meyer & Brown, Inc...	Colombo	New York	246,400	
The Fisk Rubber Co....	Colombo	Chicopee Falls	22,400	
Various	Colombo	New York	111,380	951,860
March 3. By the S. S. "Eurylochus," at Boston.				
Hood Rubber Co.......	Colombo	Watertown	112,000	
Baring Bros.	Colombo	New York	100,800	
Various	Colombo	Boston	56,140	268,940
March 3 By the S. S. "Eurylochus," at New York.				
Baird Rubber Trading Co.	Colombo	New York	246,400	
Meyer & Brown, Inc...	Colombo	New York	112,000	
L. Littlejohn & Co., Inc.	Singapore	New York	248,400	
Irwin-Harrisons & Crosfield, Inc.	Batavia	New York	18,000	
Various	Batavia	New York	33,980	658,780
March 4. By the S. S. "Muncaster Castle," at New York.				
Hood Rubber Co.......	Singapore	Watertown	408,130	408,130
March 6. By the S. S. "Peugelly," at New York.				
Meyer & Brown, Inc....	Singapore	New York	11,200	
Various	Singapore	New York	27,320	38,520
March 6. By the S. S. "Saxonia," at New York.				
L. Littlejohn & Co., Inc.	London	New York	134,400	
Various	London	New York	2,580	136,980
March 6. By the S. S. "Algie," at New York.				
L. Littlejohn & Co., Inc.	Colombo	New York	179,200	
Various	Colombo	New York	114,380	293,580
March 7. By the S. S. "Trehawke," at New York.				
L. Littlejohn & Co., Inc.	Colombo	New York	196,400	
Various	Colombo	New York	85,840	282,240
March 7. By the S. S. "Orteric," at Boston.				
Hood Rubber Co........	Colombo	Watertown	33,600	33,600
March 7. By the S. S. "Orteric," at New York.				
Chas. T. Wilson Co., Inc.	Colombo	New York	56,000	
Baird Rubber & Trading Co.	Colombo	New York	235,200	
L. Littlejohn & Co., Inc.	Colombo	New York	148,600	
Meyer & Brown, Inc....	Colombo	New York	56,000	
H. A. Astlett & Co.....	Colombo	New York	56,000	551,800
March 11. By the S. S. "Taketoyo Maru," at New York.				
L. Littlejohn & Co., Inc.	Colombo	New York	112,000	
Chas. T. Wilson Co., Inc.	Colombo	New York	22,400	
Baird Rubber & Trading Co.	Colombo	New York	56,000	
H. A. Astlett & Co......	Colombo	New York	95,000	
Various	Colombo	New York	86,840	372,240
March 13. By the S. S. "Nagano Maru," at New York.				
Various	Singapore	New York	275,900	
Irwin-Harrisons & Crossfield, Inc.	Pt Swettenham	New York	24,640	
Meyer & Brown, Inc....	Colombo	New York	224,000	
Chas. T. Wilson Co., Inc.	Colombo	New York	180,800	
J. T. Johnstone & Co., Inc.	Colombo	New York	33,600	
L. Littlejohn & Co., Inc.	Colombo	New York	156,800	
Baird Rubber & Trading Co.	Colombo	New York	17,920	913,660
March 13. By the S. S. "Clearwater," at New York.				
Various	Colombo	New York	98,860	
The Goodyear Tire & Rubber Co.	Belawan	Akron	468,720	
General Rubber Co.....	Belawan	New York	84,960	
The Goodyear Tire & Rubber Co.	Singapore	Akron	337,500	
Charles T. Wilson Co., Inc.	Singapore	New York	22,400	
Konig Bros. & Co......	Singapore	New York	5,040	
Various	Penang	New York	4,860	
Winter, Ross & Co......	Batavia	New York	14,580	
Fred Stern & Co.	Batavia	New York	70,800	
East Asiatic Co., Inc...	Batavia	New York	7,380	1,115,100
March 13. By the S. S. "Celtic Prince," at New York.				
The Fisk Rubber Co....	Singapore	Chicopee Falls	33,717	
Boustead & Co........	Singapore	New York	4,320	
Baird Rubber & Trading Co.	Singapore	New York	33,600	
William H. Stiles & Co.	Singapore	New York	224,000	
L. Littlejohn & Co., Inc.	Singapore	New York	183,780	
W. R. Grace & Co......	Singapore	New York	222,660	
East Asiatic Co., Inc...	Singapore	New York	327,600	
Aldens' Successors, Inc..	Singapore	New York	69,480	
Balfour, Williamson & Co.	Singapore	New York	186,660	
Thornett & Fehr, Inc....	Singapore	New York	219,520	
Chas. T. Wilson Co., Inc.	Singapore	New York	22,400	
J. T. Johnstone & Co., Inc.	Singapore	New York	89,600	
Rubber Importers & Dealers Co., Inc.....	Singapore	New York	92,700	
A. C. Fox & Co........	Singapore	New York	20,160	
Eastern Rubber Co.....	Singapore	New York	79,380	
Poel & Kelly..........	Singapore	New York	68,580	
Fred Stern & Co.......	Singapore	New York	83,000	
The Goodyear Tire & Rubber Co.	Singapore	Akron	272,520	
Firestone Tire & Rubber Co.	Singapore	Akron	198,900	
Canadian Consolidated Rubber Co., Ltd.......	Singapore	Montreal	283,320	
Hood Rubber Co.......	Singapore	Watertown	60,480	
Meyer & Brown, Inc...	Singapore	New York	134,400	
Various	Singapore	New York	1,011,603	
William H. Stiles & Co..	Penang	New York	49,500	
Various	Penang	New York	266,400	4,238,280
March 16. By the S. S. "Ryndam," at New York.				
Thornett & Fehr Inc...	Rotterdam	New York	11,200	
L. Littlejohn & Co., Inc.	Rotterdam	New York	56,000	
Meyer & Brown, Inc....	Rotterdam	New York	96,320	
Various	Rotterdam	New York	50,320	213,840
March 16. By the S. S. "Albania," at New York.				
Goldman, Sachs & Co...	London	New York	1,609,380	1,609,380
March 17. By the S. S. "Waaldyk," at New York.				
Aldens' Successors, Inc.	Soerabaya	New York	64,620	
Henderson, Forbes & Co.	Soerabaya	New York	27,900	
Huth & Co...........	Soerabaya	New York	17,820	
Weise & Co...........	Soerabaya	New York	18,000	
East Asiatic Co., Inc....	Soerabaya	New York	96,480	
Fred Stern & Co.......	Soerabaya	New York	13,320	
Meyer & Brown, Inc...	Soerabaya	New York	22,400	
Various	Soerabaya	New York	91,100	
The Goodyear Tire & Rubber Co.	Batavia	Akron	116,100	
Thornett & Fehr, Inc...	Batavia	New York	6,720	
Various	Batavia	New York	28,020	
Weise & Co...........	Belawan Deli	New York	18,360	
Fred Stern & Co.......	Belawan Deli	New York	380,800	
Various	Belawan Deli	New York	220,500	
Chas. T. Wilson Co., Inc.	Rotterdam	New York	33,600	
Various	T'jong Priok*	New York	112,920	1,268,640
March 18. By the S. S. "Laomedon," at New York.				
William H. Stiles & Co.	Singapore	New York	257,600	
L. Littlejohn & Co., Inc.	Singapore	New York	588,700	
J. T. Johnstone & Co., Inc.	Singapore	New York	76,160	
Baird Rubber & Trading Co.	Colombo	New York	264,320	
Meyer & Brown, Inc....	Colombo	New York	179,200	1,365,980
March 19. By the S. S. "Romeo," at New York.				
Fred Waterhouse Co., Ltd.	Singapore	New York	11,200	
J. T. Johnstone & Co., Inc.	Singapore	New York	107,520	
Fred Stern & Co.......	Belawan	New York	22,400	141,120

*Shut out S. S. "Veendyk."

CENTRALS

March 6. By the S. S. "Andrew Jackson," at New York.				
Hagemeyer Trading Co.	Montevideo	New York	6,479	6,479
March 17. By the S. S. "Panama," at New York.				
G. Amsinck & Co., Inc..	Cristobal	New York	1,800	1,800

AFRICANS

February 28. By the S. S. "Sao Vicente," at New York.				
Lawrence Johnson & Co.	Lisbon	New York	8,820	8,820
March 6. By the S. S. "Braga," at New York.				
Various	Havre	New York	330	330
March 12. By the S. S. "Iguassu," at New York.				
Various	Lisbon	New York	248,750	248,750

PONTIANAK

February 19. By the S. S. "Karimata," at New York.				
Various	T'jong Priok	New York	95,100	95,100
February 24. By the S. S. "M. S. Dollar," at New York.				
Various	Singapore	New York	125,700	125,700
March 13. By the S. S. "Celtic Prince," at New York.				
Baring Bros.	Singapore	New York	228,600	
Various	Singapore	New York	235,500	464,100

GUTTA PERCHA

February 21. By the S. S. "Jebba," at New York.				
Various	Sierra Leone	New York	42,900	42,900

GUTTA SIAK

March 13. By the S. S. "Celtic Prince," at New York.				
L. Littlejohn & Co., Inc.	Singapore	New York	52,500	52,500

BALATA

	Shipment from:	Shipped to:	Pounds.	Totals.
February 19. By the S. S. "Sebago," at New York.				
William Schall & Co....	Paramaribo	New York	1,800	1,800
February 22. By the S. S. "Berenice," at New York.				
William Schall & Co....	Paramaribo	New York	3,450	3,450
February 24. By the S. S. "General W. C. Gorgas," at New York.				
G. Amsinck & Co., Inc..	Cristobal	New York	115	115
February 25. By the S. S. "Maraval," at New York.				
South & Central America Commercial Co.......	Bolivar	New York	12,815	
G. Amsinck & Co., Inc..	Bolivar	New York	9,840	22,655
February 25. By the S. S. "Tivives," at New York.				
P. R. Rincorres........	Cartegena	New York	2,400	2,400
March 2. By the S. S. "Quilpue," at New York.				
Ultramares Corporation.	Guayaquil	New York	3,565	
American Trading Co...	Guayaquil	New York	2,415	
G. Amsinck & Co., Inc..	Guayaquil	New York	3,680	9,660
March 13. By the S. S. "Matura," at New York.				
South and Central America Commercial Co...	Port of Spain	New York	16,560	16,560
March 16. By the S. S. "Lake Sunapee," at New York.				
Arkell & Douglas, Inc...	Dutch Guiana	New York	20,825	20,825

CUSTOM HOUSE STATISTICS

NEW YORK

IMPORTS

	January 1920 Pounds	January 1920 Value	January 1921 Pounds	January 1921 Value
Unmanufactured—*free:*				
Balata:				
From England	63,928	$45,709	22,501	$18,000
Panama	28,118	11,622	......	......
Trinidad	140,903	93,375	72,930	42,587
Colombia	39,208	17,417	7,291	2,970
British Guiana	27,296	22,942	......	......
Dutch Guiana	20,267	16,833	13,545	10,546
Venezuela	174,841	84,368	10,879	6,334
Totals	494,561	$292,266	127,146	$80,437
Jelutong (Pontianak):				
From Straits Settlements.	1,008,778	$151,289	170,147	$20,630
Dutch East Indies..	202,554	20,486	......	......
Totals	1,211,332	$171,775	170,147	$20,630
Gutta percha:				
From Straits Settlements..	725,660	$120,708	127	$31
Dutch East Indies..	87,869	12,479	......	......
British W. Africa..	3,470	555	......	......
England	......	......	53,200	7,980
Totals	816,999	$133,742	53,327	$8,011
Crude rubber:				
From Belgium	298,903	$90,518	......	......
France	490,968	198,476	......	......
Netherlands	1,522,588	722,320	100,800	$35,280
Portugal	67,461	33,730	121,000	13,310
England	16,575,904	7,762,677	636,468	178,011
Costa Rica	623	551	......	......
Guatemala	942	235	......	......
Honduras	446	182	......	......
Nicaragua	12,996	3,578	......	......
Panama	4,200	1,453	......	......
Salvador	2,775	1,422	......	......
Mexico	43,441	11,167	......	......
Trinidad	9,628	4,836	......	......
Haiti	794	272	......	......
Bolivia	1,843	449	......	......
Brazil	4,233,199	1,405,944	2,432,665	310,032
Colombia	117,609	45,286	117,568	24,548
Ecuador	151,002	37,849	600	86
British Guiana......	4,078	1,956	......	......
Peru	176,721	65,118	60,681	11,661
Venezuela	724	229	2,335	1,320
British India	282,195	110,812	378,943	108,491
Straits Settlements..	17,757,741	7,440,299	17,471,256	5,607,172
British East Indies.	7,781,126	3,127,447	1,900,643	398,855
Dutch East Indies..	5,592,603	2,445,439	2,521,287	872,617
Japan	175,512	86,564	......	......
British W. Africa..	107,663	53,831	......	......
Dutch Guiana	......	......	11,170	6,718
Turkey in Asia.....	......	......	44,800	13,245
Belgian Congo	......	......	60,759	12,267
Portuguese Africa .	......	......	150	30
Totals	55,413,685	$23,652,640	25,861,125	$7,593,643
Scrap rubber	610,858	53,210	148,096	10,224
Totals, unmanufactured.	58,547,435	$24,303,633	26,359,841	$7,712,945
Manufactures of rubber and gutta percha	......	55,650	......	33,045
Chicle ....*dutiable*	......	......	208,417	106,520

EXPORTS

	January 1920 Pounds	January 1920 Value	January 1921 Pounds	January 1921 Value
Manufactured:				
Belting	......	$119,441	......	$235,315
Hose	......	41,567	......	469,916
Packing	......	17,890	......	119,797
Rubber boots ....*pairs*	21,842	88,189	12,499	38,189
Rubber shoes ....*pairs*	951,777	1,000,552	731,008	793,612
Druggists' sundries	......	60,606	......	150,351
Automobile tires	......	2,573,773	......	1,792,336
Other tires	......	117,466	......	62,857
Inner tubes	......	40,145	......	121,227
Solid tires	......	26,920	......	155,199
Soles and heels............	......	13,787	......	102,890
Other rubber manufactures..	......	432,653	......	552,314
Totals, manufactured....	......	$4,532,989	......	$4,594,003
Chewing gum	......	......	......	$114,850
Insulated wire	......	......	......	2,318,553
Fountain pens.......*number*	......	......	43,077	66,731
Suspenders and garters... .	......	......	......	155,987
Totals	......	......	......	$2,656,121
Unmanufactured—*free:*				
Reclaimed and scrap rubber.	361,108	$48,855	928,023	$69,638

FOREIGN EXPORTS

	January 1920 Pounds	January 1920 Value	January 1921 Pounds	January 1921 Value
Balata	54,958	$32,698	......	......
Crude rubber	64,960	25,303	136,687	$34,372
Gutta percha	......	......	36,010	4,998
Rubber manufactures	......	......	......	32,512
Rubber substitutes	......	......	......	53

MASSACHUSETTS

IMPORTS

	January 1920 Pounds	January 1920 Value	January 1921 Pounds	January 1921 Value
Unmanufactured—*free:*				
Crude rubber:				
From England	472,101	$232,168	......	......
British East Indies..	......	......	33,600	$7,827
Totals	472,101	$232,168	33,600	$7,827
Reclaimed and scrap rubber.	15,761	1,300	......	......
Totals, unmanufactured.	487,862	$233,468	33,600	$7,827
Rubber manufactures.*dutiable*	......	$2,464	......	$4,143

EXPORTS

	January 1920 Pounds	January 1920 Value	January 1921 Pounds	January 1921 Value
Manufactured:				
Automobile tires............	......	$12,946	......	$6,776
Inner tubes	......	569	......	......
Belting	......	1,247	......	623
Hose	......	3,767	......	535
Packing	......	1,208	......	71
Rubber boots..........*pairs*	15,775	42,118	3,203	10,113
Rubber shoes..........*pairs*	224,360	177,592	39,785	54,018
Druggists' sundries	......	749	......	4,054
Soles and heels............	......	5,524	......	2,660
Other rubber manufactures..	......	33,125	......	22,742
Totals	......	$278,845	......	$101,592
Insulated wire	......	$338	......	$15,463
Suspenders and garters.....	......	9,360	......	263

PHILADELPHIA

IMPORTS

	January 1920 Pounds	January 1920 Value	January 1921 Pounds	January 1921 Value
Manufactured:				
Rubber manufactures.*dutiable*	......	$241	......	$14

EXPORTS

	January 1920 Pounds	January 1920 Value	January 1921 Pounds	January 1921 Value
Manufactured:				
Automobile tires	......	$18,532	......	......
Inner tubes	......	487	......	......
Hose	......	24,964	......	$478
Packing	......	1,412	......	553
Other rubber manufactures..	......	239	......	87
Totals	......	$45,634	......	$1,118
Insulated wire	......	$1,071	......	$20,276
Suspenders and garters......	......	4,172	......	......
Rubber scrap and reclaimed..	99,514	6,127	69,065	4,532

NEW ORLEANS

IMPORTS

	January 1920 Pounds	January 1920 Value	January 1921 Pounds	January 1921 Value
Unmanufactured—*free:*				
Crude rubber:				
From Nicaragua	5,744	$1,225	......	......
Mexico	87,214	43,000	......	......
Totals	92,958	$44,225	......	......
Chicle ....*dutiable*	......	......	30,263	$16,564

EXPORTS

	January 1920 Pounds	January 1920 Value	January 1921 Pounds	January 1921 Value
Manufactured:				
Automobile tires	......	$1,879	......	$7,879
Inner tubes	......	580	......	925
Solid tires	......	294	......	......
All other tires.............	......	368	......	9
Belting	......	2,726	......	190
Hose	......	1,562	......	11,288
Packing	......	428	......	312
Rubber boots ....*pairs*	96	133	11	50
Rubber shoes ....*pairs*	7,874	9,354	21,004	33,856
Soles and heels............	......	367	......	109
Druggists' sundries	......	156	......	549
Other rubber manufactures..	......	2,895	......	682
Totals	......	$20,742	......	$55,849

	January			
	1920		1921	
	Pounds	Value	Pounds	Value
Insulated wire	....	$2,634	....	$4,140
Fountain pens .... *number*	48	45	....	....
Suspenders and garters	....	1,338	....	$48
Chewing gum	....	....	....	1,636

SAN FRANCISCO

IMPORTS

	Pounds	Value	Pounds	Value
Unmanufactured—*free:*				
Crude rubber:				
From Salvador	650	$325	....	....
Straits Settlements	1,888,998	721,786	56,080	$8,255
Dutch East Indies	78,851	27,606	51,239	11,618
British East Indies	....	....	5,928	922
Hong Kong	374	177	....	....
Totals	1,968,873	$749,894	113,247	$2[illegible],795
Rubber manufactures..*dutiable*	....	$1,331	....	$160
Chicle ....*dutiable*	....	....	80	24

EXPORTS

	Pounds	Value	Pounds	Value
Manufactured:				
Automobile tires	....	$112,094	....	$45,205
Inner tubes	....	8,756	....	6,282
Solid tires	....	30,762	....	7,267
All other tires	....	1,687	....	596
Belting	....	22,407	....	24,020
Hose	....	7,158	....	6,328
Packing	....	7,805	....	8,848
Rubber boots ....*pairs*	51	145	2,985	10,160
Rubber shoes ....*pairs*	2,347	2,166	717	858
Soles and heels	....	1,074	....	41
Druggists' sundries	....	4,132	....	947
Other rubber manufactures	....	12,040	....	9,102
Totals	....	$210,226	....	$119,654
Insulated wire	....	$3,033	....	$7,887
Fountain pens .... *number*	22	58	3	18
Suspenders and garters	....	3,037	....	1,761
Chewing gum	....	6,072	....	2,042
Rubber scrap and reclaimed	431,937	21,011	....	....

FOREIGN EXPORTS

	Pounds	Value	Pounds	Value
Crude rubber	170	$20	....	....

WASHINGTON

IMPORTS

	Pounds	Value	Pounds	Value
Unmanufactured—*free:*				
Crude rubber:				
From Canada	2,585	$1,034	....	....
Straits Settlements	3,589,979	1,399,824	67,200	12,096
Japan	463,764	230,479	....	....
Totals	4,056,328	$1,631,337	67,200	$12,096
Rubber manufactures..*dutiable*	....	$426	....	$17

EXPORTS

	Pounds	Value	Pounds	Value
Manufactured:				
Automobile tires	....	$[illegible],820	....	$3,629
Inner tubes	....	161	....	266
Solid tires	....	1,555	....	5,407
Other tires	....	....	....	63
Belting	....	28,111	....	3,289
Hose	....	581	....	1,843
Packing	....	695	....	207
Rubber boots ....*pairs*	603	2,469	312	901
Rubber shoes ....*pairs*	2,928	2,669	294	333
Druggists' sundries	....	1,003	....	108
Other rubber manufactures	....	2,581	....	4,312
Totals	....	$42,645	....	$20,358
Insulated wire	....	$382	....	$2,003
Fountain pens .... *number*	2	6	....	....
Suspenders and garters	....	752	....	4
Chewing gum	....	....	....	1,460
Rubber scrap and reclaimed	343,412	15,480	6,524	288

FOREIGN EXPORTS

	Pounds	Value	Pounds	Value
Crude rubber	....	....	123,000	$24,600

BUFFALO

IMPORTS

	Pounds	Value	Pounds	Value
Rubber scrap and reclaimed	....	....	17,[illegible]80	$193
Rubber manufactures..*dutiable*	....	....	....	1,229

EXPORTS

	Pounds	Value	Pounds	Value
Manufactured:				
Automobile tires	....	....	....	$17,961
Inner tubes	....	....	....	4,57[illegible]
Solid tires	....	....	....	2,876
All other tires	....	....	....	1,967
Belting	....	....	....	2,680
Hose	....	....	....	1,954
Packing	....	....	....	2,453
Rubber boots	....	....	32	129
Druggists' sundries	....	....	....	10,667
Other rubber manufactures	....	....	....	45,697
Totals	....	....	....	$90,963
Insulated wire	....	....	....	$8,165
Fountain pens .... *number*	....	....	823	895
Suspenders and garters	....	....	....	645
Rubber scrap and reclaimed	....	....	30,500	4,309

FOREIGN EXPORTS

	Pounds	Value	Pounds	Value
Crude rubber	....	....	746,991	$146,534

CHICAGO

IMPORTS

	Pounds	Value	Pounds	Value
Rubber scrap and reclaimed	56,923	$3,782	....	....
Chicle ....*dutiable*	511,716	343,884	579,224	$305,536
Rubber manufactures..*dutiable*	....	1,887	....	1,209

OHIO

IMPORTS

	Pounds	Value	Pounds	Value
Unmanufactured—*free:*				
Crude rubber:				
From Dutch East Indies	499,865	$211,724	....	....
Totals	499,865	$211,724	....	....
Rubber manufactures..*dutiable*	....	....	....	$523

RUBBER STATISTICS FOR THE DOMINION OF CANADA

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	December			
	1919		1920	
	Pounds	Value	Pounds	Value
Unmanufactured—*free:*				
Balata:				
From United States	43	$63	......	......
Rubber, gutta percha, etc.:				
From United Kingdom	702,539	381,687	151,726	$40,850
United States	1,065,886	567,667	1,040,464	179,121
Brazil	......	......	46,090	11,943
British East Indies:				
Ceylon	452,529	281,730	......	......
Straits Settlements	329,491	180,089	1,050,258	324,265
Dutch East Indies	......	......	22,129	10,933
Other countries	......	......	22,746	8,747
Totals	2,550,488	$1,411,236	2,333,413	$575,859
Rubber, recovered	352,234	41,429	25,584	5,107
Rubber, powdered and rubber or gutta percha scrap	141,297	8,831	157,764	17,351
Rubber substitute	108,502	14,073	127,873	17,605
Totals, unmanufactured	3,152,521	$1,475,569	2,644,634	$615,922
Partly Manufactured—				
Hard rubber sheets and rods	16,092	$9,411	1,328	$710
Hard rubber tubes	......	4,939	......	4,112
Rubber thread, not covered	2,589	3,861	563	838
Totals, partly manufactured	18,681	$18,211	1,891	$5,660
Manufactured—				
Belting	......	$18,668	......	$16,432
Hose	......	12,766	......	12,679
Packing	......	7,682	......	5,015
Boots and shoes	......	16,795	......	9,652
Clothing, including waterproofed	......	20,007	......	21,479
Gloves	......	1,423	......	1,265
Hot water bottles	......	6,544	......	1,977
Tires, solid	......	16,006	......	8,951
Tires, pneumatic	......	91,463	......	162,484
Tires, inner tubes	......	6,265	......	15,976
Elastic, round or flat	......	30,164	......	24,703
Mats and matting	......	127	......	58
Cement	......	2,939	......	4,777
Other rubber manufactures	......	109,149	......	98,919
Totals, manufactured	......	$339,998	......	$384,367
Totals, rubber imports	3,171,202	$1,833,778	2,646,525	$1,005,949
Insulated wire and cables:				
Wire and cables covered with cotton, linen, silk, rubber, etc.	......	$11,333	......	$21,282
Copper wire and cables, covered as above	......	10,011	......	8,905
Chicle	31[illegible],636	260,299	44,924	20,429
Fillets	......	818	......	......
Webbing	......	52,017	......	10,063
Fountain pens	......	6,525	......	3,771

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS

	December			
	1919		1920	
	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
Unmanufactured—				
Crude and waste rubber	$26,792	......	$2,256	......
Manufactured—				
Belting	663	......	5,155	......
Hose	17,[illegible]	......	31,513	......
Boots and shoes	235,291	$686	291,851	......
Clothing, including waterproofed	[illegible],056	......	3,6[illegible]	$254
Tires, pneumatic	835,318	......	605,433	......
Tires	2,968	1,675	13,072	25
Other manufactures	20,337	2,924	65,187	4,800
Totals, manufactured	$1,118,373	$5,285	$1,075,868	$5,079
Totals, rubber exports	$1,145,165	$5,285	$1,078,124	$5,079
Insulated wire and cable:				
Copper wire and cable	$24,739	......	$126,734	......

EXPORTS OF INDIA RUBBER MANUFACTURES AND INSULATED WIRE AND CABLE FROM THE UNITED STATES BY COUNTRIES, DURING THE MONTH OF DECEMBER, 1920

EXPORTED TO	Belting Value	Hose Value	Packing Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Soles and Heels Value	Automobile Tires: Casings Value	Automobile Tires: Inner Tubes Value	Automobile Tires: Solid Tires Value	Automobile Tires: All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
Europe:																
Austria						2,136	$2,200					$49				$2,249
Azores and Madeira Islands								$36	$80	$16						132
Belgium	$2,263	$272	$635	72	$260	22,946	28,522		152,937	3,662			$4,028	$231	$8,206	201,016
Bulgaria		4,994				8,208	10,199				$339					15,532
Denmark	699	732		100	400	24,892	31,633		17,891	1,496		1,297	11,014	160	3,056	68,378
Finland	380	1,226				6,390	6,890		17,144	2,052	452		160		700	29,004
France	5,525					24,072	24,072		90,488	26,010			13,946	4,732	37,393	202,166
Germany	3,389	5				6,000	9,108		1,613	211			610	644	1,124	16,704
Gibraltar						504	550									550
Greece		2,380	577			4,824	6,266		24,372	4,125			6,366	150	400	44,636
Italy	2,075			5	35	2,376	2,380	216	46,621	9,511			4,345	843	151	66,177
Netherlands	896	4,771	113			24,074	27,417	300	140,227	7,296	3,036		46,200	7,338	6,606	244,200
Norway	11,755	2,257	300	148	529	159,104	149,670		61,924	6,297	7,628		7,270	958	5,443	254,031
Poland and Danzig									3,503	465			8,818		5,000	17,786
Portugal		150	8			3,108	2,857		7,683	1,390			6,808	245	132	19,273
Roumania		8,209	20			16,978	21,159	16	3,887		847		394	36	35	34,603
Russia in Europe									6,379	2,847						9,226
Spain	3,461	4,975	24			1,656	1,401		168,573	8,629	4,620	1,941	18,121	1,396	12,560	225,701
Sweden	2,394	563		492	1,440	156	690		31,067	3,340			4,238	1,127	6,880	51,739
Switzerland	2,928	346				43,920	45,591	320	3,944	494		727	13,131	110	943	68,534
Turkey in Europe		2,380				33,475	36,219		41,336	812				518	16	81,281
England	10,474	78,339	13,545	1,056	2,531	38,126	35,925	18,160	393,203	24,976	36,398	1,991	87,879	27,923	159,954	891,298
Scotland	1,410	189	13,786	144	279	5,448	5,901		5,950	32			5		1,605	29,157
Ireland															2,683	2,683
Yugoslavia, Albania, etc									993	49						1,042
Totals, Europe	$47,619	$111,788	$29,008	2,017	$5,474	428,593	$448,650	$19,048	$1,219,815	$103,740	$53,320	$6,005	$233,333	$46,411	$252,887	$2,577,098
North America:																
Bermuda	$505	$275	$12	2	$7	1,041	$1,671	$587				$178	$1,581	$326	$226	$5,368
British Honduras		142	12	7	28	2,227	3,668		$253	$7		56	205	33	18	4,422
Canada	17,509	12,826	6,630	1,719	7,763	1,876	3,142		270,982	79,454	$20,941	592	24,268	23,487	89,253	556,847
Costa Rica	237	166				488	535	672	1,219	220			3,150	1,083	524	7,806
Guatemala	768	1,302	270			3,001	3,819	1,744	1,396	50		622	1,564	581	241	12,357
Honduras	469	927	87			304	578	586	1,547	10		51	137	786	3,437	8,615
Nicaragua	1,479	2,414	155			938	1,463	471	1,806	816			1,462	371	211	10,648
Panama	4,710	9,753	1,629			6,422	12,318	3,332	16,919	1,732	6,560	558	6,341	1,528	3,087	68,467
Salvador		344	411					1,557	3,671	6,413	1,918		26	325	159	14,824
Mexico	48,566	67,134	45,313	214	1,155	17,497	22,480	8,184	122,462	20,901	10,511	3,114	166,450	17,404	53,685	587,359
Miquelon, Langley, etc						240	222									222
Newfoundland and Labrador		1,243	45	1,745	5,791	461	232	1,569	55	7			4,160	191	296	13,589
Barbados			50			501	633		2,366	179			286	15	646	4,175
Jamaica	576	852	767			5,478	7,255	274	43,484	1,975	269	25	277	618	3,686	60,058
Trinidad and Tobago	1,925	3,782	1,854			8,643	8,312	788	26,272	1,261	4,952		1,238	879	4,140	55,403
Other British West Indies	56	576	260			7,911	9,379	85	3,206	116	177	467	2,909	72	534	17,837
Cuba	16,515	39,956	28,291	104	457	132,382	138,946	5,558	65,661	12,167	37,906	3,775	127,830	28,384	57,828	563,274
Virgin Islands of U. S.		14	166			1,584	3,101	226	869	25		93	542	113	172	5,321
Dutch West Indies			17			516	648	244	2,093	194		20	1,172	35	348	4,771
French West Indies	694	56				36	65		9,594	1,244	4,374	96			149	16,272
Haiti	162	234				501	892	189	8,065	1,673		66	810	252	1,010	13,353
Dominican Republic	838	1,868	2,068			814	1,307	819	17,589	3,542	3,997	662	7,730	1,587	10,721	52,728
Totals, North America	$95,009	$143,864	$88,037	3,791	$15,201	192,861	$220,666	$26,885	$599,509	$131,986	$91,605	$10,375	$352,138	$78,070	$230,371	$2,083,716
Oceania:																
Australia	$9,785	$10,430	$2,855			360	$304		$88,834	$2,489	$500	$150	$17,593	$3,191	$22,515	$158,646
New Zealand	21,900	2,403	2,446			264	292	$1,914	195,816	9,238	4,875	703	19,012	1,388	15,128	275,115
Other British Oceania						24	25		200						103	328
French Oceania		32	107						300	16	605	27	23		134	1,244
Philippine Islands	14,659	7,698	5,605	1,668	3,980	65,265	93,175	12,896	182,825	25,535	30,175	4,099	103,191	4,345	27,074	515,257
Totals, Oceania	$46,344	$20,563	$11,013	1,668	$3,980	65,913	$93,796	$14,810	$467,975	$37,278	$36,155	$4,979	$139,819	$8,924	$64,954	$950,590
South America:																
Argentina	$25,735	$11,874	$1,527			48,071	$49,507	$1,722	$222,477	$27,039	$750	$3,743	$62,400	$9,892	$41,056	$457,722
Bolivia	3,468	360	129						2,097	31		841	1,130	5	1,339	9,400
Brazil	13,731	27,136	3,967	114	$643	17,496	17,925	19,088	128,867	5,096	2,928	480	303,612	8,869	32,129	564,471
Chile	29,663	30,164	3,943	1,584	7,461	6,130	6,849		40,668	3,483	178		25,428	1,650	12,969	162,456
Colombia		3,133	582			3,554	5,331	2,015	9,138	1,145		1,440	13,456	3,407	2,756	42,403
Ecuador		633	110						5,246	329			3,247	805	1,492	11,862
Falkland Islands	770															770
British Guiana		1,781	78			4,275	6,083		3,791	226			5,594	331	1,221	19,105
Dutch Guiana		792				248	342	120	289				219	90	520	2,372
French Guiana		320													224	554
Paraguay															278	278
Peru	23,679	18,249	1,842	86	716	9,111	10,082	79	20,719	4,748	3,365	200	55,124	1,410	5,979	146,192
Uruguay	2,000	4,184	2			15,279	15,433		88,861	3,411		492	7,897	3,073	5,409	130,762
Venezuela	334	831	657			96	89	300	10,345	2,635	98	51	10,923	3,401	3,721	33,385
Totals, South America	$99,380	$99,457	$12,837	1,784	$8,820	104,260	$111,641	$23,324	$532,498	$48,143	$7,319	$7,247	$489,030	$32,933	$109,093	$1,581,722

EXPORTED TO—	Belting Value	Hose Value	Packing Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Soles and Heels Value	Automobile Tires Casings Value	Automobile Tires Inner Tubes Value	Automobile Tires Solid Tires Value	Automobile Tires All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
Asia:																
China	$1,196	$8,405	$4,367	36	$147	2,485	$2.869	....	$32,772	$6,379	....	....	$67,618	$3,333	$10,991	$138.077
Chosen	3,020	....	....	....	....	....	....	....	....	....	....	....	....	285	....	3,305
British India	6,706	3,971	1,129	....	....	6,471	11,668	$50	61,749	6,054	$170	$495	1,715	4,368	6,394	104,469
Straits Settlements	6,904	288	353	....	....	5,280	6.784	35	3,338	81	3,327	1,619	6,051	150	2,413	31,343
Otber British East Indies	....	....	103	....	....	360	473	....	1,120	343	....	....	....	....	63	2,102
Dutch East Indies	2,079	705	2,396	....	....	480	550	....	36,632	5,090	47,690	....	4,800	350	3,104	103,396
French Indo China	....	....	....	....	....	....	....	....	....	....	98	....	139	....	....	237
Hongkong	....	2,349	600	....	....	1,110	2,118	....	8,573	2,336	2,409	225	113	3,210	310	22,243
Japan	11,496	282	550	1,608	5,073	36,772	39,779	....	28,711	596	2,100	....	2,955	240	29,670	121,452
Persia	....	....	....	....	....	12	14	....	....	....	....	....	....	....	....	14
Siam	....	....	....	....	....	....	....	....	....	....	....	....	....	198	937	1,135
Turkey in Asia	388	250	....	....	....	2,404	2.482	28	2,523	880	....	....	158	....	652	7,361
Totals, Asia	$31,789	$16.250	$9.498	1,644	$5,220	55,374	$66,737	$113	$175,418	$21,759	$55.794	$2,339	$83,549	$12,134	$54,534	$535,134
Africa:																
Belgian Kongo	....	....	$350	....	....	....	....	....	$1,194	$173	....	....	....	....	....	$1,717
British West Africa	....	....	1,800	....	....	244	$544	....	75,243	4.089	$334	....	....	$204	$366	82,580
British South Africa	$136,648	$51,239	11.877	....	....	7,327	8,270	$1,598	159,528	17.671	....	....	$3,438	3,760	30,850	424,879
British East Africa	....	....	....	....	....	....	....	....	9,349	252	....	....	....	....	145	9,746
Canary Islands	....	....	....	....	....	....	....	....	2,832	53	....	....	....	....	....	2,885
French Africa	34,736	....	55	....	....	....	....	....	1,797	....	....	....	....	....	....	36,588
Kamerun, etc.	....	....	....	....	....	....	....	....	5,221	673	....	....	....	....	....	5,894
Morocco	....	....	....	....	....	....	....	....	640	....	....	....	....	....	....	640
Portuguese Africa	....	325	138	24	$104	....	....	....	....	....	....	....	....	....	234	801
Egypt	....	124	....	....	....	....	....	140	13,692	651	....	....	....	462	543	15,612
Totals, Africa	$171,384	$51,688	$14,220	24	$104	7,571	$8.814	$1,738	$269,496	$23,562	$334	....	$3,438	$4,426	$32,138	$581,342
Totals	$491,525	$443,610	$164,613	10,928	$38,799	854,372	$950,304	$85.918	$3,264,711	$366,468	$244,527	$30,945	$1,301,307	$182,898	$743,977	$8,309,602

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORY OF THE UNITED STATES

	Belting, Hose and Packing Value	Boots and Shoes Pairs	Boots and Shoes Value	Tires Automobile Value	Tires All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
Hawaii	$25,510	....	....	$60,325	$1,856	....	....	$15.634	$103,325
Porto Rico	13,045	....	....	165,862	1,026	....	....	85,373	265,306
Totals	$38.555	....	....	$226,187	$2,882	....	....	$101,007	$368,631

Compiled by the Bureau of Foreign Commerce, Department of Commerce, Washington, D. C.

F. M. S. RUBBER EXPORTS, 1915-1919

Pará rubber exports from the Federated Malay States during the last five years are indicated in the appended table according to quantity and value:

Years	Tons	Value	Years	Tons	Value
1915	44,523	$46,702,994	1918	78,283	$58,130,969
1916	62,764	73,796,711	1919	106,453	96,039,555
1917	79,831	94,503,117			

Details of the export trade in cultivated rubber of the Federated Malay States during 1918 and 1919 are stated in the next table:

Destinations	1918 Tons	1919 Quantity Tons	1919 Value	Increase (+) or Decrease (—) in Quantity Tons
Straits Settlements	70,668	87,645	$79,054,906	+16,977
United Kingdom	6,187	17,531	15,802,320	+11,344
Continental Europe	85	....	....	—85
Ceylon	222	809	734,946	+587
All other countries	1,121	468	447,383	—653
Total	78,283	106,453	$96,039,555	+28,170

UNITED KINGDOM RUBBER STATISTICS

IMPORTS

	December 1919 Pounds	December 1919 Value	December 1920 Pounds	December 1920 Value
Unmanufactured—				
Crude rubber:				
From—				
Straits Settlements	5,420,000	£633,641	5,324,500	£287,453
Federated Malay States	6,352,000	753,366	3,335,100	191,921
British India	1,490,800	180,042	892,500	53,132
Ceylon and dependencies	4,391,300	519,123	4,135,400	233,547
Other Dutch possessions in Indian Seas	1,028,400	127,745	662,500	44,213
Dutch East Indies (except other Dutch possessions in Indian Seas)	1.480,400	172,949	2,704,800	151,827
Other countries in the East Indies and Pacific not elsewhere specified	361,800	42,446	17,200	939
Brazil	1,277,800	154,993	116,700	7,083
Peru	21,600	2,510	......	....
South and Central America (except Brazil and Peru)	13,300	1.279	16,500	790
West Africa:				
Gold Coast	48,000	3.156	31.900	2,163
Other parts of West Africa	278,100	21,208	68.200	3,548
East Africa (including Madagascar)	44,400	4.925	....	....
Other countries	314,900	36.461	101.800	5,476
Totals	22,523,200	£2,653,844	17.407,100	£982,092
Waste and reclaimed rubber	696,600	20,123	67,600	1.796
Totals, unmanufactured	23,219,800	£2,673,967	17,474.700	£983,888
Gutta percha and balata	1,462,400	£240,870	1,397,700	£282,646
*Rubber substitutes	......	......	19,700	566
Manufactured—				
Boots and shoes..*dozen pairs*	14.096	£27,055	6.131	£29,166
Waterproof clothing	......	3.809	......	1,250
Insulated wire	......	356	......	4,137
Tires and tubes	......	336,362	......	419,093
Other rubber manufactures	......	57,880	......	74,356

EXPORTS

	December 1919 Pounds	December 1919 Value	December 1920 Pounds	December 1920 Value
Unmanufactured—				
Waste and reclaimed rubber	967,900	£23,146	520,800	£14.154
*Rubber substitutes	......	......	47,000	3,151
Manufactured—				
Boots and shoes..*dozen pairs*	15,167	£34,504	12,979	£27,329
Waterproof clothing	......	247.702	......	137,437
Insulated wire	......	97.487	......	166,072
Submarine cables	......	78,070	......	326,295
Tires and tubes	......	400.482	.....	417,639
Other rubber manufactures	......	292,851	......	330,669

EXPORTS—COLONIAL AND FOREIGN

	December 1919 Pounds	December 1919 Value	December 1920 Pounds	December 1920 Value
Unmanufactured—				
Crude rubber:				
To Russia	10,100	£820	11.400	£856
Sweden, Norway and Denmark	376,800	40,951	385,400	23.020
Germany	429,400	42,250	1,011,800	54,351
Belgium	727,400	77,126	196,700	12,378
France	1,971,000	226,305	719,800	44,097
Spain	41,600	5,222	53,900	3,539
Italy	514,900	53,787	270,900	20,169
Austria-Hungary	......	......	22,400	1,190
Other European countries	302,000	30,617	267,000	15,800
United States	14,132,000	1,707,452	78,500	9,573
Canada	537,600	74,752	248,000	16,645
Other countries	173,900	22.248	22,300	1,280
Totals, rubber	19,216,700	£2,281,530	3,288,100	£202,898
Waste and reclaimed rubber	87,900	£3,222	......	......
Gutta percha and balata	321,300	51,207	32,300	£6,396

UNITED KINGDOM RUBBER STATISTICS—Continued

	Year Ended December 31			
	1920		1921	
	Pounds	Value	Pounds	Value
Manufactured—				
Boots and shoes..*dozen pairs*	143	£414	1,169	£4,112
Waterproof clothing.........	......	34	......	296
Tires and tubes............	......	1,743	......	82,192
Other manufactures	......	3,043	......	2,785

*Included in "Other Articles," Class III. T., prior to 1920.

RUBBER STATISTICS FOR ITALY

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	Eight Months Ended August			
	1919		1920	
Unmanufactured—	Quintals[1]	Lire[2]	Quintals	Lire
Crude rubber and gutta percha —raw and reclaimed:				
From Great Britain.........	57		654	
French Asian Colony..	97		2,075	
India and Ceylon.....	20,252		5,849	
Straits Settlements....	33,955	77,305,100	22,972	44,018,250
French African Colonies	2,818		1,000	
Belgian Congo........	574		1,865	
Brazil	22,763		9,870	
Other countries.......	860		2,070	
Totals	81,376	77,305,100	46,355	44,018,250
Rubber scrap	14,679	2,201,850	136	20,400
Totals, unmanufactured....	96,055	79,506,950	46,491	44,038,650
Manufactured—				
India rubber and gutta percha—				
Threads	169	490,100	237	687,300
Sheets, including hard rubber	112	218,000	223	2,323,800
Tubes	149	210,850	144	294,050
Belting	344	551,100	524	864,600
Rubber-coated fabrics in pieces	409	863,800	642	1,254,800
Boots and shoes.......*pairs*	33,372	667,440	104,608	2,092,160
Elastic webbing............	248	843,200	352	1,196,800
Clothing and articles for travel	2	8,000	146	584,000
Tires and tubes—				
From Belgium	......		668	
France	3,237		4,148	
Great Britain.........	807	11,331,600	6,698	35,870,800
United States.........	2		1,264	
Other countries.......	1		33	
Other manufactures..........	10,739	20,184,500	15,101	28,257,400
Totals, manufactured......	......	35,368,590	......	73,425,710
Total imports............	......	114,875,540	......	117,464,360

EXPORTS OF CRUDE AND MANUFACTURED RUBBER

	1919		1920	
	Quintals	Lire	Quintals	Lire
Unmanufactured—				
India rubber and gutta percha— raw and reclaimed:				
To Austria................	......		300	
Spain	1,985	1,006,800	708	2,228,000
United States..........	1,371		2,904	
Other countries.........	......		544	
Totals	3,356	1,006,800	4,456	2,228,000
Waste	2,093	418,600	6,576	1,315,200
Totals, unmanufactured...	5,449	1,425,400	11,032	3,543,200
Manufactured—				
India rubber and gutta percha—				
Threads	367	1,137,700	251	778,100
Sheets, including hard rubber	60	131,000	238	434,900
Tubes	594	855,250	1,200	1,557,200
Belting	95	199,500	......	......
Rubber-coated fabrics in pieces	164	492,000	382	839,600
Boots and shoes.........*pairs*	......	......	495	9,900
Other footwear	......	......	2	3,000
Elastic webbing.............	491	1,865,800	924	3,511,200
Clothing and articles for travel.	17	85,000	321	1,605,000
Tires and tubes:				
To Austria	50		2,212	
Belgium	828		1,525	
Czecho-Slovakia	262		1,032	
Denmark	130		1,309	
France	377		1,946	
Great Britain.........	2,708		7,965	
Netherlands	142		432	
Rumania	1		1,156	
Spain	285		796	
Switzerland	82	20,080,000	669	91,265,000
Hungary	......		265	
India and Ceylon.....	545		4,089	
Dutch East Indies.....	......		1,746	
Straits Settlements....	140		2,184	
Australia	242		684	
Argentina	736		2,245	
Brazil	669		1,981	
Other countries.......	835		4,270	
Other manufactures...........	1,364	2,573,000	9,026	16,651,800
Totals, manufactured......	......	28,090,450	......	116,655,700
Total exports............	......	29,515,850	......	120,198,900

[1]One quintal equals 220.46 pounds.
[2]One lira equals $0.193 (normal).

THE MARKET FOR RUBBER SCRAP

NEW YORK

The rubber scrap trade continues utterly stagnant owing to the continuation of manufacturing inactivity in the rubber industry. There have been no purchases of scrap by either dealers or reclaimers for months. The plants of the latter are still closed and will not resume production until the demand for rubber goods revives in marked degree. This state of affairs effectually shuts out the scrap trade for the same indefinite period.

The feature of the past month in rubber scrap circles was the annual meeting of the National Association of Waste Material Dealers. The sessions of the Scrap Rubber Division were chiefly concerned with the effect of the present high railroad freight rates as a bar to the free movement of low price scrap when demand revives.

QUOTATIONS FOR CARLOAD LOTS DELIVERED

Prices subject to change without notice

March 26, 1921

BOOTS AND SHOES:				
Arctic tops	*lb.*	*$0.075	@	
Boots and shoes	*lb.*	*.03¾	@	.04¼
Trimmed arctics	*lb.*	*.02¾	@	.03
Untrimmed arctics	*lb.*	*.02	@	.02¼
HARD RUBBER:				
Battery jars, black compound	*lb.*	*.07½	@	.01
No. 1, bright fracture	*lb.*	.18	@	.20
INNER TUBES:				
No. 1	*lb.*	*.07	@	.08
Compounded	*lb.*	*.05	@	.05½
Red	*lb.*	*.04½	@	.05
MECHANICALS:				
Black scrap, mixed, No. 1	*lb.*	*.02½	@	.03
No. 2	*lb.*	*.01½	@	.02
Car springs	*lb.*	*.02½	@	.03
Heels	*lb.*	*.02½	@	.03
Horse-shoe pads	*lb.*	*.02½	@	.03
Hose, air brake	*lb.*	*.01	@	.01½
fire, cotton lined	*lb*	*.01	@	
garden	*lb.*	*.07½	@	.01
Insulated wire stripping, free from fiber	*lb.*	*.01½	@	.02
Matting	*lb.*	*.01	@	
Red packing	*lb.*	*.04½	@	.05
Red scrap, No. 1	*lb.*	*.07	@	.08
No. 2	*lb.*	*.05½	@	.06
White scrap, No. 1	*lb.*	*.07	@	.07½
No. 2	*lb.*	*.06	@	.06½
TIRES:				
PNEUMATIC—				
Auto peelings	*lb.*	*.02½	@	.02¾
Bicycle	*lb.*	*.01½	@	.02
Standard white auto	*lb.*	*.02½	@	.03
Mixed auto	*lb.*	*.01½	@	.01¾
Stripped, unguaranteed	*lb.*	*.01	@	.01½
White, G. & G., M. & W., and U. S.	*lb.*	*.03	@	
SOLID—				
Carriage	*lb.*	*.02½	@	.03
Irony	*lb.*		@	
Truck, clean	*lb.*	*.01¾	@	.02¼

*Nominal.

THE MARKET FOR COTTON AND OTHER FABRICS

American Cotton. The spot market for middling upland cotton has continued to decline during the past month. With minor fluctuations, quotations ranged from 11.65 cents on March 1, to 12.35 cents on March 24, when the market firmed up and prices advanced. The indications are that in the absence of a more general demand the market will continue to be unsettled.

Egyptian Cotton. Prices have recently shown a great deal of strength, due no doubt to government buying, a prospective sharp reduction in acreage and recent heavy rains which have

necessitated the resowing of practically all cotton which had been put into the ground. It is reported that the Egyptian Government will buy from farmers up to an amount not to exceed two million cantars, which is practically one-third of all the cotton raised in Egypt last year. This government buying was started in order to help small cultivators who have been unable to dispose of any of their last season's crop. It is understood that the buying is only of a limited quantity from each cultivator. Upper Egypts show an advance of about 5 cents a pound from the low, and medium grades are worth 20 cents. Better grades of Sakel are up nearly 10 cents since the first of the month, and medium Sakel is quoted at 29 cents.

Arizona Cotton. Arizona cottons are selling very slowly and good grades can be bought between 30 and 32 cents. It now seems doubtful if even 50 per cent of last year's acreage will be planted to cotton in the Salt River Valley.

Sea Island Cotton. This has practically ceased to be a market factor. We merely mention it here to point out that the recent ginning census indicates that less than 2,000 bales will be secured from last year's crop.

Raincoat Fabrics. There has been a little more interest shown in raincoat materials during the past month. Inquiries have been more numerous and more orders have been booked than at this time last month but the situation is far from normal.

Mechanical Ducks and Drills. This market has been inactive due to the absence of volume buying. Mechanical goods production has not apparently increased during the month which accounts for the quiet ruling conditions of the duck market. Prices, although lower than last month, are firm and with advancing tendencies.

Sheetings. There was small interest shown in this material last month and quotations have been made largely on a nominal basis. Prices have declined since last month.

Tire Fabrics. There has been no improvement in this market nor has there been sufficient inquiry to induce fabric mills to make quotations. Most tire manufacturers are stocked with fabrics purchased last year, which must be absorbed. A hopeful sign, however, is that the large tire manufacturers are balancing their fabric stocks and preparing figures for spring and summer buying. The indications are that real market interest will develop within the next two months.

NEW YORK QUOTATIONS

March 26, 1921

Prices subject to change without notice

ASBESTOS CLOTH			
Brake lining, 2½ lbs. sq. yd., brass or copper insertion	*lb.*		@
2¼ lbs. sq. yd., brass or copper insertion	*lb.*		@
BURLAPS			
32—7-ounce	100 *yards*	$3.85	@
32—8-ounce			@
40—7½-ounce		4.65	@
40—8-ounce		4.75	@
40—10-ounce		5.25	@
40—10½-ounce		5.35	@
45—7½-ounce		5.25	@
45—8-ounce		5.35	@
45—10-ounce		6.15	@
DRILLS			
38-inch 2.00-yard	*yard*	.15	@
49-inch 3.47-yard		.10½	@
52-inch 1.90-yard		.17½	@
52-inch 1.95 yard		.17	@
60-inch 1.52-yard		.21¾	@
DUCK			
CARRIAGE CLOTH			
58-inch 2.00-yard enameling duck	*yard*	.15½	@
48-inch 1.74-yard		.18½	@
72-inch 16.66-ounce		.39½	@
72-inch 17.21-ounce		.40¼	@
MECHANICAL			
Hose	*pound*	.30	@
Belting		.30	@
HOLLANDS, 40-INCH			
Acme	*yard*		@
Endurance			@
Penn			@
OSNABURGS			
40 inch 2.35-yard	*yard*		@
40 inch 2.48-yard			@
37½-inch 2.42-yard			@

RAINCOAT FABRICS			
COTTON			
Bombazine 64 x 60	*yard*	.12½	@
60 x 48		.11½	@
Cashmeres, cotton and wool, 36-inch, tan		.75	@
Twills 64 x 72		.10	@ .12
60 x 102		.16	@
Twill, mercerized, 36-inch, blue and black		.26½	@
tan and olive		.24	@
Tweed		.40	@ 1.00
printed		.22½	@
Plaids 60 x 48		.12½	@
56 x 44		.12	@
Repp		.32	@
Prints 60 x 48		.13	@
64 x 60		.14	@
IMPORTED WOOLEN FABRICS SPECIALLY PREPARED FOR RUBBERIZING—PLAIN AND FANCIES			
63-inch, 3¼ to 7½ ounces	*yard*	.81	@ $2.22
36-inch, 2¾ to 5 ounces		.63	@ 1.62
IMPORTED PLAID LINING (UNION AND COTTON)			
63-inch, 2 to 4 ounces	*yard*	.71	@ 1.57
36 inch, 2 to 4 ounces		.44	@ .84
SHEETINGS, 40-INCH			
48 x 48, 2.35-yard	*yard*	.10¾	@
48 x 48, 2.50 yard		.10¼	@
48 x 48, 2.85-yard		.09½	@
64 x 68, 3.15-yard		.10½	@
56 x 60, 3.60-yard		.08¼	@
48 x 44, 3.75-yard		.07¼	@
SILKS			
Canton, 38-inch	*yard*	.29½	@
Schappe, 36-inch		.47½	@
STOCKINETTES			
SINGLE THREAD			
3½ Peeler, carded	*pound*		@
4½ Peeler, carded		*.55	@
6½ Peeler, combed		*.85	@

DOUBLE THREAD		
Zero Peeler, carded	*pound*	@
3½ Peeler, carded		@
6½ Peeler, combed		@
TIRE FABRICS		
BUILDING		
17¼-ounce Sakellarides, combed	pound	@
17¼-ounce Egyptian, combed		@
17¼-ounce Egyptian, carded		@
17¼-ounce Peeler, combed		@
17¼-ounce Peeler, carded		@
CORD		
15-ounce Egyptian	*pound*	@
BICYCLE		
8-ounce American	*pound*	@
10-ounce American		@
CHAFER		
9¼-ounce Sea Island	*pound*	@
9¼-ounce Egyptian carded		@
9¼ ounce Peeler, carded		@

*Nominal.

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS

NEW YORK

During the past month the market for chemicals, pigments and rubber compounding ingredients has continued in a state of suspense and uncertainty, awaiting the hoped for industrial activity. Reports from the Akron district indicate a distinct gain in tire manufacturing activity but as yet the volume of rubber goods manufacturing has not called for heavy renewal of supplies of compounding ingredients.

Aniline Oil. The movement has been at low ebb. Stocks were heavy and demand dull. Prices ruled from 20 to 26 cents per pound.

Barytes. The business was featured by the movement of large resale stocks, weak prices and dull demand.

Benzol. The demand has ruled generally fair to active. Early in the month 90 per cent grade was much in demand at 30 cents per gallon. Quotations on this grade have held from 28 to 30 cents, while that for pure, ranged from 30 to 36 cents.

Blanc Fixe. The same dullness controlled the blanc fixe situation as was evident with barytes. Early in the month producers generally had closed down their plants and lower prices ruled for stocks.

Blue Lead. About the middle of the month the market was featured by liquidation sales at one cent below market. Dullness prevails in the matter of demand and quotations are fixed at 7¼ to 7½ cents.

Carbon Black. A rise in prices of three cents per pound was noted the third week of the past month and lampblack was also stronger. The demand for blacks has been routine largely owing to reduced demand from the rubber tire industry.

Carbon Bisulphide. Very little interest in evidence. Prices from 8 to 8½ cents per pound.

Carbon Tetrachloride. The demand has been fair. Prices declined from 12 to 10½ cents per pound.

China Clay. Stocks have accumulated in the absence of consumers' business.

Dry Colors. There was slightly better inquiry as the month progressed. Earth colors are particularly quiet.

Litharge. The slump in rubber manufacturing has removed temporarily the largest part of the normal demand for litharge. Producers are limiting output to the trade needs. Increased activity of tire manufacturing after the middle of the month had some effect on demand and the situation is improving. Prices are 8¾ to 9 cents per pound.

Lithopone. Owing to the usual spring activity in the paint trade lithopone has been in brisk demand at 7 to 7½ cents in bags, 7½ cents in barrels.

Solvent Naphtha. Supplies low and demand very quiet.

Sublimed Lead. The same condition of dullness rules with this as with the other lead pigments. Prices 7¼ to 7½ cents per pound.

Sulphur. Prices are steady and movement of stock slow.

Talc. Prices weak and market very quiet.

Whiting. Imported, quoted at 1 to 1¾ cents per pound. Rubber makers other than the tire trade, have been taking some supplies.

Zinc Oxide. There has been good demand for the lead-free grades for paint purposes. Production is markedly affected by general trade conditions and lack of demand from the tire makers. Prices are still held firmly.

NEW YORK QUOTATIONS

March 26, 1921

Prices subject to change without notice

ACCELERATORS, ORGANIC				
Accelerene (f. o. b. English port)	*lb.*	13s. 6d.		
Accelemal	*lb.*	$0.60	@	
Adco	*lb.*	.60	@	
Aldehyde ammonia crystals	*lb.*	1.00	@	1.10
Aniline oil	*lb.*	.26	@	.28
Excellerex	*lb.*	.70	@	.75
Hexamethylene tetramine (powdered)	*lb.*	1.00	@	1.10
N. C. C.	*lb.*		@	
No. 999	*lb.*	14½	@	
Paraphenylene diamine	*lb.*	2.00	@	2.25
Thiocarbanilide (factory)	*lb.*	.65	@	.75
ACCELERATORS, INORGANIC				
Lead, dry red (bbls.)	*lb.*	.09¼	@	
sublimed blue (bbls.)	*lb.*	.07¼	@	.07½
sublimed white (bbls.)	*lb.*	.08¼	@	
white, basic carbonate (bbls.)	*lb.*	.07½	@	.08
Lime, flour	*lb.*	.02½	@	
Superfine, "Cream of Lime"	*lb.*	.03	@	
Litharge, domestic	*lb.*	.08¾	@	09
sublimed	*lb.*		@	
Magnesium, carbonate, light	*lb.*	09	@	
calcined extra light	*lb.*	.55	@	
calcined light	*lb.*	.25	@	.30
calcined medium light	*lb.*	.25	@	
calcined heavy	*lb.*	.07	@	
calcined commercial (magnesite)	*lb.*	.05	@	
oxide, extra light	*lb.*	.65	@	
ACIDS				
Acetic 28 per cent	*cwt.*	2.50	@	2.75
glacial, 99 per cent	*cwt.*	9.35	@	9.75
Cresylic (97% straw color)	*gal.*	95	@	1.02
(95% dark)	*gal.*	.90	@	.97
Muriatic, 20 degrees	*cwt.*	1.55	@	2.25
Nitric, 36 degrees	*cwt.*	6.00	@	6.50
Sulphuric, 66 degrees	*ton*	20.00	@	21.00
ALKALIES				
Caustic soda (76% factory)	*lb.*	.03¾	@	.04½
Soda ash, 58%	*cwt.*	1.90	@	2.10
COLORS				
Black				
Bone, powdered	*lb.*	.06½	@	.14
granulated	*lb.*	.12	@	
Carbon black (sacks, factory)	*lb.*	.10	@	.16
pressed	*lb.*	.12	@	
compressed	*lb.*	.12½	@	
Dipped goods	*lb.*	1.00	@	
Drop	*lb.*	.08	@	.16
Ivory black	*lb.*	.17	@	.45
Lampblack	*lb.*	.16	@	.45
Oil soluble aniline	*lb.*	.95	@	
Rubber black	*lb.*		@	
Rubber makers' non-flying black	*lb.*	.40	@	
Blue				
Cobalt	*lb.*	.25	@	.30
Dipped goods	*lb.*	1.00	@	
Prussian	*lb.*	.60	@	
Ultramarine	*lb.*	.16	@	.35
Rubber makers' blue	*lb.*	3.50	@	
Brown				
Iron oxide	*lb.*	.04	@	.04½
Sienna, Italian, raw and burnt	*lb.*	.06½	@	.06¾
Sienna, Italian, raw (tan color)	*lb.*	.07	@	
Umber, Turkey, raw and burnt	*lb.*	.04½	@	.05
Vandyke	*lb.*	.06	@	
Maroon oxide	*lb.*	.13½	@	
Green				
Chrome, light	*lb.*	.37	@	.40
medium	*lb.*	.40	@	.52
dark	*lb.*	.44	@	.58
commercial	*lb.*	.13½	@	
tile	*lb.*	.08	@	.12
Dipped goods	*lb.*	1.00	@	
Oxide I. R.	*lb.*		@	
Oxide of chromium	*lb.*	.66	@	
Rubber makers' green	*lb.*	3.50	@	
Red				
Antimony, crimson, sulphuret of (casks)	*lb.*	.43	@	.46
crimson, "R. M. P."	*lb.*	.55	@	
crimson F.	*lb.*	.45	@	
Antimony, golden sulphuret of	*lb.*	.24	@	.27
golden, "R. M. P."	*lb.*	.25	@	
golden 1	*lb.*	.40	@	
golden 2	*lb.*	.35	@	
7-A	*lb.*	.42	@	
vermilion sulphuret	*lb.*	.65	@	.75
red sulphuret	*lb.*	.25	@	
Arsenic, red sulphide	*lb.*	.14	@	
Dipped goods, red	*lb.*	1.25	@	
purple	*lb.*	1.00	@	
orange	*lb.*	1.25	@	
Indian	*lb.*	.13½	@	
Para toner	*lb.*	1.60	@	
Red excelsior	*lb.*		@	
Toluidine toner	*lb*	3.25	@	3.50
Iron oxide, reduced grades	*lb*	.04	@	.12
pure bright	*lb.*	.14½	@	.15½
Spanish natural	*lb.*	.05½	@	.05¾
Venetian	*lb.*	.03	@	.06

Oil soluble aniline, red	lb.	$1.75 @ $2.00
orange	lb.	1.50 @
Oximony	lb.	.17½ @
Vermilion, American	lb.	.25 @ .30
permanent	lb.	.34 @
English quicksilver	lb.	1.00 @ 1.15
Rubber makers' red	lb.	3.50 @
purple	lb.	2.50 @
White		
Albalith	lb.	.07 @ .07½
Aluminum bronze, extra brilliant	lb.	@
extra fine	lb.	@
Lithopone, Beckton white	lb.	.07 @ .07½
Lithopone, domestic (factory)	lb.	.07 @ .07½
Ponolith (carloads, factory)	lb.	@
Rubber-makers' white	lb.	@
Zinc oxide. American Horse Head brand (factory):		C.L. L.C.L.
Special	lb.	.09¼ @ .09¾
XX red	lb.	.08¾ @ .09¼
French process, Florence brand (factory):		
White seal	lb.	.12¼ @ .12½
Green seal	lb.	.11 @ .11½
Red seal	lb.	.10 @ .10½
White seal, imported	lb.	.12¼ @ .12½
Azo factory:		
ZZZ (lead free)	lb.	.08¾ @ .09¼
ZZ (under 5% leaded)	lb.	.08 @ .08½
Z (8-10% leaded)	lb.	.07⅝ @ .08⅛
Standard AA	lb.	.09 @
Yellow		
Cadmium, sulphide, yellow, light, orange	lb.	@
red	lb.	@
Chrome, light and medium	lb.	.25 @
C. P.	lb.	.28 @
Dipped goods	lb.	1.25 @
Ochre, domestic	lb.	.02 @ .02½
imported	lb.	.03½ @ .04
Oil soluble aniline	lb.	1.60 @
Rubber makers' yellow	lb.	2.50 @ 3.50
Zinc chromate	lb.	.40 @ .41
COMPOUNDING INGREDIENTS		
Aluminum flake (carload)	ton	33.00 @ 45.00
hydrate	lb.	.22 @
silicate	ton	26.00 @ 28.00
Ammonium carbonate (powdered)	lb.	.08 @ .10
Asbestine	ton	20.00 @ 35.00
Barium, carbonate, precipitated	ton	85.00 @
dust	ton	100.00 @ 110.00
Barytes, pure white (f. o. b. works)	ton	28.00 @
white	ton	35.00 @ 45.00
white, No. 3	ton	30.00 @
off color	ton	20.00 @
uniform floated	ton	28.00 @
German "Cream"	ton	@
Baso for	lb.	.05 @
Beta-naphthol	lb.	.70 @ .75
Blanc fixe	lb.	.05 @ .06¼
Bone ash	lb.	.10 @
Carrara filler (factory)	ton	18.00 @
Chalk, precipitated, extra light	lb.	@
heavy	lb.	@
China, clay, Dixie	ton	22.00 @ 35.00
Blue Ridge	ton	22.00 @ 35.00
domestic	ton	10.00 @ 12.00
imported	ton	50.00 @
Cotton linters, clean mill run (factory)	lb.	.02 @
Fossil flour (powdered)	ton	60.00 @
(bolted)	ton	65.00 @
Glue, high grade	lb.	.30 @ .40
medium	lb.	.25 @ .30
low grade	lb.	.17 @ .19
Graphite, flake (400-pounds bbl.)	lb.	.10 @ .30
amorphous	lb.	.04 @
Ground glass FF. (bbls.)	lb.	@
Infusorial earth (powdered)	ton	60.00 @
(bolted)	ton	65.00 @
Liquid rubber	lb.	.16 @
Mica, powdered	lb.	.15 @
Pumice stone, powdered (bbl.)	lb.	.03 @ .08
Rotten stone, powdered	lb.	.02½ @ .04½
Rubber paste	lb.	@
Silica, gold bond (factory)	ton	25.00 @
silver bond (factory)	ton	18.00 @
Soap bark, crushed	lb.	.14½ @ .15
Soapstone, powdered gray (carload)	ton	12.00 @
Italian Talc	lb.	.02 @ .02½
Starch, powdered corn	cwt.	2.58 @
Talc, powdered soapstone	ton	22.50 @ 25.00
Terra blanche	ton	25.00 @
Tripoli flour, air-floated, cream or rose (factory)	ton	25.00 @
white (factory)	ton	27.00 @
Tyre-lith	ton	100.00 @
Whiting, Alba	cwt.	@
Columbia	cwt.	.75 @
commercial	cwt.	1.25 @
Danish (factory)	ton	15.00 @
English cliffstone	cwt.	1.75 @ 2.00
gilders	cwt.	1.45 @ 1.90
Paris, white, American	cwt.	.90 @ 1.50
Quaker	ton	13.00 @ 15.00
Super	ton	@
Wood pulp, imported	ton	@
XXX	ton	35.00 @
X	ton	35.00 @
Wood flour	ton	@
MINERAL RUBBER		
Elateron (c. l. factory)	ton	@
(l. c. l. factory)	ton	@
Gilsonite	ton	70.00 @
Genasco (c. l. factory)	ton	50.00 @
(l. c. l. factory)	ton	52.00 @
Hard hydrocarbon	ton	35.00 @ 45.00
Soft hydrocarbon	ton	@
K-X	ton	@
K. M. R.	ton	@
M. R. X.	ton	@
Pioneer (c. l. factory)	ton	$50.00 @
(l. c. l. factory)	ton	55.00 @
Raven M. R.	ton	@
Refined Elaterite	ton	@
318/320 M. P. hydrocarbon (c. l. factory)	ton	50.00 @ 55.00
(l. c. l. factory)	ton	57.50 @
300/310 M. P. hydrocarbon (c. l. factory)	ton	40.00 @
(l. c. l. factory)	ton	45.00 @
States "A" (c. l. factory)	ton	45.00 @
No. 1 (c. l. factory)	ton	40.00 @
Robertson, M. R. pulverized (c. l. factory)	ton	87.50 @
M. R pulverized (l. c. l. factory)	ton	90.00 @
M. R. (c. l. factory)	ton	62.50 @
M. R. (l. c. l. factory)	ton	65.00 @
Rubrax (factory)	ton	50.00 @
Synpro, granulated, M. R. (factory)	ton	87.50 @
Walpole rubber flux (factory)	lb.	@
OILS		
Avoilas compound	lb.	.16 @
Castor, No. 1, U. S. P.	lb.	.11 @
No. 3, U. S. P.	lb.	.10 @
Corn	lb.	.09 @
Cotton	lb.	.08½ @
Glycerine (98 per cent)	lb.	.18 @ .19
Linseed, raw (carloads)	gal.	.72 @
Linseed compound	gal.	@
Palmoline	lb.	.13 @ .14
Palm niger	lb.	.08 @
Palm "Lagos"	lb.	.11½ @
Palm special	lb.	@
Peanut	lb.	.10 @
Petrolatum	lb.	.05 @ .09
Petrolatum, sticky	lb.	.06 @ .10
Petroleum grease	lb.	@
Pine, steam distilled	gal.	1.35 @ 1.40
Rapeseed, refined	lb.	.13 @
blown	lb.	.15 @
Rosin	gal.	.40 @ .42
Synpro	gal.	.40 @ .60
Soya bean	lb	.08 @
Tar	gal.	.35 @ .36
RESINS AND PITCHES		
Balsam, Oregon fir	gal.	2.00 @
Cantella gum	lb.	.50 @
Cumar resin, hard	lb.	.09 @ .13
soft	lb.	.09 @ .13
Tar, retort	bbl.	12.75 @ 14.75
kiln	bbl.	12.75 @ 14.00
Pitch, Burgundy	lb.	.04¼ @
coal tar	lb.	.01½ @
pine tar	lb.	.03½ @
ponto	lb.	.10 @
Rosin, K	280 lbs.	6.35 @
strained	280 lbs.	6.00 @
Shellac, fine orange	lb.	1.00 @
SOLVENTS		
Acetone (98.99 per cent drums)	lb.	.12 @
methyl (drums)	gal.	@
Benzol (water white, 90%)	gal.	.25 @ 31
pure	gal.	.36 @
Carbon bisulphide (drums)	lb.	.07 @ .07¾
tetrachloride (drums)	lb.	.12 @ .13
Naphtha, motor gasoline (steel bbls.)	gal.	.26 @
73@76 degrees (steel bbls.)	gal.	.37½ @
70@72 (steel bbls.)	gal.	@
68@70 degrees (steel bbls.)	gal.	.35 @
V. M. & P. (steel bbls.)	gal.	.25 @
solvent	gal.	.28 @
Toluol, pure	gal.	.28 @ .34
Turpentine, spirits	gal.	.58 @
wood	gal.	.55 @
Osmaco reducer	gal.	@
Xylol, pure	gal.	.45 @ .51
commercial	gal.	.25 @ .31
SUBSTITUTES		
Black	lb.	.08 @ .17
White	lb.	.10 @ .19
Brown	lb.	.12 @ .18
Brown factice	lb.	.07 @ .15
White factice	lb.	.08½ @ .15
Paragol, soft and medium	cwt.	10.91 @
hard	cwt.	10.91 @
VULCANIZING INGREDIENTS		
Lead, black hyposulphite (black hypo)	lb.	@
Orange mineral, domestic	lb.	.12½ @
Sulphur chloride (jugs)	lb.	.20 @
(drums)	lb.	.06½ @ .07½
Sulphur, flour, Brooklyn brand (carloads)	cwt.	2.35 @ 2.60
Brooklyn brand (less carload)	cwt.	2.65 @ 2.90
Bergenport (carloads, factory)	cwt.	2.55 @
Pure soft	cwt.	2.30 @
superfine (carloads, factory)	cwt.	2.00 @ 2.90
(See also Colors—Antimony.)		
WAXES		
Wax, beeswax, white, commercial	lb.	.60 @
ceresin, white	lb.	.14 @
carnauba	lb.	.20 @
Montan	lb.	.09 @
ozokerite, black	lb.	.30 @
green	lb.	.30 @
paraffine, 115° m. p.	lb.	@
120° m. p.	lb.	@
125° m. p.	lb.	@
130° m. p.	lb.	@
Phenanthrene	lb.	.08 @ .10
Sweet wax	lb.	.12 @

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GOOD GOODS AND EXPORT

Authorities are agreed that America must soon regain and even extend its European trade, not merely that manufacturers may find an outlet for surplus production, but in order that American labor may be kept employed and the American standard of living may be upheld. Our international experts do not concur in opinion as to how trade resumption with Europe may best be effected. Some of the methods suggested are: An exchange of merchandise not unlike primitive bartering, extending credits and acceptances over a long term of years, making loans on foreign factories, and supplying cotton and other raw material to mills in war-torn countries to be made up into finished goods for sale here or abroad; and all in the hope of overcoming the money shortage and adverse exchange. There is still something else that America must do to retrieve and retain the great trade of Europe, and that is, as Secretary of Commerce Herbert Hoover has so strongly emphasized, it must meet its rivals in foreign markets with goods of unquestioned quality.

With regard to the quality of rubber goods exported by the United States, they are the same that find a ready market at home, and our people demand the best. Is not this constant claim that American goods are deficient in quality enemy propaganda?

RELIGION IN RECONSTRUCTION

Harvey S. Firestone, president of the Firestone Tire & Rubber Co., declares that the remedy for the recent business depression is spiritual rather than material. We must, he urges, not merely practice service and thrift, learn real values, buy necessary things to avert unemployment, and appreciate basic economic laws; but we must also contribute more earnest thought and honest effort to our work, "for only in this way can we keep in balance the three fundamentals of civilized progress—religion, agriculture, and manufacturing industry."

So remarkable an expression from a leader in American industry goes a long way toward dispelling the impression that business captains regard religion as a negligible factor. Mr. Firestone is but one of many industrial leaders who feel that it is quite as important for America to take reckoning of its spiritual as well as its commercial assets. Never so much as during the present reconstruction period was there so much need of developing a livelier moral enthusiasm, a loftier idealism, and a deeper reverence for the true principles of religion. This, with a more practical patriotism, a more intensive efficiency, a wider cultural development, and a more generous appreciation of the part played by labor, will solve all problems.

When President Harding, in taking the oath of office, kissed the Bible, he performed no merely perfunctory act. He but emphasized a fact that some of us may have overlooked in the stress of business, that American civilization is essentially religious and that to this influence may be directly attributed our great ethical progress and broadening benevolence. It is safe to say that in proportion as America cherishes its spiritual inheritance will its best traditions be perpetuated and the National Conscience and the Golden Rule be active and far-reaching forces in our countless activities.

AS TO COTTON PRICES

Rubber manufacturers were not a little disconcerted last Fall at the virtually unanimous decision of the rubber planters to reduce acreage 25 per cent for thirteen months in order to offset a low, glutted market. Now they have something else, yet of a kindred character, to give them keen concern. It is the practically compulsory restriction of the cotton acreage in the United States to meet a condition not unlike that which has confronted the rubber raisers of the Far East. The time was in the

South, and more recently in the Southwest, when a farmer could not get credit unless he planted the greater part of his land in cotton. Today conditions are reversed. Credit is denied him unless he limits his cotton area to an almost irreducible minimum, so that there may be a better margin between cost and profit on the total value of all his products. Bankers who have been lending as high as $75 a bale on cotton that has been selling of late for $40 are determined not to be caught again with a big balance against them. Nor do they view with indifference a carry-over of nearly 10,000,000 bales, much of which might be thrown on the market at any time and break prices still further.

If cotton is to be financed it must be on a basis fairly profitable to those who lend money to plant and harvest the crop. Hence do they insist that the surplus of this staple be consumed before much more is raised. With a world-wide, reviving demand one thing is then practically as inevitable as death and taxes—cotton will get dearer. It may be that this will prove a handicap to some fabric manufacturers who had not the means or the foresight to stock up with cotton at its low price; yet a better price for cotton will eventually warrant a bigger production. This should help to stabilize both price and output, a condition rubber manufacturers will welcome. Indeed, so intimately related are the two lines, that it may truthfully be said that a demoralized cotton market is almost as detrimental to the rubber industry as a badly disordered market for crude rubber.

SELECTING WORKMEN BY PSYCHIATRY

Many are the means adopted by mill managers in the hope of overcoming that bugbear of industry, the labor turnover, with its attendant waste of time in engaging and breaking in men and the spoiling often of much valuable material by raw recruits. Some of the methods employed in the selection of workmen have indeed yielded fairly good results and have helped much to lessen the loss referred to; but too many employers still rely upon methods for judging applicants for work that should be scrapped just as well as their worn-out machinery. Old, haphazard ways of "hiring and firing" are giving way to methods more scientific. The modern tendency is less chance and more choice in engaging men for service that wastage may be minimized and efficiency enhanced. With competition keener than ever, no plant now can afford to be burdened with a lot of industrial misfits.

To a considerable extent employment managers have, in dealing with applicants, contented themselves with getting references, studying their general physical appearance, and requiring them to fill out simple question cards. References are sometimes genuine and truthful facial contours often reveal strength, ability and desirable traits, and question blanks are usually filled out in a perfunctory manner. Indeed, more often than not candidates for jobs do not make any damaging admissions, such, for instance, as may disclose any moral or civic delinquency or reveal any nervous or mental handicap that might at once cause their rejection. The objection to most trade tests is that they do not go far enough. The margin of error in determining the job-seekers' potential usefulness is still too large, and there is less excuse for this now in the post-war period when man-power is relatively abundant than a couple of years ago when the bars had been deliberately left down in order to get any help at all.

In the examination of recruits for the Navy surprisingly good results have followed the introduction by Lieutenant A. W. Stearns, M. D., of a strictly psychiatric method of determining the fitness of applicants; and it is said that out of thousands of cases, it registered 95 per cent correct. A brief, exact, school, social, and medical history of each applicant is taken, apart from other applicants, by a trained observer, intent on getting vital, positive information; and it is said that almost unfailingly the mental test method reveals whether the applicant is vigorous, dependable, industrious, tractable, resourceful, and cooperative, or lacks fair health, is lazy and shifty, not amenable to discipline, or is unable or unwilling to learn.

There is no good reason why manufacturers should not avail themselves of the knowledge which physicians now have in order to select normal, contented, progressive workmen. The tactful putting of a few well directed questions may often mean all the difference between profit and loss.

May Day brings a little revolution in the rubber industry. Henceforth the standard golf ball must be made lighter for all tournaments. Its weight, according to the ruling of the highest authority, the Royal and Ancient Club of St. Andrews, London, must not exceed 1.62 ounces nor its diameter be less than 1.62 inches. Golf Champion Duncan says that it will make the play easier. At any rate, credit is given American players for insisting on the less ponderous "pill."

Evidencing the fact that the rubber industry has held its own remarkably well during the recent (and passing) general trade depression is the statement of the United States Chamber of Commerce that out of a total of 2,325,000 workers unemployed the maximum for the rubber industry was 50,000, or but one-sixth of the number of idle building tradesmen. Since the survey was made there has been a marked recovery in rubber manufacturing lines and a gratifying increase in the number of workers back at their jobs. A favorable augury, too, is the development of a better spirit of cooperation between employers and employed in all sections of the country, a condition largely brought about by tactful, humane, and progressive mill managers.

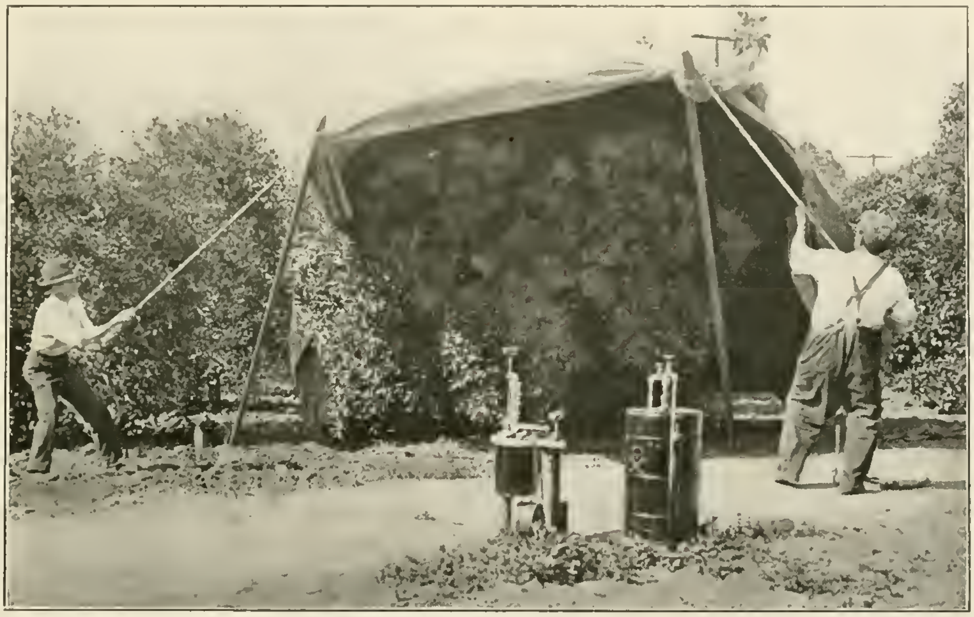
Rubber Tents in Tree Fumigation

Attempts to Control an Annual Loss of More Than a Billion Dollars by a New Use of Rubber

Few realize the constant fight that fruit growers and indeed all agriculturists wage against pests of a thousand and one kinds. Scale and boll-weevil are but two out of scores of common enemies that sometimes wipe out huge plantings. Gas fumigation, already practiced upon a large scale, has proved a wonderful success. And furthermore, the rubber, gas-tight, fumigation tent has arrived; and growers of oranges, lemons, grapefruit, and other citrus fruits, are predicting that it will soon supplant the old-time canvas covers, under which scale and other pests have been quite generally killed.

EVOLUTION OF THE RUBBER TENT

For twenty years the growers have sought in various ways to check one of the greatest drawbacks of the tent method—gas leakage through the cotton fabric; but even the application of a mucilage from boiled down cactus leaves mixed with linseed oil, as tried in the Southwest, has failed to make the fabric impermeable to the confined fumes. As the fumigant has to be used from one to three times a year, the item of leakage of valuable gas becomes important. Some growers discouraged by the cost, the trouble of tent erection, and the fact that fumigation had to be carried on almost entirely at night, even turned back to the almost discarded method of spraying with dry and liquid insecticides.



Placing Rubber Gas-Tight Tent Over Orange Trees

An alert rubber man, George Hockensmith, an expert on balloon fabrics, had been studying the troubles of the citrus growers and he intimated several months ago to Professor H. J. Quayle, entomologist of the University of California Experimental Station of Riverside, California, that he could help to solve one of the growers' most trying problems, gas leakage. Encouraged by the entomologist, Mr. Hockensmith tried various kinds of materials and finally decided that a fabric, equivalent in strength to 8-ounce U. S. Army duck would best serve the purpose.

FABRIC TREATMENT, TENT CONSTRUCTION AND TESTS

The treatment given the material is similar to that which was given to balloons and dirigibles manufactured during the war, the fabric being not only rubberized and made perfectly gas-tight, but also given an aluminum color facing that makes the tent also opaque. The advantage of opacity is that fumigation may be carried on in the tents three or four hours before sundown. Experience with the plain canvas tents has proved that day fumigation gives decidedly inferior results to night work. For some reason not yet explained, sunlight on plain canvas tents during the fumigation of trees with liquified hydrocyanic-acid gas often causes peculiar injury to fruit and leaves. Hence the practice of doing most of the "gassing" after sundown. It is claimed that the new rubberized cloth tent will effectually bar out the actinic sun rays which are believed to do the mischievous work with the gas, thus making the long-desired daylight fumigation feasible.

The new rubber tents are octagonal in shape, the center being made of the heavy material and the wings or sides of a coated fabric about three ounces lighter to the yard. Such construction not only makes the tent lighter, but also more convenient to handle in the field. As might be expected, the initial cost of the rubber tents is more than that of the plain canvas affairs, but the advantages of the rubber tree cover are so great, it is claimed, that the higher cost is easily offset.

A severe test not only of the efficiency of the tents in retaining gas, but of their durability, was given recently at Corona, California, where they were used in fumigating 1,000 newly - pruned Lisbon lemon trees. The tents were given the equivalent of two years' wear and tear in a few days' time and showed no visible defects after all the rough handling, as attested by members of the Growers' Cooperative Fumigating Association of that place.

STANDARD FUMIGATION METHODS POSSIBLE

Standardization of fumigation is the goal for which economic entomologists have long been striving, and they feel that in the rubber tent their hope will at last be realized. Standardization was impossible with such a variable factor as gas-leakage, possible always with the porous sail-cloth and often influenced by weather conditions. To hold a definite amount of gas for a definite period is the very basis of fumigation, and these two essentials are quite obtained, it is said, by Professor Quayle, in the use of gas-tight tenting material. Exact dosage, not merely to get results but also to insure the tree's safety from injury by excess gas, or overexposure, as has so often happened, can now be achieved. Moreover, it is claimed, with gas-tight tents the dosage for small trees may be reduced two-thirds; of average sized trees, one-half; and very large trees, one quarter. In addition, the time of exposure may be reduced from about an hour to an average of thirty minutes.

It is necessary, too, for trees to be kept dry during fumigation. Plain canvas tents often allowed dampness to reach the fruit and foliage, and when the dry gas (liquified hydrocyanic acid) unites with the moisture, serious damage may be done to the tree. Under a rubber tent the tree may be entirely safeguarded from dampness as well as wind, which also interferes to some extent

Plant at Azuza, California, for the Manufacture of Hydrocyanic Acid, Used in Tent Fumigation

with fumigation. Even in covering time, it is claimed that 50 per cent saving can be effected with rubber tents.

SUPERIORITY OF GAS FUMIGATION

One of the advantages of gas as an insecticide and fungicide is, that it is not only quick and certain, but, if properly used, it will disappear when the tent is removed and harm neither the tree nor the fruit. Spraying mixtures, on the other hand, cannot be diffused through dense foliage and often fruit is affected by the chemicals, cases of arsenical poisoning having been attributed to such a cause. A fumigated tree, it has been found, produces cleaner, bigger, better fruit, with better color and flavor, than one which has been merely sprayed. While some growers still generate their own gas, most of it is prepared by fumigating companies and delivered in metal drums to the groves. The gas is then forced under high pressure through a hose leading under the tent and issues from an atomizer, the amount being graduated by registering apparatus.

THE GENESIS OF HYDROCYANIC ACID

A word about hydrocyanic acid (HCN) may not be amiss. It is the prussic acid of the old chemistry, and very poisonous. It is a colorless, mobile, volatile liquid with a peculiar peach-blossom odor. It is, when vaporized, much lighter than air and diffuses rapidly. On a small scale it is made by the action of one fluid ounce of sulphuric acid (sp. gr. 1.83) on one ounce of cyanide of soda. Pure acid is produced by passing hydrogen disulphide gas over dry mercuric cyanide. Its boiling point is 26.5 degrees C. It is interesting to learn that hydrocyanic acid has been found in the latex of rubber trees. R. T. Stokes in *Chemical Abstracts*, volume 9, page 2607, tells of an analysis of the latex of *Hevea brasiliensis* by M. Kerbosch in which the presence of HCN was proved by its reaction with Prussian blue. It is conceivable that to some such substance the latex may owe the power it is believed to possess of safeguarding the tree from attacks by insect enemies.

USEFULNESS OF RUBBER TENTS UNLIMITED

Perhaps, too, the day is not far distant when two substances found in the latex will play an important part in saving rubber from damage by pests. Rubber, gas-tight tents may be used for fumigating the younger trees, and giving their insect enemies a proper dosage of hydrocyanic acid. Apparently there is practically no limit to the usefulness of the rubber fumigating tent. It may be used to rid the date-palm trees of suckers, to save the peach crop, the prune, pear, apricot, and many other fruit and berry crops, and in many ways to lessen the loss, estimated for 1920 at a billion and a half of dollars, due to the ravages of scales, flies, beetles, moths, aphids, caterpillars, etc., on the products of the country's farms, gardens and orchards.

Curing Tires in Melted Metal Molds

The Stone Process and What It Covers—The Gleason Fusible Metal Core—The Eatin Patent

Steel molds and cores for tires, footwear, druggists' sundries, etc., as well as vulcanizing presses and similar machinery in which manufacturers of rubber goods have invested millions of dollars will all be scrapped, and vulcanizing time cut almost in half, if the hopes of Dr. Frank O. E. Stone are realized. Dr. Stone is a young dentist, formerly of Akron, Ohio, who, after much experimenting in rubber and metals, has patented a method[1] of curing rubber by immersion in low fusible metals.

Dr. Stone claims that he can completely eliminate molds in making rubber goods, overcome variations in the physical condition of raw and cured rubber, obtain more definite results in vulcanizing than by using steam, and avoid overcuring and bloom in the goods. The inventor claims that the amount of sulphur and accelerators ordinarily used in vulcanizing, can be reduced, and the toughness, resilience, and flexibility of cured rubber, considerably increased. Tire casings can be cured in 50 minutes, air-bags wholly dispensed with, and a closer adhesion of rubber to fabric secured. In making solid tires oxidation is eliminated and closer adhesion of rubber and metal secured as steam and hot water would be dispensed with. Rubber manufacturers, therefore, would be able to make a wider range of articles that are now made of other materials, and the labor cost would be reduced, generally speaking, 30 per cent.

THE STONE PROCESS

Applied to tire-making, the method is as follows: A casing, having been built up on a tire core, is suspended or supported in a metal trough into which fusible metals at a liquefying temperature are poured so as to completely envelop the casing. The metals are then allowed to solidify. By means external to the trough, or with an electric resistance coil within the trough, the fusible metals are kept steadily at a vulcanizing temperature until the cure is effected. The metals are then allowed to cool, when they are liquefied, poured off, and the casing removed from the trough to be finished in the usual manner.

Pressure is obtained by contraction of the liquefied metals as they cool around the article they encase, from the fusing point

[1] United States patent No. 1,368,071 granted February 8, 1921.

to the vulcanizing temperature. It is said that a vulcanizing temperature much lower than that ordinarily used can be employed satisfactorily with this process. The fusible metals employed are in the form of an alloy, commonly lead, tin, and bismuth, to which antimony or cadmium is sometimes added. One of these alloys, known in chemistry as Lipowitz', is composed of bismuth 50, lead 27, tin 13, and cadmium 10 per cent, and it melts at 140 degrees F.

The various metallic combinations are remarkable for the pressure they can withstand, for breaking with a clean fracture, for their hardness, and the sharpness of their castings.

The first impression of those who have not tried molding rubber in fusible metals is that the alloys liquefied by heat would burn the rubber, but this fear is dispelled when celluloid does not ignite when imbedded in the molten mass or when one's fingers are thrust into the hot flowing metal without injury. The metals may be used indefinitely, the first cost being the only one.

Dr. Stone is now giving his attention to the mechanical aids required in vulcanizing by the new process, such as the troughs or containers for the curing metals, pressure and temperature-controlling devices, electric heating arrangements, etc. He also states that he has perfected a process for making seamless inner tubes with the fusible metals.

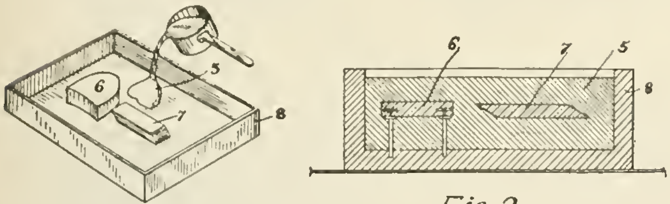


Fig. 1 Fig. 2

Stone Fusible Metal Mold

Referring to the accompanying illustration of Stone's method, Fig. 1 shows a container with a rubber heel and eraser in position, and the method of pouring the molten metal. Fig. 2 is a cross-section of the container with the rubber articles embedded in metal.

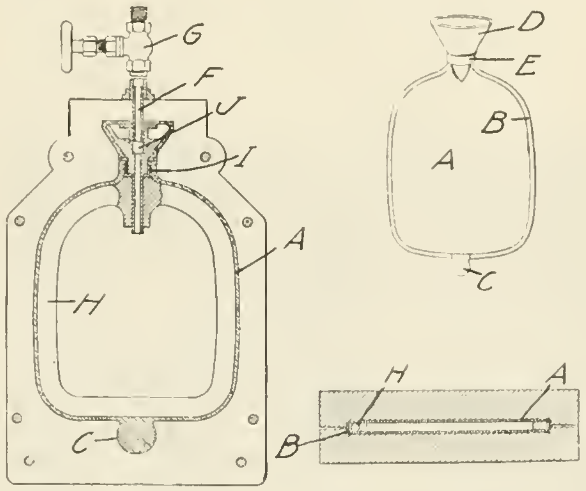
Any low fusible substance may be employed, preferably one composed of two or more metals intimately united, the ratio of the composition varying in accordance with the degree of heat at which fusibility is desired. The rubber heel 6 or the eraser 7 are preferably preformed and placed in a container 8, the metal 5 is subject to heat and liquefied, whereupon it is poured over and around the articles, as shown in Fig. 1. The metal is then allowed to solidify and the articles are firmly embedded in solid metal. The heat is next applied and the metal is kept at the vulcanizing temperature for the time required. The metal is then allowed to cool, when it is liquefied and drawn off.

It is difficult for one familiar with the rubber business to evolve anything wholly new, and it is almost impossible for others to do so. Dr. Stone is doubtless perfectly sincere, and in calling fresh attention to fusible metals in rubber molding he may have done the industry good, but to us the novelty is not apparent. Take for example the Gleason patents for fusible cores for water bottles, inner tubes, etc.

GLEASON'S FUSIBLE CORE MOLD

Gleason's water-bottle mold employs a rigid mandrel or core of soft metal which melts at a temperature below that destructive to rubber. During vulcanization the inner wall of the water bottle is sustained, first by the fusible core and when that melts, by compressed air or gas. The illustration shows a plan view of the lower half of the mold, a cross-section of the mold, and the complete bottle.

The bottle is formed by assembling the two main pieces *A*, the edging *B*, the tail piece *C*, neck *D*, and collar *E*. *F* is a tube connecting the valve *G* with the interior of the water bottle. The fusible core *H* is a narrow, open band, which conforms in shape and thickness to the interior of the unvulcanized bottle. The core is connected with a non-fusible piece *I*, which constitutes the nipple of the finished bottle and becomes attached to the rubber during vulcanization. It is also connected to the non-fusible part *J*, which forms the funnel of the bottle.



Gleason's Mold and Complete Water Bottle

When the various parts are assembled in the mold and the core is in place, the mold is clamped together and heated to 250—285 degrees F. Vulcanization proceeds inward from the exterior. The fusible core melts before the bottle is entirely cured, and the molten metal is drawn out through the tube *F*. The bottle may be expanded during the final stage of curing, by compressed air or by gas from a volatile liquid introduced through the tube *F*.

THE EATIN PROCESS

Fusible cores are, to be sure, not what Dr. Stone claims, so we cite for his attention the Eatin British patent No. 2637, issued November 21, 1859, for curing india rubber compound. Briefly it is thus explained. "The process consists in the use of a metallic bath for the purposes of vulcanization, so constituted as to fuse at or below the lowest degree of temperature required in vulcanization and capable of being elevated readily to the highest temperature required in the process. The preparations of india rubber and sulphur immersed in such a bath when at its fusing point are thoroughly vulcanized in from two to five hours, according to the temperature maintained.

"The composition of this bath may be varied to meet any required case. It will be well usually to make use of an alloy, 50 parts of bismuth, 31 of lead, and 19 of tin, fusing at about 203 degrees F. When the articles will bear a higher temperature than 212 degrees F. in the early stage of the process a bath of higher fusing point may be used by increasing the proportion of tin and lead and by the addition of zinc or other metal."

MOTOR TRUCKS IN THE TEXTILE INDUSTRY

Reports received from 414 textile mills located in various parts of the country show that approximately half of the firms use motor trucks. Of this number 153 actually owned trucks, while about 20 per cent more have their trucking done on contract. Reports indicate there is more work for light trucks of less than 1½-ton capacity, and that more than 60 per cent of the trucks are three tons or less. Relating to the tire equipment, there were 140 reports; 117, or 84.5 per cent, were using solid tires while the other 23, or 16.5 per cent, reported pneumatics in use.

The American Chewing Gum Industry

Origin and Extent of the Industry

The chicle chewing gum business forms an interesting chapter in American industrial development. Its beginning dates back less than 60 years.

Previous to that time those who chewed gum used for the purpose lumps of native spruce resin or preparations of sweetened paraffine wax and oil-softened resin sold in the form of convenient sticks.

American Chicle Co.

Fig. 1. Plant of the American Chicle Co., Long Island City, New York.

The American habit of gum chewing is rapidly extending in other countries, notably among the populations of the South American countries, Australia, New Zealand, and in lesser degree in England and France. It is authoritatively reported that the output of chewing gum was greater in 1920 than in any previous year, the weight of the finished product being estimated at 40,000 short tons.

The use of chewing gum is regarded as a harmless relief for nervous tension, making concentration of attention easier, and for that reason the United States War Department ordered chewing gum listed as a ration and distributed to American soldiers during the European war. This fact served to advertise and extend the habit of its use among the peoples of England, France and Belgium.

In 1860 Thomas Adams recognized the perfect suitability of chicle as a base for chewing gum and he began manufacturing the first chicle gum on a total investment, it is reported, of $55. The product at once became popular because chicle not only chews easily and satisfactorily but compounds readily with sugar and flavorings into a pleasant confection.

In its half-century of growth the chicle chewing gum industry has made phenomenal progress and at present ranks among the big American industries. The manufactured output in 1920 was valued at $57,000,000, representing a retail business of $100,000,000. By resort to well-planned advertising methods the sale of chewing gum is being converted from a seasonal to an all-year business.

The success of the company that originated this industry subsequently led to the formation of the American Chicle Co., the most extensive chewing gum organization in the world. This company imports over three-quarters of the chicle entering the American market, which is practically the only one for chicle. Collections are made from the company's forest concessions of 5,000,000 acres in Southern Mexico, Guatemala and British Honduras.

Table I gives the importations of crude chicle into the United States by fiscal years from 1906–1907 to 1920. Practically the total

Table I

United States Importations of Crude Chicle

Fiscal Year	Pounds	Fiscal Year	Pounds
1906-1907	6,732,581	1914-1915	6,499,664
1907-1908	6,089,607	1915-1916	7,346,969
1908-1909	5,450,139	1916-1917	7,440,022
1909-1910	6,793,821	1917-1918	6,408,093
1910-1911	6,508,208	*1918	4,645,761
1911-1912	7,782,005	†1919	9,445,538
1912-1913	13,758,592	†1920	9,859,788
1913-1914	8,040,891		

*July 1 to December 31.
†Calendar year.

supply is utilized by the American chewing gum industry. The supply, however, has in recent years been inadequate to meet the demand and prices have increased, although at present the price has receded from the high level. These conditions led to the exploration for new areas of forest in search of chicle-bearing trees, and may ultimately lead to a chicle plantation industry.

CHEWING GUM INGREDIENTS

CHICLE

Chicle is a resinous gum derived from the milky latex of the Nispero (*Achras sapota*), an evergreen tree which grows abundantly in the warm, damp forests of Southern Mexico, Yucatan, Central America, British Honduras and adjacent South American countries. Some interesting authoritative information on the chicle industry has recently been published[1] from which the botanical data and the information on collection and preparation is quoted.

Fig. 2. Achras Sapota, Leaves, Fruit and Seeds

Although the bulk of the world's supply of chicle comes from Mexico and British Honduras, nearly all the central and tropical South American republics are chicle producers, several of the latter having come into prominence only during the last few years.

While the true chicle is produced by the Nispero tree, the chicle exploited in Colombia is derived from a different source, as is probably also that obtained in the neighboring republics. The exact botanical origin of the Colombian chicle is a matter of some doubt, but it appears to be a species of Couma. This genus belongs to *Apocynaceæ*, a family containing many economic plants of importance, including several rubber-yielding trees and vines.

The botanical source of chicle in the different South American countries is apparently not known, but it is not improbable that the tree may be a species of Couma, as the Colombian chicle tree appears to be.

As compared with the Mexican chicle, the Colombian contains more resin and less gutta, namely, 83.2 per cent resin and 5.5 per cent gutta in the wet material, as against 44.8 per cent resin and 17.2 per cent gutta in the Mexican material. The Colombian product is therefore inferior to the Mexican, and when used in the manufacture of chewing gum, is mixed with the latter.

[1] Chicle. By M. T. Dawe, F. L. S. The Rubber Age, London, December, 1920, 452-454.

According to the United States *Commerce Reports* for June, 1920, the total exports of chicle from Colombia for the year 1918 amounted to 690,496 pounds, about half of which came from the Sogomoso river region of the Magdalena Valley.

Collection and Preparation

The resiniferous latex from which chicle is prepared occurs in the bark of the tree, and is obtained by tapping in much the same way as rubber or balata. Incisions are made in the bark, usually in V-shaped form, a long knife known as a *machete* being used for the purpose. The outfit of a chicle collector, or *chiclero,* consists of a *machete,* a rope for climbing the trees, and receptacles for collecting the latex.

American Chicle Co.

Fig. 3. Tapping the Tree Fig. 4. Collecting the Latex

A series of these V-shaped incisions are made and usually connected by a vertical channel, down which the latex readily flows into receptacles placed to receive it. Fig. 4 shows the arrangement of tapping cuts and a canvas bag attached to the tree trunk as a latex receptacle. Canvas bags are preferred for this purpose because they admit of baling in large numbers, thus occupying the minimum space for mule-back transportation.

The latex is conveyed to collecting camps, where it is boiled down in large vessels to a dough-like consistency, then it is kneaded to remove some of the water, and pressed in wooden molds for exportation. The largest quantity of the gum is produced in the southern states of Mexico, particularly Yucatan. The gum as shipped from Mexico contains about 50 per cent of water. On arrival in New York it contains around 40 per cent water. The latex, when fresh, resembles cow's milk, but when coalesced by boiling, it assumes a grayish hue, though the color may vary owing to the admixture of impurities. The latex is sometimes adulterated with the milk of other trees. In Mexico, the best chicle is said to be produced by trees grown in the higher altitudes. The tree yielding chicle grows to a height of from 40 to 50 feet, with trunk from 35 to 40 inches in diameter. Each tree yields, on an average, 30 to 35 pounds of chicle per year. The trees are tapped throughout the year with the exception of the rainy period, which lasts from three to four months. The tree requires a good loamy soil and a rainfall of about 90 inches.

Appearance

Crude chicle is quite hard, brittle and easily reduced to fragments. It varies according to purity, from a light to a dark brown color and melts very readily with heat, being easily softened when held in the mouth. When warm it is very ductile and adhesive without perceptible odor or taste, and is entirely free from any injurious qualities.

Analysis of Crude Yucatan Chicle[2]

	Per Cent
Acetone soluble resins	40.0
Gutta and hydrocarbons	17.4
Proteins	0.6
Sand and foreign matter	2.3
Water	35.0
Mineral ash	4.7

[2] Dr. Frederic Dannerth, Journal of Industrial and Engineering Chemistry, 1917, page 679.

CHICLE SUBSTITUTES

A number of gums are regularly cleaned and blended as substitutes for chicle and are largely used. The ingredients of these substitutes are the low-grade rubber from Borneo known as Pontianak or jelutong and the inferior guttas, among them being gutta siak, gutta kay, etc.; also the Pontianak resin extracted from jelutong as well as waxes, resins and balsams of various sorts. Several chicle substitutes have been patented and others pass under special trade names.

The aggregate tonnage of these compounded gums annually employed in the manufacture of chewing gum, approximately equals or perhaps exceeds that of the pure chicle used. Comparatively little chewing gum is made of a strictly chicle base and much is made containing no chicle whatever.

Methods of Making Chicle Substitutes

There are various processes and machines for the purification of guttas, resins and low-grade rubber for use as substitutes for chicle and for chewing gum manufacture, some of which have been patented.

Cleaning Crude Pontianak

James D. Darling, of Philadelphia, patented the following methods:

Comminuted crude Pontianak, or jelutong, is boiled in a receptacle for a considerable time in an alkaline solution consisting of 25 pounds of caustic soda to 100 gallons of water. The boiling is continued until all the impurities are precipitated, while the mixture of rubber and resin, purified and changed in physical characteristics, floats as a spongy mass. When freed from the alkaline liquor this mass is odorless and tasteless, but still somewhat tough and resilient. This product is removed and after repeated washings is subjected to a pulling or kneading operation by which its physical qualities are further changed.

During this treatment the material is maintained at a temperature between 200 and 300 degrees F. for a considerable time until the rubber content loses its toughness and resiliency and the whole mass becomes plastic, tenacious and extremely ductile, with little or no resiliency, and suited to the manufacture of chewing gum.

Treating Pontianak Resin and Gutta

Pontianak resin and low-grade guttas contain either an objectionable taste, or odors and poisonous substances which must be removed before the material can be used in making artificial chicle. It has been found that these faults may be removed by using sugar in solution.

The crude materials are dried and powdered in a mill in the case of the resin or in a hollander in the case of the gutta and the finely divided materials are then boiled in a five per cent sugar solution. The cleaned products are washed and dried by suitable means. Thus treated, they are sufficiently pure to be used, being free from taste, odor, etc.

Chicle substitutes are deficient in plasticity, and tougher and more elastic than true chicle; therefore they do not chew as easily and smoothly. These features, however, are obviated in compounding the chewing gum mixture. Practically no chewing gum is now made in which chicle is not largely or even wholly displaced by some combination substitute. Certain large gum manufacturers prepare their own substitute, others depend on purchase from concerns regularly engaged in cleaning and blending materials for the purpose.

CARAMEL PASTE

In order to obviate the naturally stiff and springy quality inherent in chicle substitutes a material known in the trade as "paste" is used. In physical appearance and consistency this much resembles ordinary yellow caramel candy. Oleo stock is one of its principal ingredients, the effect of which is to soften the chicle substitute and render it more plastic and less elastic, consequently more agreeable to chew. Other functions of paste are to act as a binder for the powdered sugar in the gum mixing and as a preservative against aging or hardening of the finished product by drying.

GLUCOSE

Glucose is familiar as corn syrup, a thick, transparent, heavy liquid of sweet taste, although less sweet than sucrose or ordinary cane sugar. Glucose syrup contains from 40 to 50 per cent of dextrose, from 30 to 40 per cent of dextrin, and water.

In chewing gum mixing glucose syrup serves as a binder and solvent for the dry sugar, thus permitting the easy incorporation of the large proportion of the latter in the mixing.

SUGAR

Pure, refined, white XXXX powdered sugar is the chief compounding ingredient in chewing gum. It also is freely used for dusting the gum as it is handled in the machines, on conveyors and on trays for cooling.

The same grade of sugar is also used to make the thick syrup for coating gum balls, "chiclets" or "nuggets" by the process employed for sugar coating in various forms of confectionery.

COLORS

While sugar-coated forms of chewing gum are generally left white it is a common practice to color the surface of ball gum. The colors used are: licorice for black; chocolate for brown; turmeric for yellow and certified harmless colors allowable in food products for red, green, etc.

FLAVORING

The various flavorings employed are a very expensive feature of chewing gum manufacture. Some are synthetic and others natural, as for example, the oil of mint. Special storage is set apart for safe keeping of the flavoring extracts in a gum factory because of their high value. In the larger plants the stock of flavoring extracts frequently amount to several hundred thousands of dollars.

MEDICAMENTS

Naturally the medicaments used in chewing gum are very few. The list includes pepsin, listerine, licorice and possibly some others. The amount of medication possible in a stick of chewing gum is too limited to be practical.

CHEWING GUM FORMULAS

TYPICAL FORMULA

Chicle	14
Chicle substitute	14
Caramel paste	1
Glucose	14
Powdered sugar, XXXX	57
	100

Flavoring extract as required.

CHICLE GUM FORMULA

Gum chicle, 3½ pounds; paraffine wax, 1 pound; balsam tolu, 2 ounces; sugar, 12 pounds; water, 3 pints; flavoring.

By the aid of heat, dissolve the sugar in the water and boil to the "crack" degree, so called by confectioners; pour the resultant syrup upon an oiled slab; add the chicle, paraffine wax and balsam tolu, all melted together, and mix thoroughly. This manipulation produces a tough plastic mass which after addition of the flavoring may be cut into the desired form.

PARAFFINE GUM FORMULA

Paraffine is dissolved at a gentle heat with a small amount of sweet oil and glycerine, the amount of each depending upon the season, less being required in warm than in cold weather. The gum (Peruvian balsam, liquid amber or whatever gum desired) is then added and stirred in until the mass becomes homogeneous. Next, add white powdered sugar, stir in, and finally add the flavoring desired. The mass is then poured on a candy slab, rolled into sheets and cut to size.

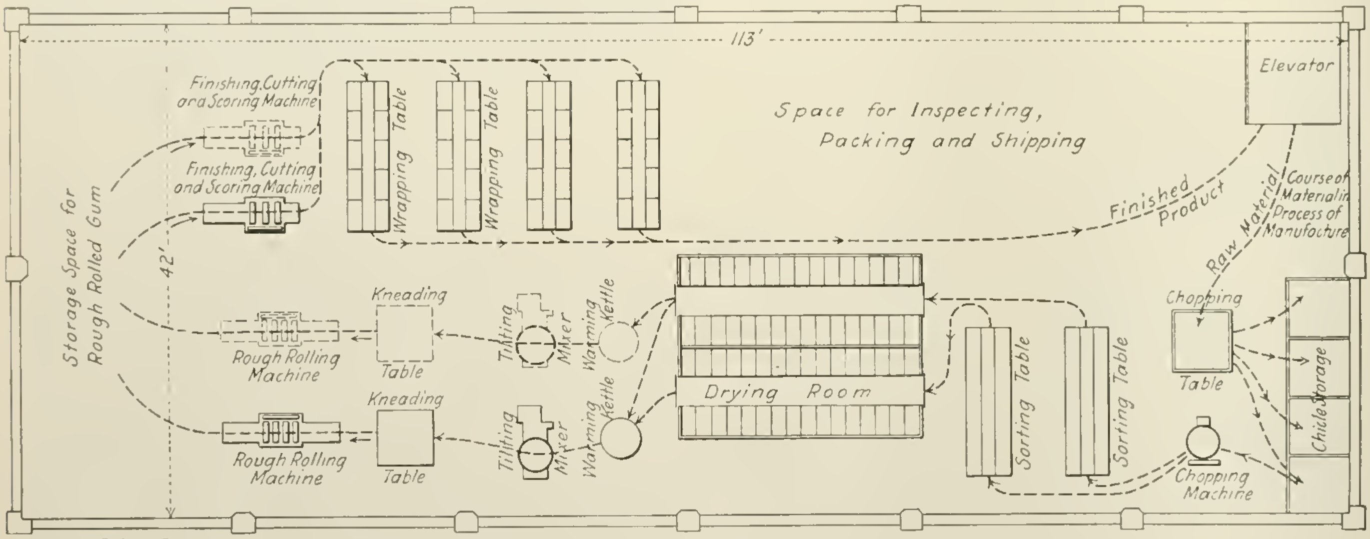
MANUFACTURE

Although the great bulk of the chewing gum trade is concentrated with a few well-known concerns the total number of gum manufacturers in the industry is said to somewhat exceed 200.

Various special machines are required in gum manufacture, some of which are heavy and expensive. Automatic machinery is much used, particularly in packaging the goods where the output is considerable.

TYPICAL CHEWING GUM PLANT

A typical lay-out for a small gum plant is shown in Fig. 5. The arrangement of equipment is that of two parallel units to admit doubling the capacity when required. The course of the material through the manufacturing processes is indicated by arrows. In such a plant as that indicated much hand labor would be employed and only the essential machinery would be found. The largest plants of course contain many special and automatic machines and an elaborate air-conditioning installation for the drying, cooling and packaging departments.



American Chicle Co.

Fig. 5. Typical Lay-Out of a Modern Chewing Gum Factory

TENNIS BALLS CANNED FOR EXPORT

Imported "canned" tennis balls have a real playing advantage over balls shipped otherwise, in the opinion of tennis players in Shanghai, China. When manufacturers learned that tennis balls were affected by moisture during the long voyage, thereby losing much of their resiliency, they began to pack balls for shipment to the Far East in hermetically sealed cans. It is believed that such canning has a good effect and that balls so protected were the determining factor in winning this year's singles tournament in Shanghai.

A Glossary of Words and Terms Used in the Rubber Industry—V[1]

By Henry C. Pearson

PLANTATION RUBBER—Continued

Good Dark Brown Crêpe. Thick or thin. A New York term for low grade crêpe. See Crêpe.

Grading. The selecting or classifying of rubber with regard to market values.

Good Smoked Sheet. A general term for fair grade smoke-cured rubber. See Sheet.

Ipoh. A Singapore sub-grade of unsmoked sheet rubber comparing well with types *A* and *B* blanket crêpe with regard to strength but shrinking about 8 per cent on an average. Takes its name from the district in which it is produced. See Sheet.

Klang. A Singapore sub-grade of unsmoked sheet named after the Malayan district in which it is produced. A strong rubber of the *A* and *B* blanket crêpe types, with a shrinkage ranging from 5 per cent to 8 per cent. See Sheet.

Kuala Kangsar. Rubber named after the Malayan district of that name. See Sheet.

Kuala Lumpur. Rubber named after the Malayan district of that name. See Sheet.

Lace. A very thin open sheet. Has been superseded by crêpe.

Light Amber Crêpe. See Crêpe.

Lump.—A Batavian term for rubber which has been coagulated in the cups, or has become coagulated on the way to the factory, or rubber which had coagulated ahead of time at the factory. See Crêpe.

Malacca. A Singapore sub-grade of unsmoked sheet named after the Malayan district of that name. In two qualities, dry and wet, the latter seldom coming to market. The dry runs from a good pale color to brown and will crêpe to form types *A* and *B* blanket crêpe of about the same color as the original sheet. The wet sheets or mixed Malacca sheet are dark and make a good, firm type of *C* blanket crêpe, with 3 to 5 per cent shrinkage. See Crêpe.

Massed or Rolled Crêpe.. New York term for earth crêpe See Crêpe

Medium Color Brown Crêpe. Thick or thin. A New York term for a medium grade of crêpe. See Crêpe.

Mexican Plantation. See Castilloa.

Mixed Malacca. See Malacca.

Mottled Crêpe. A New York term for No. 4 amber. See Crêpe.

Mouldy Rubber. Rubber that is surface stained or spotted with fungus growths.

Muar. A Singapore sub-grade of unsmoked sheet named after the district producing it, medium brown in color, but growing darker after crepeing and drying, strong but inclined to soften. Shrinkage 8 per cent. See Sheet.

Machine-Smoked Sheets. Thin layers of rubber latex that have been smoked in a machine, coagulation being effected after the manner of the Brazilian "smoke cure."

Manihot Crêpe, Sheet and Scrap. See Ceará.

Normal Latex. Undiluted latex with a dry rubber content of 30 per cent.

Nearly-Clean Dark Brown Crêpe. A grade of bark rubber. See Crêpe.

Off-Color Crêpe. A Batavia grade of crêpe made from latex that is diluted with rain water. See Crêpe.

Off-Color Latex. New York term for a grade of crêpe. See Crêpe

Off-Quality Ribbed Smoked Sheets. A Singapore and Batavia term for a grade of smoked sheet. See Sheet.

Off-Standard Latex Crêpe. A New York term for off-color latex. See Crêpe.

Over-Smoked. A tarry condition of rubber due to oily fuel.

Papua. Plantation Hevea from the island of that name.

Penang Sheet. A Singapore sub-grade of unsmoked sheet named after the producing district, dark and strong. When crêped, makes a good type of *C* blanket crêpe. See Sheet.

Philippine Plantation. See Plantation Pará.

Plain Smoked Sheets. A Singapore term for a grade of smoked sheet. See Sheet.

Plantation Pará. A general term applied to rubber grown in the Far East from the cultivated *Hevea brasiliensis*, the product being usually named after the districts supplying it as: "Ceylon," "Malay," "Straits," "Java," "Sumatra." This rubber also comes in a less degree from Africa, Dutch and British Guiana, Trinidad and the Philippine Islands, and the grades bear the names of the country of origin.

Plantation Smoked Sheets. Rubber which, after coagulation with acetic acid, has been cured and dried in the smoke-house.

Plantation Rubber. A general term for all cultivated rubber, chiefly that derived from the Hevea, but also including planted Castilloa, Manihot, Ficus, Funtumia, etc.

Prime, Clean, Light Brown Crêpe. A New York term for a medium grade of crêpe. See Crêpe.

Prime Pale Crêpe. A Java term for the highest grade of crêpe. See Crêpe.

Prime Ribbed Smoked Sheet. A Batavia term for a high grade smoked sheet. See Sheet.

Ribbed Sheet. A Singapore term for a high grade sheet. See Sheet.

Rolled Bark Crêpe. A Singapore term for a low grade crêpe. See Crêpe.

Rolled Crêpe. A New York term for low grade crêpe. See Crêpe.

Rambong Crêpe. Ficus rubber machined like plantation Pará.

Smoked Sheet No. 1. East Java term of prime ribbed sheet. See Sheet.

Smoked Sheet No. 2. A New York term for plain smoked sheet. See Sheet.

Smoked Sheet. See Sheet.

Sheet. A grade of plantation rubber nearly equal to the best grades of crêpe, the chief difference being its physical shape. Most of it is smoked, although some comes to the market as the unsmoked. A further difference is made between that which is ribbed or has diamond shaped markings from the washing-rolls and that which is smooth. The first New York grade is known as ribbed smoked sheet; in Singapore as standard quality ribbed smoked; in Batavia, prime ribbed or diamond smoked; and in East Java as No. 1 smoked. The second grade is known in Singapore and Batavia as off-quality ribbed smoked; and East Java as No. 2 and No. 3 smoked. This grade is followed in New York by standard quality smooth smoked; in Singapore as smooth smoked. The unsmoked is known in New York as standard quality unsmoked sheet; in Singapore as clean dry pale amber and light brown unsmoked sheet. These are grades in which there is much variation, as they are often from small native plantations and usually bear the names of the localities from which they come. Such as Bjambi, Batu, Pahat, Ipoh, Klang, Kuala Kangsar, Kuala Lumpur, Muar, Penang, etc.

Smoking. The process of drying, curing, disinfecting and preserving freshly rolled coagulated latex in the fumes of burning wood, coconut shells, etc. The characteristic ham-like odor of rubber thus treated is due to the absorption of a small amount of creosote.

[1]Continued from The India Rubber World, April 1, 1921, pages 481-482.

Specky Scrap. A Batavia term for a low grade crêpe. See Crêpe.

Specky Brown Crêpe. A New York term for a low grade crêpe. See Crêpe.

Spotted Rubber. Rubber stained, blemished or discolored.

Standard Quality Latex Crêpe. New York term for first grade crêpe. See Crêpe.

Standard Quality Ribbed Smoked Sheet. A New York term for best grade of smoked sheet. See Sheet.

Standard Quality Smooth Smoked Sheet. A New York term for best grade of smoked sheet. See Sheet.

Standard Quality Unsmoked Sheet. A New York term for a low grade unsmoked sheet. See Sheet.

Standardized Raw Rubbers. Referring to a plan formulated for the British Rubber Growers' Association for a more accurate standardization and valuation of plantation crude rubber. Assuming 1,000 to represent the highest quality, as determined by tests as to tensile properties, physical condition and stability, all proving above the index figure of 900 would be rated as first grade; above 800 as second grade; above 700 as third grade; above 600 as fourth grade, and above 500 as fifth grade.

Scrap. Remnants of rubber obtained after tapping, which are rolled into balls, made up into cakes or into lower grades of crêpe. Also a Java term for barky rubber. See Crêpe.

Scrapings. Java term for scrap. See Crêpe.

Tacky Rubber. Rubber more than normally sticky or adhesive, the cause being ascribed to decomposition of certain proteins by acid normally in the latex.

Thick Pale Grisly Crêpe. See Crêpe.

Thin Pale Crêpe. See Crêpe.

Trinidad Plantation. Product of the cultivated Hevea or Castilloa from Trinidad and Tobago. See Plantation Pará.

Unsmoked Sheet Standard Quality. New York term of a high grade. See Sheet.

Unsmoked. Rubber that has not been treated by any smoking process.

Unsorted Scraps. Java term for bark. See Crêpe.

Uganda Plantation. Pará rubber from British East Africa. See Plantation Pará.

Vacuum Drying. Dehydration of newly-made sheets of rubber in a steam-heated vessel or compartment which has been exhausted of air and moisture with a vacuum pump. It greatly shortens drying time and helps in the making of the blocks. Very efficient when handled by experts, otherwise rubber may be overheated, its nerve injured and its pores opened to harmful action by the air.

Worm Rubber. Sheets of freshly-made rubber cut into thin worm-like strips with shears or machinery rolls.

West Indies Plantation. Product of the cultivated Hevea or Castilloa rubber from that district. See Plantation Pará.

Washing. Passing coagulated latex or scrap and a steam of water between grooved steel rolls revolving at different speeds.

Wash-Water Rubber. The rinsings of cups, pails and other receptacles which contain a certain amount of latex, which is coagulated and thus recovered.

The Glossary—Comments and Suggestions

The following comments from those interested have been received:

GUAYULE—RUBBER OR SUBSTITUTE?

"Should not guayule be listed as a substitute and not as a true rubber?"

Guayule is a true rubber. Its source and characteristics, differing as they do from other rubbers, are responsible for its confusion with gums that contain no caoutchouc.

GUM ELASTIC

"Why should not the whole trade adopt 'gum elastic' as its term for rubber or india rubber?"

Excellent. But how can it be brought about?

ELIMINATING THE SHRINKAGE IN PARAS

"If all the Pará sorts were washed and dried, say at Pará and Manáos, would it not save freight charges and get rid of many meaningless names? Are there any objections to such a procedure?"

It would upset all existing brands, and buyers would be suspicious of new ones. Furthermore, mixtures of good and bad, of weak fine and fine would be likely to occur. Moreover, when some years ago, the plan was mooted it was found that the cost of washing at source was ten times as great as at the factory.

DEFINING RAW RUBBER COMPOUND

"In a patent suit the question of the meaning of the words, raw rubber compound, wants expert definition. Will you be good enough to wire me your definition of raw rubber compound? Our understanding being that raw or crude rubber is the base, together with the necessary curing agents, such as sulphur and whatever else might be added to give the desired results. But to be a raw rubber compound, nothing else but the two things, rubber and sulphur, have actually to be present. Namely, these two must be, but others may or may not be. If you speak of raw rubber compound you refer to a line of uncured compounds which are and have been well known to the rubber trade for a great many years, and such compounds are based on raw crude rubber combined with sulphur and such things as one may, from the experience of those skilled in the art, choose to combine."

Strictly speaking, anything mixed with raw rubber for any reason results in a raw rubber compound. If the product is to be vulcanized, sulphur or some vulcanizing agent is employed. If not, as in the case of electric tape or medicinal plasters, no sulphur or vulcanizing agent is incorporated.

WHAT IS CHICLE?

"I am curious to know if in your listings you will refer to chicle. Is it rubber, and if so, why is it taxed when other rubbers are free of duty?"

Chicle is derived from one of the Sapotads, trees that do not produce rubber, but from which nearly all of the gutta percha of commerce comes. It is really a Central American gutta percha. According to the last tariff law, crude india rubber and gutta percha are admitted free. Nevertheless, chicle, a gutta percha, is taxed.

SYNTHETIC RUBBER NOT RUBBER

"To my mind, synethetic rubber is not rubber. It is a substitute."

Nature runs one kind of laboratory, man another. When the products are the same, they would seem to merit the same name.

WHERE DOES BALATA BELONG?

"Certain of the authorities in describing balata claim that it is a gum that stands midway between rubber and gutta percha. Does that mean that it contains both gutta and rubber, and that it is actually neither a true rubber nor a true gutta?"

Balata contains no rubber. It does contain, however, some 39 per cent of true gutta. The statement that it ranks midway between rubber and gutta percha is misleading, as it refers to its elasticity in the crude state. East Indian gutta percha is hard like wood, balata is springy like whalebone, rubber is still more springy. Balata is just as truly a gutta as a lesser grade of rubber is a rubber.

Oils, Fats, Waxes, and Resins Used in the Rubber Industry[1]

By Frederic Dannerth, Ph.D.

INTRODUCTION

There are a number of materials used in preparing plastic masses which have two or more important and technically valuable properties. In a discussion of these materials we shall find that the properties or characteristics change gradually. For example, if we examine products obtained from mineral sources—cylinder oil, petrolatum, paraffine wax, ozokerite, ceresin, and montan wax, we find that these are entirely unsaponifiable.[2]

Turning to the so-called higher fatty acids, we find oleic acid to be a liquid resembling an oil, while stearic acid is a hard wax-like body, melting at 69 degrees C. (157 degrees F.). A chemical combination of these fatty acids with glycerol (glycerin) is found in the plant oils, generally obtained by pressing the seeds in hydraulic presses. Peanut oil is a non-drying oil; soya, a semi-drying oil; and tung, a drying oil. By this is meant that tung, like linseed oil, has the power or ability to absorb oxygen from the air and form a new substance which is dry to the touch.

Although the oils are liquid at usual room temperature (60 degrees F.), they are quite similar in chemical character to palm fat, coconut fat, and Japan fat (Japan wax). In the case of cottonseed stearin we have a substance which is obtained from cottonseed oil merely by refrigerating the oil. It is, strictly speaking, a fat.

In the next group we find substances in which the higher fatty acids are combined chemically with mon-atomic or di-atomic alcohols. They are never combined with the tri-atomic alcohol (glycerol). The waxes include the products obtained from the carnauba and candelilla, plants; beeswax, and wool wax (wool grease or lanolin).

All the plant and animal products mentioned thus far are saponifiable. That is they can be converted into soaps by boiling with alcoholic potash. This holds good for all but the nast named, the wool grease. Here we have a product which contains cholesterol and iso-cholesterol—both of them alcohols—chemically combined with acetic acid. Its saponification value is 100 compared with 190 for peanut oil.

Next we come to a group of substances designated "resins" because they are obtained as exudations from plants, and from the milk bearing canals of trees. Jelutong resin is a good example. It has a melting point of 160 degrees C. (320 degrees F.), and is therefore very brittle at room temperature, whereas wool wax is of the consistency of a fat. Jelutong resin and wool wax both contain esters of the cholesterol alcohols. Pine resin (colophony or common rosin) melts at about 130 degrees C., while guayule resin is a sticky mass resembling molasses, at room temperature (60 degrees F.).

PHYSICAL PROPERTIES

In studying the properties of these materials, with reference to their use in industrial work, we will find at once that the primary consideration is their melting point. The rubber chemist and the worker in plastic masses wants to know the temperature at which these substances soften and assume the condition of a liquid. As few if any of them are absolutely pure chemical compounds we will find that their melting point or their solidifying point varies slightly just as their other physical and chemical properties vary.

If they were absolutely pure chemical compounds they would, if they melted at all, have the property of melting at an almost constant temperature. In view of the fact that commercial commodities are prepared in a variety of ways and with varying degrees of carefulness, these *commercial* products differ slightly from the *chemically pure* article. Owing to the differences in reported specific gravities by different investigators it has been thought best in preparing data for the attached tables to take an average of several published specific gravity figures.

The points which are of interest to the worker in plastic masses are: (1) the specific gravity; (2) saponification value; (3) melting point; (4) viscosity; (5) the tendency which the material has to absorb or take up oxygen and change its character; (6) the chemical composition of the material.

In studying the solvents and thinners we are generally careful to consider the boiling point, because these materials are generally valuable as they are volatile; but in the case of oils, fats, waxes, and resins we want materials which lose little or none of their weight at 300 degrees F. (149 degrees C.). This will be readily understood when we consider that the latter group of materials are added to the rubber batch or dough in order to give it certain characteristics *permanently*. As rubber compounds are vulcanized at temperatures from 280 to 300 degrees F, they should contain no substances which will vaporize below those temperatures.

RESUME

Groups

1. Higher fatty acids.
2. Glycerides of the fatty acids. Non-drying and semi-drying.
3. Glycerides of linolic and linolenic acids. Drying.
4. Plant fats. Non-drying glycerides.
5. Esters of monatomic and diatomic alcohols.
6. Resins. Saponifiable and unsaponifiable.
7. Resinous gums.
8. Rubber gums. True rubbers.
9. Mineral oils, fats and waxes. Unsaponifiable.
10. Pitches, solid hydrocarbons, and distillation residues.

Part I—Raw Materials

GROUP 1

Oleic Acid is a fluid of oily consistency which solidifies at about 14 degrees C. Combined with glycerol as glyceryl oleate it is the principal constituent of olive oil (olea europea).

Palmitic Acid with a melting point of 62 to 63 degrees C. is present as glyceryl palmitate in palm fat, forming 98 percent of that fat. Japan fat is a mixture of about 10 per cent palmitic acid with almost 90 per cent of palmitin (glyceryl palmitate).

Stearic Acid is a type of solid acid resembling a wax in appearance with a melting point of about 69 to 70 degrees C. It is found as gylceryl stearate in the fat of mutton, swine and beef.

Virtually all the oils and fats obtained from plants and animals are mixtures of glycerides of oleic, palmitic and stearic acids. For that reason it is possible to split them into their two constituent parts, fatty acid and glycerol or glycerine as it is known in commerce.

Lauric Acid as glyceryl laurate is the principal constituent of coconut fat, and has a melting point of 43 to 47 degrees C.

GROUP 2

The Plant Oils known as peanut and olive are distinctly non-drying. In the next section we have soya, corn, cotton and rape, all of them seed oils classed as semi-drying. Here, too, belong

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[2] The saponification number, or Koettsdorfer value, indicates the number of milligrams of potassium hydroxide required for the complete saponification of one gram of the substance. Two grams of the oil, fat or wax are heated with 25 cubic centimeters of ½ normal alcoholic potash, in a suitable flask so as to prevent the evaporation of the alcohol.

the animal oils, the oil of menhaden fish, and the oil of hogs known in commerce as lard oil.

GROUP 3

THE DRYING OILS have been recognized for many years as important constituents of paints, varnishes and plastic masses. They are also used in the manufacture of oilcloth, linoleum and sulphurized oil products. This group includes linseed oil produced in the United States; the tung oil or China nut oil of China and Japan, the perilla oil of East India and China.

SULPHURIZED OILS (black rubber substitute, black oil substitute) can be made by heating the oil of peanut, soya, corn, cotton, rape, linseed or menhaden with flowers of sulphur until chemical combination has taken place. These products will always be found to contain a high percentage of free sulphur and free oil.

CHLORINATED OILS (white rubber substitute) are prepared by the action of the liquid sulphur chloride on these oils. If desired the oil may first be thinned down with an equal volume of some suitable volatile solvent, and the sulphur chloride may then be added to this mixture. A third method consists in spraying the oil into a chamber containing vapors of sulphur chloride.

GROUP 4

COTTON-SEED STEARIN is practically the only plant fat occuring in the United States. This is the solid matter which settles out when cotton seed oil is chilled.

PALM FAT is obtained from Africa and the Philippines.

COCONUT FAT is obtained from China, Ceylon, Brazil and Florida.

JAPAN FAT, known in commerce as Japan wax, is obtained from the berries or fruits of sumac trees in Japan and China.

GROUP 5

THE PLANT WAXES include carnauba obtained from Brazil and other South American countries as well as candelilla wax obtained from Mexico and southern Texas.

WOOL WAX, known in commerce as wool grease, is obtained from high-grade wool by extraction with a volatile solvent, or by scouring, while beeswax is the familiar product of the honey bee.

GROUP 6

THE RESINS available in large quantities vary in character from the bitter-tasting colophony, which can be converted into water-soluble sodium resinate, to the brittle resin of Pontianak or jelutong which is practically unsaponifiable.

JELUTONG RESIN. The resin extracted from Pontianak (*Dyera costulata*) by means of a mixture of acetone-gasoline possesses characteristics of such commercial importance that they are worthy of detailed notice. Washed and dried Pontianak yields on an average 75 per cent of resin, the balance being a rubber. The melting point of the resin is about 160 degrees C. (320 degrees F.). Its molecular weight is between 372 and 392. Some have considered the major constituent of jelutong resin to be an alcohol of the cholesterol series, while others have found in the resin certain bodies related to the sterols, namely, the acetates of lupeol, of alpha-amyrin, and beta-amyrin. Iso-cholesterol (dextro rotary) has also been recognized as present. It will be recalled that an ester of this alcohol is contained in wool grease. Jelutong resin so far as known is entirely unsaponifiable. This fact combined with its high melting point has been the principal cause for the use of Pontianak as an ingredient in "friction" compounds.

GUAYULE RESIN. This material is quite unlike the resins obtained from other varieties of rubber. It is very sticky, almost like molasses at a temperature of 60 degrees F. So far as known it contains no stearol-like constituents. The washed and dried guayule obtained from the *Parthenium argentatum* of Mexico contains about 25 per cent resins. They are, like the resins of Pontianak, soluble in commercial acetone as well as in a mixture of 53 gallons acetone and 47 gallons (of 70-degree) gasoline.

PINE RESIN. This is the solid residue found in the stills after the volatile oil has been driven off in the purification of crude turpentine. It is brittle, has a slightly bitter taste, with a smooth, glassy fracture. Colophony forms about 66 per cent of the crude turpentine. It is obtained from the long-leaf pine (*Pinus palustris*) found in the Carolinas. When boiled with caustic soda it takes up water to form a sodium salt of abietic acid. One hundred pounds of resin can be saponified by boiling with 15 pounds of soda ash. The melting point of pine resin is 130 degrees C. or 266 degrees F .

GROUP 7

. THE RESINOUS GUMS include: natural guayule obtained from *Parthenium argentatum*, containing about 20 to 25 per cent resins; balata obtained from *Mimusops globosa*, containing from 40 to 50 per cent resins; gutta percha obtained from *Palaquium gutta*, containing about 50 per cent resins; chicle obtained from *Achras sapota*, containing about 60 per cent resins; jelutong obtained from *Dyera costulata*, containing about 75 per cent resins.

GROUP 8

Rubber gums, strictly speaking, would include all those rubbers of commerce containing not more than 5 per cent of resins based on the washed and dried weight. Fine Pará rubber, medium Pará rubber, coarse Pará rubber; plantation Hevea rubber, both smoked sheets and crêpe—all come easily within this group. Ficus, Funtumia and Landolphia rubbers with a resin content varying from 6 to 20 per cent would more properly be classed with the resinous gums.[8]

Part II—Plastic Masses

It is an interesting fact and one not generally recognized, that there are a number of industries which have many problems in common, therefore chemists and engineers would do well to examine into the processes, raw materials and products used in industries outside of their own.

The point is well illustrated in the case of concerns manufacturing rubber products, linoleum, oil-cloth, paints and varnishes. These industries are grouped together because they are based on the use of plastic masses. Generally speaking, they utilize oils, fats, waxes, pitches, resins and rubbers on the one hand and powdered minerals on the other. To be more definite the powdered minerals include: chemical elements, oxides, carbonates, sulphides, sulphates, and silicates. Here we have an enumeration of most of the possible ingredients of a rubber compound, but the list tells little if anything about the function of each ingredient in the mixture.

PAINTS, VARNISHES AND RUBBER GOODS

In recent years, the researches of chemists have brought to light a group of drying agents which to a great extent have displaced the older baking Japan driers. These are the metallic soaps; the linoleates of lead and manganese; the resinates of manganese, lead, cobalt and nickel. These substances are, in effect, catalytic agents which induce the rapid oxidation of the oil or varnish. They form two classes of compounds, one containing more oxygen than the other. And they easily pass from one form into the other. If, for example, we have a varnish containing oleo-resins, a small amount of lead resinate and some oil, we will find that the lead resinate gives up half of its oxygen to the oil, and then takes up more oxygen from the air. In this way, the lead resinate drier acts continuously as a go-between to

[8] Doctor Dannerth's conclusions are very interesting and, as a rule, sound. Just why, however, an arbitrary ruling should be made to the effect that a gum containing less than 6 per cent of resin should be a rubber, and one containing more should come under another classification, does not appear evident. A valuable constitutent of any rubber gum, be it Pará rubber or Pontianak, is the rubber it contains. As a rule, the resin is so much waste material. It is probable, therefore, that they will all continue to be rubbers. We take issue with him also, where he speaks of jelutong, "the balance being gutta rubber." Actually, the balance is rubber, and only rubber, as has been long established. In the writer's opinion, both guayule and jelutong, being rubber, should be classed with rubbers. Balata and chicle, being guttas, should be classed with the guttas.—THE EDITOR.

pass oxygen along from the air to the oil. The result is that the oil finally becomes permanently hard and the surface of the wood is protected. For 100 kilograms of oil, the manufacturer of varnish would use not more than one kilogram of the drier. This is equal to one per cent. In fact 1/10 of one per cent in many cases is quite sufficient to induce drying.

The accelerators used in the rubber industry, are generally recognized as catalytic agents, used for the purpose of carrying sulphur to the rubber, and helping these two substances to combine chemically. Charles Goodyear in his early experiments discovered that raw rubber could be converted into a useful substance by mixing it with a certain amount of sulphur, and heating this mixture while it was under compression.

Later it was found that the addition of litharge hastened the process of vulcanization, and so this substance was recorded as an accelerator, or as now termed a catalyst or "carrier." In this particular instance the litharge is a carrier of sulphur, but there are other substances which, being similar to litharge in chemical behavior, act in the same manner. These are the oxide of calcium (lime) and the oxide of magnesium (magnesia).

TECHNICAL PROPERTIES OF METALLIC SOAPS

If rubber has been properly vulcanized its physical properties of tensile strength and elasticity increase to a marked degree. If a varnish has been properly dried, we will note a similar change. This, and many other observations make clear why the rubber industry has much in common with the other industries which use plastic masses. Thus we find that several mineral soaps; the oleates and stearates of lead, and magnesium and calcium, have been applied successfully to the rubber-sulphur compound for the purpose of hastening vulcanization. Besides those just named, aluminium oleate, stearate, and resinate, and zinc oleate, stearate and resinate deserve attention as possible compounding ingredients which will give to the rubber mixture some property hitherto unknown.

LEAD OLEATE

The properties of lead oleate which commend it to the consideration of chemists and compounders in the rubber industry may be summed up thus:

1. It is possible to use as much as five pounds of lead oleate for each 100 pounds of rubber used.

2. The oleate can be incorporated without having the batch become soft and sticky.

3. If more than five per cent is used, the batch will not become soft or sticky, or difficult to work on the rolls.

4. Five pounds of oleate appear to be equivalent in action as a catalyzer to three pounds of litharge.

5. The molecular weight of lead oleate is 487 equal to the formula:

$$\left.\begin{matrix}C_{17}H_{33}COO\\C_{17}H_{33}COO\end{matrix}\right> Pb$$

It contains 42.5 per cent of lead by weight, and has a specific gravity of 1.50.

6. Owing to its oleaginous nature, lead oleate is easily mixed with the rubber, and more uniformly distributed in a shorter time, than is the case with litharge. The amount of lead in litharge or lead oxide is 93.0 per cent.

7. Lead oleate is preferable to aniline as an accelerator in those cases where poisonous vapors are objected to.

8. Oleate assists cohesion of the ingredients and helps the compound to stick together.

9. Oleate prevents blooming of the sulphur in the finished rubber product.

10. Oleate costs $29 per cubic foot, weighing 93.6 pounds.

11. When litharge is used, there is danger of burning the compound on the mill or calender, but if oleate is used this danger disappears.

12. Lead oleate can be used with impunity in the same compound with bone glue.

CHEMICAL FORMULAS

Oleic acid is a derivative of the olefine hydrocarbons and is a liquid at ordinary room temperatures, whereas stearic acid is a derivative of the methane hydrocarbons, and is a solid waxy substance at ordinary temperatures. The molecular weights are given below:

Oleic acid Molecular Weight = 282	Stearic acid Molecular Weight = 284	Resinic acid Molecular Weight = 656 ?
CH_3	CH_3	(C_5H_8)
|	|	|
$(CH_2)_7$	$(CH_2)_{15}$	(C_7H_7)
|	|	|
C	CH_2	$(COOH)_2$
||	|	
C	COOH	
|		
$(CH_2)_7$		
|		
COOH		

Magnesium Oleate is the product obtained by heating magnesia with oleic acid and is a plastic mass much softer than lead oleate. It can be used in compounds both for its lubricating properties as well as its ability to accelerate the cure.

Physical Properties of Some Oils, Fats, Waxes and Resins

Materials	Specific Gravity at 15° C.	Saponification Value	Melting Point Degrees C.
Oleic acid	.898	...	14
Palmitic acid	.853	...	62
Stearic acid	.839	...	69
Peanut oil	.920	191	Less than 20° C.
Soya oil	.925	193	
Corn oil	.921	190	
Rape oil	.913	175	
Cotton oil	.922	194	
Tung oil	.936	193	
Linseed oil	.932	194	
Perilla oil	.930	190	
Menhaden oil	.930	191	

Materials	Specific Gravity at 15° C.	Saponification Value	Melting Point Degrees C.
Hog lard oil	.916	193	Under 20
Palm fat	.925	190—205	30—42
Japan fat	.970	220—240	50—55
Coconut fat	.911	245—260	20—25
Cottonseed stearin	.920	195	40
Candelila wax	.983	65	67
Carnauba wax	.995	80—85	84
Beeswax	.960	90—96	60—65
Wool wax	.973	98—102	40—42
Guayule resin	...	......	<20
Pine resin	1.080	......	130
Jelutong resin	....	......	160

Rule to Determine the Volume Cost of Materials

One cubic foot of water at 16.5 degrees C. weighs 62.355 pounds. The specific gravity of water is 1.000. A substance having a specific gravity of 0.963 will weigh: 62.355 × 0.963 = 60.05 pounds per cubic foot. If this material is quoted at 12 cents per pound, it will cost: 12 × 60.05 = $7.20 per cubic foot. Therefore: 62.355 × specific gravity × price in cents per pound is equal to the price of the material per cubic foot.

The formula for magnesium oleate is C—36, H—66, O—4, Mg. as it takes two molecules of oleic acid (282) to combine with one molecule of magnesium oxide (40). Therefore 564 pounds of oleic acid combined with 40 pounds of magnesium oxide will yield 588 pounds of magnesium oleate under ideal conditions. Or it might be said that 14.7 pounds of magnesium oleate has as much magnesium in it as that contained in one pound magnesium oxide.

Aluminum Oleate has a consistency resembling stiff jelly. It has been used for thickening mineral oils, because it swells to a considerable extent under their influence. Aluminum stearate and, in fact, all of the stearates are solid, resembling hard waxes. Zinc stearate is extensively used as an antiseptic dusting powder in medical work.

SPECIAL PATENTS

E. S. Ali Cohen has obtained a patent in Norway, No. 29446, February 10, 1919, for the production of a plastic mass of the following type: a metal compound of a fatty acid (a water-insoluble soap) is dissolved in a hydrocarbon of high boiling point. It is then treated with an oxidizing agent in a drying oil, heated to 200 to 250 degrees C.

A patent taken out by the same inventor in Holland, No. 3293, June 2, 1919, covers the use of the stearates of aluminum, manganese, chromium or iron dissolved in a fluid hydrocarbon. These compounds are suited as ingredients in linoleum compounds.

WOMEN RUBBER WORKERS

A fair idea of the extent to which women entered the rubber industry in America during the war period is given in a general survey embodied in Bulletin No. 12, recently issued by the Women's Bureau of the United States Department of Labor. It is shown that out of the 23,987 workers reporting in 80 rubber plants, after the first draft, 6,633 were women, or 276 in each 1,000 employed. After the second draft the proportion rose to 354 per 1,000. With the signing of the armistice and the closing of the gas-mask factories included in the rubber group, the proportion of women employed fell to 116 per 1,000. Statistics are far from being complete, but seven tire factories reported about 4,294 women as having taken the places of men since 1917. They have been employed to cut tire fabric with machines, others to prepare fabric for men tire builders, while some make inner tubes, stamp sizes and names on the tubes, and box them for shipment. Tire beads and treads are trimmed and wrapped by women, and small tires finished and inspected by women, "because of their deftness, quickness, and neatness," as one concern puts it.

In one large plant some women have replaced men in rubber washing and in reclaiming, some have helped at the calenders, others have cemented rubber boot parts, and some have taken well to the work of molding rubber heels, while others have replaced men in cutting and cementing balloon fabric. But, generally speaking, relatively few women are still in the rubber trades.

"What is Vulcanization?" A brief, non-technical treatise for the general reader, distributed by the United States Rubber Co., 1790 Broadway, New York.

The origin, development, and the universal importance of vulcanizing are briefly and interestingly related; and a very good résumé is given of the art of tire manufacturing. So exact is this art that a "second" occurs but once in a thousand tires. Users are reminded that a properly-cured tire cannot be subjected to further curing without producing an "overcure," which results in early destruction of the rubber. Hence are tire-owners cautioned against careless retreading in which part of the carcass is often overcured while the new tread is being vulcanized, and the tire's life shortened, instead of being lengthened.

GUIDE FOR MAKING SPLICES

Tire Surgeon offers the following to those who realize the money to be made by making one good tube out of two old ones or in cutting sections from one tube and splicing blowouts that are past repairing by the usual patch method.

For example: In making a 30 by 3½ tube from old tubes of 3½-inch size, measure the longest portion and take from another tube the difference, 85 inches, and allow 2 inches for the splice which, when spliced, will give you the length before last splice is made. The 85 inches allow for a 2-inch splice, as shown in the column under "Splice Length."

Size	Pole Length Inches	Hole for Valve Inches	Splice Length Inches
26x3	74½	5/16	2
30x3	86½	5/16	2
30x3½	85	5/16	2
32x3½	91½	3/8	2
31x4	86½	5/16	2½
32x4	89½	3/8	2½
33x4	91½	3/8	2½
34x4	96	3/8	3
32x4½	89½	3/8	3
33x4½	93	3/8	3
34x4½	96	3/8	3
35x4½	99	3/8	3
36x4½	102½	3/8	3
33x5	90	3/8	3
35x5	97	3/8	3
36x5	100½	3/8	3
37x5	104	3/8	3

JUNIOR RUBBER TECHNOLOGIST

The United States Civil Service Commission announces an open competitive examination for junior technologist. Vacancies in the Bureau of Standards, Department of Commerce, for duty in Washington, D. C., or elsewhere, at $1,200 to $1,500 a year, and vacancies in positions requiring similar qualifications, at these or higher or lower salaries, will be filled from this examination, unless filled by reinstatement, transfer, or promotion.

Competitors will be rated in the following optional subjects, and applicants should state in which of these subjects they desire to qualify: Rubber technology; leather technology; paper technology; textile technology; oil technology; general technology.

Applicants should at once apply for Form 1312, stating the title of the examination desired, to the Civil Service Commission, Washington, D. C.; the secretary of the United States Civil Service Board, Customhouse, Boston, Massachusetts; New York, New York; New Orleans, Louisiana; Honolulu, Hawaii; Post Office, Philadelphia, Pennsylvania; Atlanta, Georgia; Cincinnati, Ohio; Chicago, Illinois; St. Paul, Minnesota; Seattle, Washington; San Francisco, California; Old Customhouse, St. Louis, Missouri; Administration Building, Balboa Heights, Canal Zone; or to the chairman of the Porto Rican Civil Service Commission, San Juan, Porto Rico.

Applications should be properly executed, excluding the medical certificate, and must be filed with the Civil Service Commission, Washington, D. C., prior to the hour of closing business on May 10, 1921.

HEVEA PLANTATIONS IN THE CONGO

According to a report by the Société Anonyme Bungé, the following quantities of rubber arrived at Antwerp:

During 1919—first quarter, nothing; second quarter, nothing; third quarter, 5,719 kilos; fourth quarter, 1,829 kilos; total, 7,548 kilos.

During 1920—first quarter, 7,711 kilos; second quarter, 19,361 kilos; third quarter, 17,559 kilos; fourth quarter, 12,553 kilos; total, 57,184 kilos.

These quantities come almost exclusively from the plantations of the Belgica at the island Bertha, from the Forminière at Lake Leopold II, and from the government plantation at Yangambi.

Repairing Rubber Footwear—III[1]

A New and Growing Industry

Dissecting Old Boots and Shoes—Boot Making—Parts of a Light Rubber Shoe—The Dry-Heat Cure—The Pressure Cure—The Footwear Repair Unit—Cold Cure Patching

DISSECTING OLD BOOTS AND SHOES

A man who expects to be an expert pneumatic tire repairer must know how tires are built. Those who have not had an opportunity to visit the great tire factories, as a rule, have dissected old tires, tearing off the tread, separating the plies, cutting open the bead, and, in fact, learning exactly, through this destruction, how the tire was put together.

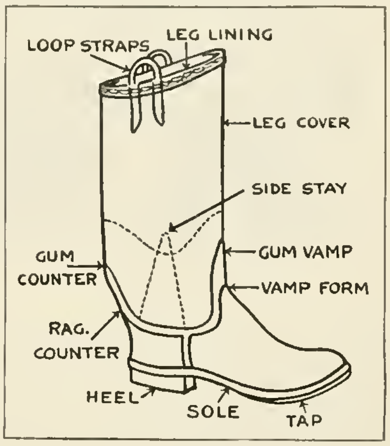
To be a successful footwear repair man, if one cannot spend time in a rubber footwear factory, the same procedure is of great advantage. For example: If one will take an old rubber boot and cut a wedge-shaped piece out of the sole and upper, the different portions that go to make up those parts will be exposed in cross-section, and the view will be very informing. Further investigation includes tearing off the outer sole, the inner sole, stay pieces, and the various fillers, and examining them in detail as to what they are made of, their stretch, resilience, and hardness—of course, in a "rule of thumb" way. The necessity for this is, that in repairing a boot, the original structural conditions should be as nearly as possible reproduced in order to make the repair successful. The same method of dissection should be resorted to with heavy overshoes, arctics, light shoes, and any other styles one essays repairing. In fact, no knowledge of the making of rubber footwear that any repair man can get will be out of place.

Dissected Rubber Boot

BOOT MAKING

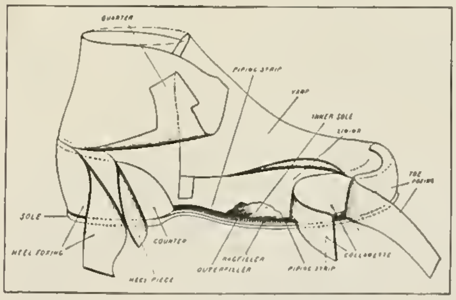
The repair man, before he has been in business long, will be introduced to quite a variety of boots. In accordance with trade nomenclature, the types are known as short, knee, Storm-King, thigh, and hip boots. Incidentally, he will run across firemen's boots, lumbermen's overs, oystermen's boots, acid boots, and other specialties in the boot line. Most of these boots have black soles, but some have red soles, and others white. In repairing a red sole, red repair stock will be necessary, but that is very easily secured, as is also white stock for white boots or white soles.

So many inquiries have come for information as to how boots are made that a brief description of the old-time process is in order. To begin with, all rubber boots are made upon "trees," either maple or aluminum. The boot maker receives the cloth and rubber parts with which he is to build the boots, in cloth books. These parts he cements and dries in the order in which they are used. The first step in making is lasting. The boot tree is set on a block with the foot upwards, and the leg and vamp linings cut to fit are wrapped snugly around the tree and joined along the back of the leg by a strip of thin rubberized fabric known as "piping." Piping is frictioned sheeting; that is, the structure of the fabric is filled and coated with sticky rubber and is used for binding the various parts of the boot. The leg lining is seamed up the back of the tree by running a strip of piping from heel to top. The edges of the lining around the foot are then lapped over the edge of a rubber and fiber inner sole and stuck fast upon it. This makes a little ridge around the sole and the space inside of the ridge is leveled up to the ridges or filled with what is known as the "rag filler," really a tough fiber and rubber combination. Outside of this is placed a very tough sole made of rubber and fiber, which is called the "rag sole." This is skived around the edge so that it will be smooth and then the rag sole and lining are brushed over with a fine quality of cement and allowed to dry. When fully dry, holes are cut for straps in the upper part of the legs, and they are placed in position. Then heel stays are added, which are triangular pieces of rubber and fabric; next comes a heavy counter of rubber and fiber. This is followed by a back strip running all the way from the heel to the top of the boot. Then follows the toe strip, the piping around the edge of the sole, and the ankle side stays, when the boot is finished except for the outside rubber covering.



Standard Short Boot

The leg cover, of rubber without any attached fabric, is then placed carefully over the whole, with the exception of the sole and part of the toe. This must be put on smoothly with a binding around the top, and is followed by the vamp lining, the sides of which extend over the counter. The outer filler is next added to the bottom of the foot. The operation known as covering is next in order. A counter of heavy rubber is put around the heel, then a vamp of heavy rubber, the tongue exactly covering the heavy lining. The sides of the vamp extend to the counter and half around the side seams. When placed, the vamp is cut around the toe filler to the bottom of the boot, coated with cement, ready for the sole.



Standard Arctic Overshoe

The soles are built separately and consist of a fiber and rubber form, and then the rubber piece, top and heel. These come to the boot maker ready for application and are applied as the

[1]Copyrighted by Henry C. Pearson, continued from The India Rubber World, April 1, 1921, pages 477–480.

last process in bootmaking. Incidentally, it should be remarked that in every part of the work, either a hand roller or stitcher is used to cause the parts to adhere and also to exclude air from being imprisoned between the cemented surfaces.

Going back to the parts of a boot and to the dissecting that the boot repairer will indulge in, it will be best for him to discover all the various parts for himself, because any written description probably will not be retained in his memory. If, therefore, he will hunt for the piping, leg lining, toe lining, inner sole, toe

Parts of a Woman's Light Rubber Shoe

filler, skived sole, vamp form, side and back stays, ankle piece, vamp cover, counter and vamp, he will soon be able, not only to understand exactly how the boot is built, but also to rebuild it when the necessity arises.

Just as the boot is built up of separate parts, cemented together and vulcanized as a whole, so are shoes. For example: An arctic or a lumberman's "over" will show by analysis counter, vamp, piping strips, inner sole, inner and outer sole fillers, outer sole, toe and heel foxing, etc. The parts run anywhere from 18 to 30, and they are all necessary, and until one is familiar with them all, it is difficult to get the best out of the business of footwear repairing.

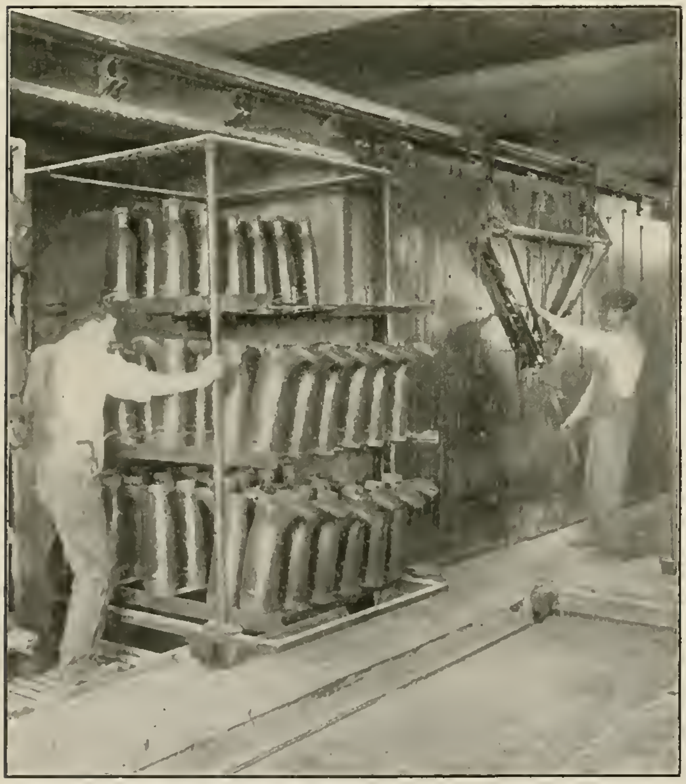
PARTS OF A LIGHT RUBBER SHOE

The numerous parts essential in the making up of an ordinary light rubber for women's use are shown in the illustration in which the separate pieces are numbered and described as follows:

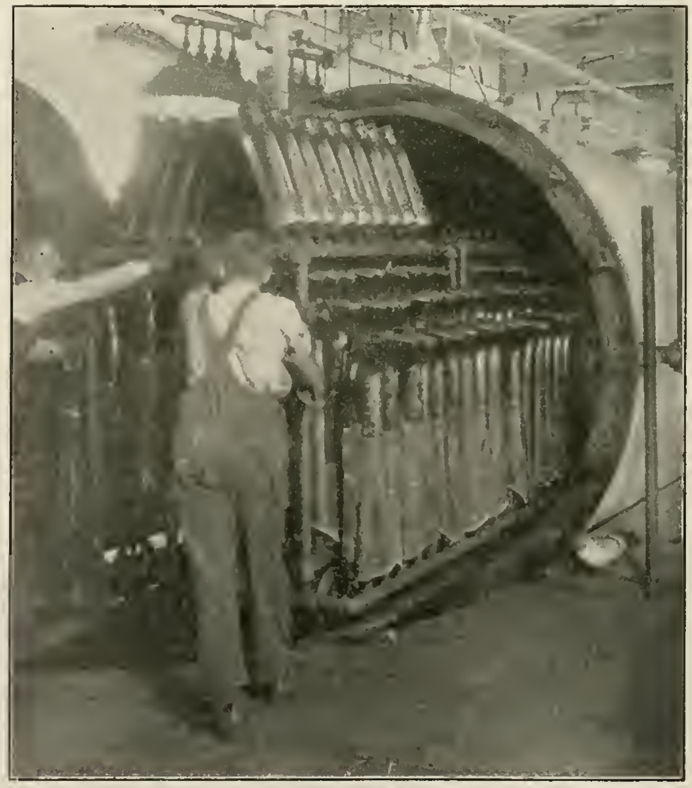
1. Piping strip of frictioned sheeting, for joining the upper to the inner sole around the edge of the latter. 2. Shoe lining showing the rubberized surface to receive the outside rubber vamp (18 or 19). 3. Plain or cloth side of the shoe lining. The dark outline indicates the piping strip for joining the heel seam and uniting with the inner sole. 4. – 5. Rubberized and plain sides, respectively, of the inner sole. 6. – 7. Frictioned fabric stays for reinforcing the toe. 8. – 9. Rubber and fiber, "rag," heel fillers. 10. – 11. Outside rubber heel reinforcement pieces. 12. – 13. Frictioned, fabric stays for rear of the heel. 14. – 15. Frictioned fabric heel counter. 16. – 17. Rubber and fabric, "rag," sole fillers. 18. – 19. Outside rubber vamp coverings.

THE DRY-HEAT CURE AND THE PRESSURE CURE

Those who repair rubber footwear will almost at once come in contact with two separate types of goods. The old-fashioned dry-heat cure has evolved a product all its own and one that is distinctive. The meaning of dry-heat cure is that a rubber boot or shoe, when it has been built up for vulcanization, is put in a room in which the air is heated to vulcanizing temperature, and left there several hours until vulcanization is effected. As air is a poor conductor of heat, this is a slow process of curing. To hasten it and indeed make it possible, the compound contains oxide of lead, otherwise known as litharge, and considerable of it. The litharge acts as an accelerator or a hastener of the cure, and is necessarily present in 98 per cent of the dry heat goods. It is rather necessary that the repair man should know when he is handling dry-heat goods, as litharge stock in a press, or in contact with hot metal, will cure quite quickly and there might be danger of burning. A very little experimenting, however, with scraps from an old boot leg on the vulcanizing plate will show the repair man exactly how far he can go in applying heat to work of this kind.



Dry-Heat Vulcanizer

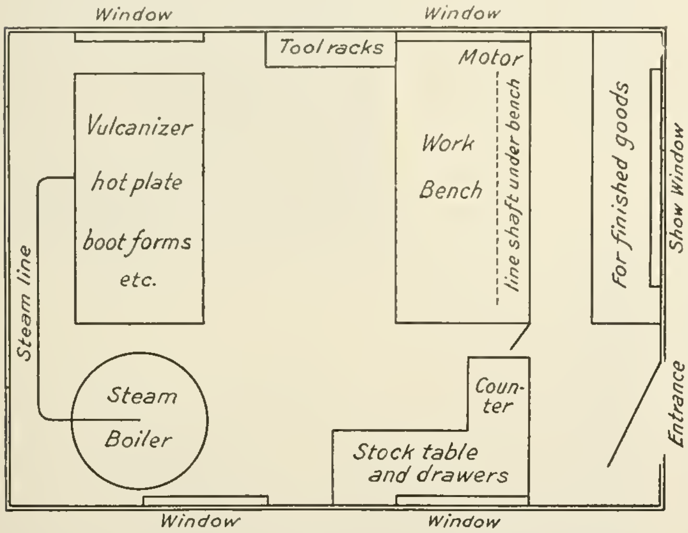


Pressure-Cure Vulcanizer

The pressure cure is the newest development in rubber footwear manufacture and is of great value, not only to the wearer, but also to the rubber footwear repair man. In this case, the goods are cured in an air-tight chamber under a very considerable pressure of gas. The air inside of the boot is also pumped out by vacuum, and thus the gas surrounding the outside acts not only as a mold compressing the parts tightly, but carries the heat into the rubber rapidly, and thus vulcanization is quickly performed. The goods made by the pressure cure are not necessarily compounded with litharge, as are those by the dry-heat cure. In fact, the stocks from which they are made are very similar to those from which tires are built. This is why tire repair material is so useful, particularly with pressure-cured goods. This does not mean that many of the repair materials cannot be used in dry-heat repairing.

THE FOOTWEAR REPAIR UNIT

The state of the art of shoe repairing is such that the repair corner is quite likely to be dark, crowded and confused. In other words, the business of tire repairing is of so much more importance that it is given, not only the best position in the shop, but



Lay-Out of a Rubber Footwear Repair Shop

altogether the best organization. That is why the shoe-repair unit is apt to consist of one vulcanizer set up against a wall in a dark corner, a single shelf crowded with clippings, scraps, tools, empty cement jugs and a great variety of things, confusing rather than helpful. Of course, in time this will correct itself. There will be racks if repair stock is used in the roll, shelves or drawers if used on a small scale; covered bins for all types of unvulcanized scrap, each plainly labeled; the presses will be so placed that there is plenty of room to get around them, and the lighting will be perfect; work tables will be zinc covered, equipped with places for tools within easy reach; the tools will be stamped with the name of the department to keep the tire men from borrowing, and the whole so arranged that the work moves continuously without any sort of double handling. This, of course, would call for pigeon-holes or hangers for tagged goods that are to be repaired, and similar arrangements for goods that have been repaired. Incidentally, referring to bins, a very excellent thing is to have a covered tin can for cement scraps. Speaking of cement, unvulcanized scraps and cement scraps can be dissolved in naphtha and used for ordinary work. For mixing small amounts a small can, with a hand stirrer, is all that is necessary. It should be remembered, however, that cement should be stirred thoroughly before use, as the heavier compounding ingredients and the sulphur will often settle and be at the bottom, in which event the cement used from the top would not vulcanize.

No matter where the shoe repair department is placed, it should be very thoroughly ventilated. It will be found that the work goes on much more smoothly and much more work is turned out if this is the case. It should also be equipped with fire extinguishers, as should any room where either cement or naphtha is

Gaiter—Before and After Repairing

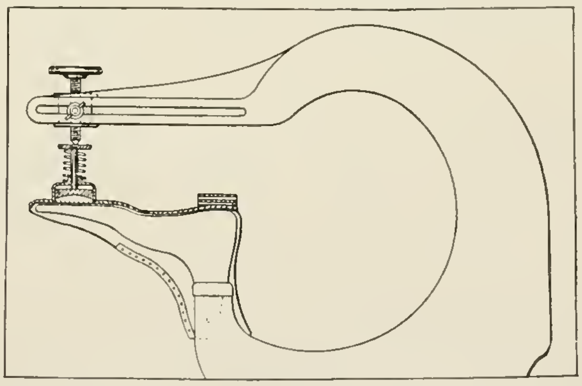
used. A very excellent precaution against the spread of fire, if one has plenty of steam, is a steam-pipe that will enable live steam to be turned upon flames as an extinguisher.

COLD CURE PATCHING

By means of suitable facilities for exerting pressure over the repaired area it is feasible to mend punctures, cuts, tears and chafed spots on ordinary rubber boots and shoes, or even to apply new soles by this method. In making a cold-cure repair, cured patching material should be used. The patching stock and spot to be repaired are prepared in the same way as for patching an inner tube, namely, by cleaning with naphtha the surfaces that are to be united, roughing them with sand paper and applying to each a couple of coats of heavy pure gum cement. When the cement is thoroughly dry the cemented surfaces are thoroughly wet with curing acid and promptly brought together under pressure over the entire area of the patch, and so held until the cure is complete, say for 15 minutes.

The illustration shows a convenient clamping arrangement designed for cold-cure shoe repairing, in which the shoe is held on a removable last and the patch is held firmly in contact during the cure under an iron pad held by the elastic force of a spring, upon which pressure is exerted by a screw and hand-wheel. The latter is adjustable to any position within the range permitted by the slotted way in the top arm of the holder.

This particular device was patented in 1906 by A. S. Bowley. The essential pressure to ensure a firmly attached cold-cure patch



The Bowley Cold-Cure Press

may be secured in a variety of ways. The principle having been shown the resourceful repair man will easily find the means to meet the working conditions as they arise in practice.

How do you wash your car? Water that seeps down between rims and tires quickly rusts neglected rims and destroys tubes, flaps and even the beads or edges of the tire. Use stove polish, nickel paint or graphite to overcome this condition. This also prevents the tire from creeping by giving it a firmer hold on the rim.—*Miller News Service.*

U. S. LONG-STAPLE COTTON PRODUCTION[1]

The urgent demand for long-staple cotton in the manufacture of thread, automobile tires and the higher grade fabrics has given such varieties an importance seemingly out of proportion to the amount produced. While at one time long-fiber sea-island cotton grown in the West Indies provided a large part of the total cotton used in Europe, the world's production of this variety at the present time is comparatively insignificant, being less than 20,000 bales. The quantity of long-fiber cotton produced in Egypt last year was about 1,100,000 bales, and the quantity of upland and American-Egyptian cotton with a staple of 1⅛ inches or more in length produced in the United States from the crop of 1919, according to the estimate of the Department of Agriculture, was 1,000,000 bales. Long-staple cotton is also produced in comparatively small quantities in India, Brazil, Peru, and several other countries. Altogether the total of long-staple cotton—that is, cotton having a fiber of 1⅛ inches or more in length—produced throughout the world from the crop of 1919 did not, in all probability, exceed 2,250,000 bales.

SEA-ISLAND COTTON

The sea-island cotton crop of 1919 amounted to only 6,916 running bales, or 2,510,000 pounds gross weight, equivalent to 5,020 bales of 500 pounds each. The reduction in the production of sea-island cotton, due to the ravages of the boll-weevil and to reduction in acreage on account of the pest, has been rapid and pronounced, the total for the crop of 1916 being 117,559 running bales. Recent ginning census indicates that last year's crop will be less than 2,000 bales.

AMERICAN-EGYPTIAN COTTON

The imports of Egyptian cotton into the United States during the year ended July 31, 1920, amounted to 485,004 bales of 500 pounds each. The demand for Egyptian cotton by American manufacturers has led to efforts to grow in the United States cotton having its characteristics, and its culture has been established in Arizona and California. The status of the cultivation of Egyptian varieties of cotton in this country is presented in the following statement, prepared by the Bureau of Plant Industry of the Department of Agriculture:

The crop of American-Egyptian cotton of the calendar year 1919 amounted to 42,374 bales of 500 pounds each and consisted exclusively of the Pima variety which has an average length of staple of 1⅝ to 1¾ inches. The great bulk of the crop was produced in Maricopa County, Arizona, but several hundred bales were produced in Pinal, Pima, and Yuma Counties, Arizona, and in Imperial, Kern, and Fresno Counties, California. The prices received were by far the highest in the history of the industry. Toward the close of the marketing season a sale at $1.35 a pound to the producer was recorded. The total value to the growers of the lint and seed produced is estimated at about $20,000,000. The value of the crop in Maricopa County is stated greatly to have exceeded the entire cost of construction of the Salt River reclamation project, including the Roosevelt Dam.

The acreage which has been planted to American-Egyptian cotton of the Pima variety in Arizona and California in 1920 is estimated provisionally at 256,000 acres, or more than two and one-half times the acreage grown in 1919. Of this total approximately 185,000 acres are located in Maricopa County, Arizona. Preliminary estimates of the acreages in other counties are:

Arizona	Acres	California	Acres
Yuma County	13,000	Imperial County	28,000
Pinal County	10,000	Kern County	10,000
Pima County	5,000	Other Counties	5,000

LONG-STAPLE UPLAND COTTON

Formerly a large part of the long-staple upland cotton produced in the United States was grown in the Mississippi Delta, where a market for handling cotton of this character had been created. With the increased demand for superior staple cotton, efforts were made in other sections of the cotton belt to grow improved varieties of upland cotton.

Complete data of the production of long-staple upland cotton are not available. The Bureau of Crop Estimates of the Department of Agriculture, however, made an inquiry to determine what percentage of the total crop of 1919 was long-staple. The results of this inquiry are given for the crops of 1918 and 1919 in the tabular statement below.

LENGTH OF COTTON LINT—RELATIVE PRODUCTION: CROPS OF 1918 AND 1919

Compiled from publications of the Bureau of Crop Estimates, Department of Agriculture

State	Over 1¼ Inches		1⅛ to 1¼ Inches		Under 1⅛ Inches	
	1919	1918	1919	1918	1919	1918
	Percentage of Total Crop					
United States	1.3	1.5	7.5	9.8	91.2	88.1
Alabama	....	....	0.3	0.7	99.7	99.3
Arkansas	3.4	2.6	15.4	20.4	81.2	77.0
Arizona	6.0	.....	.....	3.6	40.0	35.7
California*	1.0	.....	10.0	13.4	90.0	83.6
Florida	18.8	7.1	.....	7.1	81.2	32.2
Georgia	0.2	1.3	1.1	3.5	98.7	94.4
Louisiana	0.3	0.3	2.4	3.8	97.3	95.9
Mississippi	4.4	5.4	31.2	38.4	64.4	56.2
Missouri	....	.....	5.6	6.5	94.4	93.5
North Carolina	0.4	0.1	1.4	0.9	98.5	99.0
Oklahoma	0.2	1.0	7.6	9.6	92.2	89.4
South Carolina	1.7	2.6	6.5	7.8	91.8	89.2
Tennessee	0.6	0.3	4.9	4.6	94.5	95.1
Texas	0.2	0.2	5.9	7.0	94.1	92.8
All other States	...	....	....	6.5	....	93.5
	Bales in Thousands (000 omitted)					
United States	152	177	854	1,182	10,372	10,588
Alabama	....	.....	2	6	710	794
Arkansas	30	26	136	201	717	758
Arizona	36	.....	.....	2	24	20
California*	1	.....	10	9	89	56
Florida	2	2	.....	2	14	9
Georgia	3	27	18	75	1,637	2,002
Louisiana	1	2	7	22	289	566
Mississippi	42	66	297	470	613	689
Missouri	....	.....	4	4	60	58
North Carolina	3	1	12	8	814	887
Oklahoma	2	6	75	55	907	515
South Carolina	24	41	92	122	1,306	1,397
Tennessee	2	1	15	15	292	313
Texas	6	5	181	189	2,878	2,499
All other States	....	.....	5	2	22	29

*Including some grown in Mexico.

The reports of the length of staple show a total of 1,006,000 bales of cotton having a length of 1⅛ inches or over, produced from the crop of 1919, against 1,359,000 bales of this length of the crop of 1918. The marked increase in long-staple production is due primarily to the relatively high prices paid for it during the last few years, and secondarily to improved varieties which, in sections suitable to their growth, are showing themselves to be almost or quite equal in yield and in early maturity to standard varieties of short staple. Responses to supplemental inquiries as to the proportion of the crop represented by specified lengths of staple indicated that 1.3 per cent of the total crop ran over 1¼ inches, the percentage in Mississippi being 4.4 per cent of the total crop. The most important states producing long-staple upland cotton in 1919 were, in the order of quantity produced, Mississippi, Texas, Arkansas, and South Carolina.

[1]From Cotton Production and Distribution—Season of 1919-1920. Bulletin 145, Department of Commerce.

Labor Terminology, Bulletin No. 25, Bureau of Business Research, a publication of the Graduate School of Business Administration, Harvard University, Cambridge, Massachusetts, Vol. VII, No. 1, March, 1921, is a dictionary of labor terms used by organized labor. This bulletin is compiled after careful perusal of copies of constitutions, trade agreements and proceedings of conventions of all international and national unions.

Rubber Masks and Faces

A New and Interesting Development

A new use of rubber which marks a revolutionary change in theatrical productions is the rubber face worn by various actors. With it, the wearer may simulate a thousand characters and reproduce even the most fleeting expressions of the original's countenance. Invented to meet an urgent need in the moving picture industry, the new art is apparently destined for service in a far wider field and in a more enduring manner.

Head, Face and Neck Mask

The rubber face was devised by Alexander Hall, a sculptor, who observed that even the most ingenious make-up fails to give an actor the true facial contour and lineaments of the character he assumes, and that great difficulty is experienced in preparing animated grotesque figures for the films. Mr. Hall hit upon the plan of making not merely false faces, but also heads and necks of one piece of rubber cuticle. One of the newer rubber companies in Southern California was intrusted with the practical working out of the problem.

The mode of manufacture is as follows: A type of character having been modeled in clay, the bust is varnished and then dipped in a fine Pará rubber solution, the process resembling that used in the making of rubber gloves. The rubber covering of the clay bust is cured and rolled off the form. Then, filled with sawdust, it is touched up in colors, and a wig, beard, etc., added. Puffed cheeks are made by repeatedly dipping those parts, or by additional coats of rubber. Rolls of flesh about the neck are obtained with cotton padding, over which the rubber stretches, or, where much distension is desired, by making inflatable double sections.

When the eyes in the face are slitted, so fine is the cuticle that it fits upon the eyelids and allaws them to be opened and closed with almost natural freedom. The illusion is heightened by the rubber curving inside the lips and slightly into the nostrils, suitable apertures being left to allow the wearer to breathe and speak with ease. In fact, the rubber article, unlike the old type of false face, by reason of its mobile, pliable quality, adapts itself in an almost uncanny way to the muscles of the face and permits of almost endless expression. A "speaking likeness" may thus become a reality, and an effigy of anyone made by this process may, many a year hence, be as easily quickened as is a phonographic record of their voice, and have even greater historical value.

It is prophesied that uses other than those of the stage are likely. For instance, the celebrities of a century that pose only for the patrons of Madame Tussaud's Wax Works in London or the Musée Grévin in Paris, could be duplicated in rubber, tinted, etc., like the plastic originals and displayed everywhere with the advantage in favor of the rubber faces, which can be animated at will. Its possibilities in historical pageantry and theatrical productions are endless, while the educational value of it is self-evident.

It is conceivable that the new rubber art may even greatly enhance the usefulness of another new art—that of photo-sculpture, and cause to be placed in innumerable schools, museums, homes and public buildings, life-like replicas in rubber (instead of "dead" plaster casts) of the statues of living notables made by the ingenious process invented by Professor J. Hammond Smith of the University of Pittsburgh, and whereby any face, figure, or object may be swiftly molded in clay, and every feature portrayed with photographic exactness. Shadow lines in network are first cast by stereopticon upon the figure placed on a rotating stand; the figure is then photographed from various angles (as was done in six minutes with President Harding as the subject); the developed photographs are then projected on the mass of clay put in place of the figure on the revolvable stand, and the modeler thus guided, fashions his material with an ease and accuracy unknown to old-time sculptors.

Though few may have remarked them, yet multitudes have already seen the new rubber masks. Two of the "Four Horsemen of the Apocalypse," a recent motion picture production, employ the rubber face-covering in a strikingly realistic representation of Famine and Death riding in a cloud over the victims of Conquest and War.

Rubber Masks in "The Four Horsemen"

IMPROVED BURRS FOR RUBBER HEELS

The reference to heel burrs on page 489 in the April issue of this journal is somewhat misleading, as the inference might be drawn that the burrs manufactured had eccentric holes and ragged edges. A leading manufacturer claims that its burrs are and always have been of good quality with central holes and good edges; they are flat, not dished, making them easy to handle.—J. H. Sessions & Son, Bristol, Connecticut.

REMOVING GIANT PNEUMATICS

By pushing the valve stem inside and taking a piece of steel thin enough to insert between the rim and the tire, so that it runs through to the permanent rim on the other side, the rim can be removed. Use a hammer and drive the steel around the rim from stem to stem to loosen the tire and it will fall off easily. Then grease the rim to remove all rust. —*Tire Surgeon.*

REACTIONS OF ACCELERATORS DURING VULCANIZATION[1]

II—A THEORY OF ACCELERATORS BASED ON THE FORMATION OF POLYSULPHIDES DURING VULCANIZATION

By Winfield Scott and C. W. Bedford[2]

The investigation of organic accelerators, as shown by the literature of the past five or six years, appears to be confined largely to a search for new compounds or a combination of compounds to catalyze the addition of sulphur to rubber. It has been shown that these accelerators are almost entirely organic nitrogen compounds, and as a result nearly all classes of nitrogen-containing substances have been tried. Furthermore, it has been shown that the nitrogen of such compounds is basic or becomes basic during vulcanization by the action of heat, sulphur, or hydrogen sulphide.

It has been previously proposed that a sulphur reaction of the accelerator is necessary, and certain reaction products in some way make sulphur available for vulcanization. In some cases a sulphur reaction is doubtless necessary to form the true accelerator, which is a polysulphide.

The latest theory for the action of accelerators during vulcanization is that of Kratz, Flower and Coolidge[3]. These writers attribute the accelerating action of amines, such as aniline, to the formation of an unstable addition product of aniline and sulphur, in which the sulphur is temporarily attached to the nitrogen, making it pentavalent.

The compound thus formed gives up its sulphur to the rubber and is then regenerated by a further reaction with sulphur.

The writer believes that the mechanism of the action of amines is represented differently from that given by the above investigators, and that hydrogen sulphide is one of the important factors in acceleration. It is believed that, in general, amines catalyze the addition of sulphur to rubber. As a specific example, dimethylamine, with hydrogen sulphide and sulphur, forms a derivative of ammonium polysulphide as follows:

$$(CH_3)_2NH + H_2S \longrightarrow (CH_3)_2NH_2SH$$

$$(CH_3)_2NH_2SH + xS \longrightarrow (CH_3)_2NH_2SH \\ \qquad\qquad\qquad\qquad\qquad\qquad\qquad || \\ \qquad\qquad\qquad\qquad\qquad\qquad\qquad Sx$$

Polysulphide compounds similar to the above are considered to be the true accelerators that furnish the sulphur necessary for vulcanization. That this type of sulphur is available for vulcanization has been shown by Ignaz Block[4], who states that hydrogen polysulphides (H_2S_2 and H_2S_8) will cure rubber at ordinary temperatures. C. O. Weber[5] quotes Gerard and his work showing that alkali polysulphides in concentrated solution will also vulcanize rubber.

ORGANIC ACCELERATORS

All organic accelerators do not function in the same manner as the bases, and for this reason the writers choose to divide accelerators into two classes.

I. Hydrogen Sulphide Polysulphide Accelerators. In this class belong those bases which form polysulphides similar to yellow ammonium sulphide

II. Carbo-sulphydryl Polysulphide Accelerators. This includes all accelerators that contain the grouping = C-SH, such as the thioureas, dithiocarbamates, thiurams, mercaptans or the disulphides which may be formed from them by oxidation or by reaction with sulphur.[6]

To the first class belong all basic organic accelerators or such compounds as produce basic accelerators under curing conditions. Certain inorganic accelerators may also be included. These will be discussed later in the paper.

The second class includes certain of the Schiff bases[7] which form thiourea derivatives by a sulphur reaction during the cure. Further discussion of this class will be reserved for a later paper[8].

The phenylated guanidines belong to both classes, since at curing temperatures they easily react with hydrogen sulphide to form thioureas and free amines. Diphenylguanidine, for example, gives thiocarbanilide and ammonia.

The present paper deals with the first-mentioned class of accelerators, i. e., with those which, in the presence of hydrogen sulphide under curing conditions, form polysulphides analogous to those of sodium and ammonium.

The structural relationships of the polysulphides of the nitrogen bases and the more positive metals are not clearly understood at present, although it is known that some of the sulphur is held in a more or less loose form of chemical combination. This is evidenced by the precipitation of sulphur from concentrated solutions on dilution, and the generation of heat when sulphur dissolves in sulphide or hydrosulphide solutions. It is certain that the sulphur of polysulphides is quite different from rhombic or α-sulphur, and that the aggregate S_8 is changed to the sulphur of polysulphides by the combined action of hydrogen sulphide and basic accelerators.

It is a well-known fact that sulphur will react with rubber resins and proteins at temperatures near 140 degrees with the formation of hydrogen sulphide. This hydrogen sulphide in the presence of basic accelerators forms hydrosulphides which in turn take up sulphur to form polysulphides These polysulphides pass on part of their sulphur to the rubber and constitute the true curing agents. Such a mechanism applies also to the curing action of alkali and alkaline-earth hydroxides. The fact that basic magnesium carbonate will react with hydrogen sulphide and sulphur in water suspension to form polysulphide solutions no doubt accounts for its mild accelerating power. Lime and magnesia do not function well in deresinated rubbers where much of the hydrogen sulphide producing materials have been removed. The sulphides and polysulphides of the alkali and alkaline-earth metals should function in deresinated or synthetic rubbers.

The relative accelerating power of the organic bases is dependent upon the facility with which they form polysulphides and the extent to which they are able to activate sulphur and make it available for the rubber. This will, in some measure, be dependent upon the basicity. In a previous paper by the writers[9] it was stated that at least a part of the accelerating action of hexamethylene tetramine is due to the fact that during the cure there are produced, among other products, ammonia and carbon disulphide which, alone or with basic products present in the rubber, form dithiocarbamates. It may be added that "Hexa" also forms hydrogen sulphide by sulphur reaction, which with the ammonia undoubtedly forms ammonium polysulphides. This accelerator may, therefore, be classed under both types since it is both a hydrogen sulphide and a carbo-sulphydryl polysulphide accelerator.

Aldehyde ammonia, by the action of heat alone, forms ammonia, while with sulphur it also gives hydrogen sulphide. Heat also produces other bases such as the alkyl pyridines or collidines. This material appears to be solely a hydrogen sulphide polysul-

[1]Presented before the Rubber Division at the meeting of the American Chemical Society, Chicago, Illinois, September 6-10, 1920: Part I, The India Rubber World, January 1, 1920, pages 206-207

[2]The Goodyear Tire & Rubber Co., Akron, Ohio, and Quaker City Rubber Co., Philadelphia, Pennsylvania.

[3]Journal of Industrial and Engineering Chemistry, 12, 1920, 317.

[4]German patent No. 219,525.

[5]"Chemistry of India Rubber," page 47.

[6]Although the term polysulphide is applied to each class of accelerators, it should be noted that they are distinct types. In Class I, the polysulphide sulphur is related to a sulphydryl group attached to nitrogen, while in Class II the polysulphide sulphur is held by a sulphydryd group attached to carbon. In the so-called disulphides and their higher sulphides, the hydrogen of the sulphydryl group is considered as having been eliminated in hydrogen sulphide.

[7]Bedford and Scott, Journal of Industrial and Engineering Chemistry, 12, 1920, 31.

[8]The reaction of carbon disulphide on amines to form thioureas and hydrogen sulphide is reversible, and it is entirely possible that by the action of hydrogen sulphide during vulcanization the thioureas are changed to the more powerful dithiocarbamates which are intermediate to the complete transformation to amine and carbon disulphide. It is also possible that the thioureas may form polythio compounds direct, through the carbo-sulphydryl group.

[9]Journal of Industrial and Engineering Chemistry, 12, 1920, 31.

phide accelerator. The ammonia condensation products of other alipathic aldehydes behave in a similar manner.

p-Phenylenediamine is an accelerator that is much more active than would be assumed from its basicity. At curing temperatures, this accelerator reacts with sulphur to form large amounts of ammonia and hydrogen sulphide together with certain weaker bases. If the reaction be carried out under a cold reflux, the condenser will frequently become clogged with the white solid compounds of ammonia and hydrogen sulphide which are described by Roscoe and Schorlemmer. The action of *p*-phenylenediamine in the cure is entirely that of a hydrogen sulphide polysulphide accelerator.

The three above-mentioned accelerators are not dependent on the rubber resins or proteins for their supply of hydrogen sulphide, since this is one of their sulphur reaction products. It is to be expected that these accelerators will function in a deresinated or a synthetic rubber, and the Bayer patents state that this is true. It is also known that piperidine will cure in a nitrogen-free rubber, Here we have a strong base acting apparently without the aid of hydrogen sulphide. Piperidine, however, reacts with sulphur at temperatures lower than those used in vulcanization, with the formation of hydrogen sulphide. Both the sulphur reaction product and the unchanged piperidine may then use this hydrogen sulphide to form polysulphides with sulphur.

INORGANIC ACCELERATORS

Inorganic accelerators that function in the cure by the removal of hydrogen sulphide the writers choose to term "secondary accelerators," while those that function in the same manner as the organic polysulphide accelerators may be classed with them as "primary accelerators." A third class consists of those compounds that are both primary and secondary accelerators.

I. Secondary Accelerators. Litharge, zinc, oxide, etc., seem to act no further than to form the corresponding sulphides, in connection with hydrogen sulphide polysulphides.

II. Primary Accelerators. To this class belong the sulphides and hydrosulphides of the alkali and alkaline-earth metals.

III. Accelerators That Are Both Primary and Secondary. Inorganic oxides and hydroxides function first as secondary accelerators forming sulphides or hydrosulphides which then take up sulphur and act as primary accelerators. Such accelerators are sodium and calcium hydroxides, magnesium oxide and basic carbonate, etc.

Secondary accelerators are believed to function as aids to organic polysulphides by breaking them up into colloidal sulphur and the original nitrogen base. This may be illustrated by the decolorization of polysulphide solutions by litharge or zinc oxide. Ferric oxide does not act as a secondary accelerator, and neither does it readily decompose the polysulphide solutions. The solubility of organic accelerators in sulphur and rubber gives them much more intimate contact with hydrogen sulphide at the time of its formation than is the case with the comparatively large particles of litharge or zinc oxide. Hydrogen sulphide is therefore available for the formation of organic polysulphides before being taken up by the secondary accelerators. The decomposition of a polysulphide by a secondary accelerator regenerates the free base, which with more hydrogen sulphide and sulphur re-forms the polysulphide. Secondary accelerators do not act as true catalysts; once formed into sulphides they do not react again with hydrogen sulphide.

SUMMARY

1. All organic accelerators are believed to function through the formation of some type of polysulphide.

2. Organic bases and compounds that form bases during vulcanization are believed to form polysulphides through the aid of hydrogen sulphide. These are termed "hydrogen sulphide polysulphide accelerators."

3. Thioureas, dithiocarbamates, thiurams, and mercaptan compounds are believed to form polysulphides directly, or by first forming disulphides, and are termed "carbo-sulphydryl polysulphide accelerators."

4. It is proposed that the function of such compounds as litharge and zinc oxide may lie in the decomposition of polysulphides into colloidal sulphur and amines.

5. Such inorganic compounds as sodium hydroxide, calcium hydroxide and magnesium oxide are believed to function as "primary accelerators" through the formation of inorganic polysulphides.

BENZOL POISONING IN RUBBER FACTORIES

That rubber manufacturers are eager to safeguard the health of their employes is evidenced in the exhaustive study being made by experts into the causes and prevention of the occupational diseases that have been incidental to the rubber industry. Typical of such valuable research work is the investigation recently made by Dr. Robert S. Quinby, of the Hood Rubber Co., of Watertown, Massachusetts, as to the manner in which benzol poisoning is occasioned, the best treatment for those affected by the noxious vapor, and the surest means for overcoming any menace to health from this source.

According to the report of the State Board of Labor and Industries of Massachusetts, five workers died within three years from the toxic action of benzol used in rubber works, but during the past year and a half there have been no deaths from this cause, the gratifying change for the better being due mainly to the fact that the use of benzol had been practically discontinued and that comparatively harmless rubber solvents have been substituted.

Dr. Quinby's inquiry has revealed the fact that most of the cases of poisoning in the rubber industry have been due to the use of pure benzol, rather than commercial benzol. The latter boils at or over 100 degrees C., while the former distills at 80.5 degrees C. Tests indicated that the toxicity of pure benzol is much greater than that of the commercial article, as the amount of vapor given off and breathed by operatives is larger with the benzol having a lower boiling point. Oddly enough, the vigorous, deep-breathing workers were more affected than those of apparently less physical resistance. Females appear to be more susceptible to the fumes than males. Hot, humid weather, in which such a solvent was more volatile, increased the susceptibility of workers to the toxic action. In a general sense those affected show symptoms closely resembling indications of pernicious anemia. Poisoning by benzol is usually due to breathing the fumes, but, like aniline, it may also be absorbed through the skin.

As a prophylactic measure, it is suggested that whenever possible benzol should be replaced with solvent naphtha, xylol, toluol, carbon tetrachloride, or xylol compound. Where benzol must be used, it is advised that ample ventilation be provided, that all benzol operations be carried on in closed containers, and provision made for the filling of containers by gravity from storage tanks, or by other mechanical means. Examination of workers exposed to benzol fumes should be made at least once a month, especially to determine the condition of the blood (diminution of white blood cells being a characteristic symptom of poisoning), and none with heart or kidney disease should be permitted to be exposed to the vapor of benzol.

TIRE BUILDERS AFFLICTED

All of the five cases referred to occured in the tire-building department of a rubber works, where benzol had been used in a cement and where it was customary to wipe tires with a cloth saturated with benzol prior to vulcanization. The process was repeated about every half hour, or about eighteen times in an 8-hour day. In the case of one man who succumbed to the poison, it is stated that he was thirty-three years old, had been working eight years in a rubber factory, and that he had not been working long in the tire-building department to which he had been trans-

ferred, before he complained of severe headaches, often lasting two and three days. Within eleven months he noticed that his gums bled freely after brushing his teeth. A month later, in addition to spongy gums, he remarked bluish-green spots on his left thigh, followed in a few days with similar spots on his left arm. Spots on other parts of his body soon appeared, and within a couple of months he had to give up work on account of weakness and shortness of breath. Severe nosebleeds followed, and he was removed to a hospital.

Clinical examination revealed a steady drop in the hæmoglobin percentage in the blood, and a particularly rapid drop in the count of white blood corpuscules, as from 5,000 to 850 in nine days, while the red count in the same period fell from 2,288,000 to 1,616,000. A transfusion of ten ounces of blood was made, but this was succeeded by an uncontrollable nosebleed, headache, vertigo, dizziness, restlessness, delirium, talkativeness, loss of power of arms and legs and finally coma convulsions and death, twenty-eight days after he had started to work in the tire-building department.

OTHER FATAL CASES

Another man, forty years old, after working in other parts of a rubber factory for ten years, was transferred to the tire-building department. Severe weakness and shortness of breath began to trouble him within six months. Then followed nosebleeds and bloody stools, spongy gums, discoloration of arms and legs, finally paralysis, delirium, and death within just one year.

A man, thirty-three years old, after working in the tire-building department of a rubber factory two years, developed "red spots" on face and neck, then followed general weakness, loss of weight, shortness of breath, rapid pulse, dry cough, anemia, persistent nosebleed, brownish-yellow stains on both sides, and finally pneumonia and death, two years after working with benzol.

In one non-fatal case, a worker, twenty years old, who had been using benzol cement on cured tires developed anasymetry of the face which he believed due to tooth extraction, with headache, nausea, and general weakness. A blood count showed the characteristic effects of benzol poisoning.

In the case of another worker, twenty-nine years old, who for two years had been applying benzol to tire fabric, a pin-head eruption appeared on his arms, feet, ears, and neck, and this developed into very itchy blebs with fever. He stated that about eighteen others suffered similarly; but all symptoms disappeared among the workers when naphtha was substituted for benzol.

QUOTES MANY AUTHORITIES

Dr. Quinby's conclusions were confirmed by the observations of many investigators in America and abroad who have studied the effects of benzol and related volatile hydrocarbons in the rubber, painting, chemical, and other industries, as well as by the reports of many health boards and trades unions in the United States, Great Britain, France, Germany, Italy, and other countries, his references totaling forty-seven. But little information is as yet available on this subject, he says, in medical text books.

Foreign Import Duties on Boots and Shoes

The following table, corrected to April 16, 1921, by the Bureau of Foreign and Domestic Commerce, shows the foreign import duties on rubber boots and shoes of all descriptions, imported into the various countries from the United States.

Owing to the frequency of tariff changes the figures and information given in this table should be periodically verified. It is also advised that small trial shipments be made in order to test the rates prior to sending more extensive shipments.

In the first column is given the country, while the next column contains the articles with notes regarding surtaxes, basis of rates, etc. The third column specifies whether the weight is to be taken as gross or net, and the last gives the ad valorem duty or the rate of specific duty in United States currency.

Countries	Articles and Remarks	Weight	Duty (U. S. Currency)
Europe:			
Austria-Hungary	Shoemakers' wares, with textile goods, per 100 pounds	Net	$11.05
Belgium	Manufactures of india rubber, ad valorem	...	10%
Bulgaria	Ordinary rubber boots and shoes (galoshes), per 100 pounds (includes 20 per cent surtax)	Net	$10.51
	Other rubber boots and shoes, per 100 pounds (includes 20 per cent surtax)	Net	21.01
Denmark	Rubber boots and shoes, with textiles, per 100 pounds—including inner packing	Legal	6.03
Finland	Rubber footwear, per 100 pounds	Legal	10.51
France	Rubber footwear lined with felt, wool, or any partly woolen cloth, per 100 pounds	Net	27.57
	Rubber footwear lined with cotton, hemp, or flax cloth, per 100 pounds	Net	22.07
	Footwear with soles of rubber, per pair	...	0.29
Germany	Footwear, with or without rubber soles—Unvarnished, per 100 pounds	Net	7.56
	Varnished, per 100 pounds	Net	8.64
Great Britain	Manufactures of rubber	...	Free
Greece	Galoshes of rubber, per 100 pounds	Net	$30.78
Italy	Rubber footwear, lined or trimmed with fabrics, per 100 pairs	...	38 60
	Other rubber footwear, per 100 pounds	Net	4.38
Jugo-Slavia	Rubber footwear with or without textile materials, per 100 pounds	...	12.26
Netherlands	Rubber footwear, ad valorem	...	5%
Norway	Rubber footwear, per 100 pounds	Net	$12.16
Portugal	Rubber footwear, per 100 pounds	Net	38.44
Rumania	Rubber footwear, per 100 pounds	Legal	10.51+2%
Servia	Rubber footwear, per 100 pounds	Net	12.26
Spain	Rubber footwear, per 100 pounds	Net	26.26
Sweden	Rubber footwear, per 100 pounds	Net	14.59
Switzerland	Rubber footwear, per 100 pounds	Gross	2.63
Turkey	Articles not specified	Net	11%
North America:			
Canada	Rubber boots and shoes, ad valorem	...	25%
	Imports of articles invoiced at prices less than the market value in the country from which exported, are liable to a "dumping" duty if such articles are also made in Canada.		
Newfoundland	Footwear and all manufactures in part or in whole of india rubber or gutta percha, ad valorem, including 10 per cent surtax	...	44%
Central America:			
*Costa Rica	Rubber footwear, per 100 pounds	Gross	$21.09
Guatemala	Boots and shoes, and overshoes of rubber or rubberized cloth, per 100 pounds	Legal	90.76
†Honduras	Rubber boots and shoes, per 100 pounds	Gross	24.96
Mexico	Footwear of rubber or cloth and rubber, including variable surtax taken as equivalent to 3 per cent of the duty, per 100 pounds	Legal	23.29
Nicaragua	Footwear of rubber such as waterproof boots and shoes, per 100 pounds	Net	22.73
Panama	Rubber footwear, ad valorem	...	15%
Salvador	Rubber footwear, per 100 pounds	Gross	$46.14
West Indies:			
Cuba	Rubber footwear with cotton fabrics, per 100 pounds	Legal	10.32
	Rubber footwear with woolen fabrics, per 100 pounds	Legal	17.09
Dominican Republic	Rubber footwear, per 100 pounds	Net	11.35
Haiti	Rubber shoes or footwear with rubber soles, per dozen pairs	...	0.99
St. Vincent	Manufactures of rubber, ad valorem	...	12.5%
Virgin Islands	Imports from the United States	...	Free

South America:			
Argentina	Rubber footwear—includes surtax of 7 per cent—duty based on valuation of $65.66 per 100 pounds.	...	47%
	Footwear of cloth and rubber, whole sole measures 25 centimeters (9.84 inches) or less, duty based on valuation of $157.58 per 100 pounds, includes surtax of 7 per cent of valuation.	...	47%
	Same footwear, larger sizes, duty based on valuation of $367.69 per 100 pounds, includes surtax of 7 per cent	...	47%
Bolivia	Rubber footwear, per dozen pairs	...	6.22
‡Brazil	Rubber footwear—nominally 3 milreis per kilo—per 100 pounds (Footwear made of Pará rubber, 5 per cent of the rate shown.)	Legal	$51.93
Chile	Rubber footwear of all kinds, per 100 pounds	Net	49.66
Colombia	Rubber footwear, including surtax of 7 per cent of duty, per 100 pounds	Gross	48.53
Ecuador	Rubber footwear, per 100 pounds	Net	30.02
Paraguay	Rubber footwear, includes surtax of 1½ per cent of valuation, based on valuation of $78.79 per 100 pounds	...	63.5%
Peru	Rubber footwear, including weight of inner packing; at ports of Callao, Salaverry, Mollendo, Ilo, Paita and Pisco, surtax of 20 per cent of duty; per 100 pounds	Legal	42.38
	At other ports, 18 per cent; per 100 pounds	Legal	41.68
Uruguay	Rubber footwear, based on valuation of $5.17 per dozen pairs—surtax of 14 per cent of valuation included	...	62%
Venezuela	Rubber footwear, including surtax of 56.55 per cent per 100 pounds	Gross	$34.26
Asia:			
Ceylon	Rubber footwear, ad valorem	...	7.5%
China and Manchuria	Rubber boots / Rubber shoes } ad valorem	...	5%
Japan	Rubber boots, per 100 pounds	Net	18.82
	Rubber shoes, per 100 pounds	Net	21.79
	Rubber overshoes, per 100 pounds	Net	19.43
Oceania:			
Australia	Galoshes, rubber sand boots and shoes, and plimsolls, ad valorem	...	35%
	Rubber gum and wading boots, ad valorem	...	10%
New Zealand	Rubber footwear, ad valorem	...	34¼%
Guam	Products of the United States	...	Free
Philippine Islands	Products of the United States	...	Free
Tutuila	Articles not specified	...	10%
Africa:			
Algeria	Same as France	...	.....
Egypt	Articles not specified	...	8%
Eritrea	Articles not specified	...	8%
Liberia	Articles not specified	...	12½%
Libya	Articles not specified	...	11%
Mauritius	Articles not specified	...	12%
Morocco	Articles not specified	...	12½%
Nigeria	Articles not specified	...	Free
Somaliland (Italian)	Articles not specified	...	15%
South Africa	Rubber footwear, ad valorem	...	20%
With a minimum per pair of—			
	Men's	...	$0.18
	Women's	...	0.12
	Children's	...	0.06
Zanzibar	Articles not specified	...	7½%

Legal weight is not uniformly construed, but generally includes the weight of the immediate packing or container, though in some countries fixed tare allowances are made. In Argentina, Bolivia, Paraguay, and Uruguay, the duties are to be computed upon the official valuations at the rates given in the last column.

*Imports for provinces of Limón, plus surtax of 5 per cent ad valorem. Imports for interior provinces, plus 2 per cent ad valorem.

†Imports into Amalpa, surtax of 13.75 cents per quintal of 101.4 pounds.

‡There is 20 per cent reduction on these goods imported from United States.

Foreign Import Duties on Rubber Tires

The following table, corrected to April 16, 1921, by the Bureau of Foreign and Domestic Commerce, shows the foreign import duties on rubber tires of all descriptions imported into the various countries from the United States.

The column marked "Weight" shows whether duties are levied on net or gross weight, or include simply the inner packings. The next two columns give the rate of the duty for each one hundred pounds in United States currency or the rate per cent ad valorem.

In the following monograph the surtaxes have been included and the converted rates therefore indicate the actual duty payable.

Certain charges, such as warehousing, customs handling, local taxes, revenue stamps, etc., are not included. The rates of duty shown, including the surtaxes as noted, should therefore be regarded as the minima. As changes in duties are likely to occur at any time, frequent verification of these figures is advised.

Countries	Weight	Rate per 100 Pounds, U. S. Currency	Rate Per Cent Ad Valorem
North America			
Canada	.....	.....	35
(Ad valorem duties are based on the fair market value of the articles when sold for home consumption in the country whence exported direct to Canada.)			
Central American States—			
British Honduras	.....	.....	15
(Duties based on price in the port of export.)			
*Costa Rica	Gross	$4.22	.....
Guatemala	Gross	90.76	.....
Honduras—Motorcycle tires	Gross	12.48	.....
Automobile tires	Gross	4.99	.....
(Imports into Amalpa—surtax of 14 cents per quintal of 101.4 pounds.)			
Nicaragua—Auto tires, inner tubes, solid tires, motorcycle tires, etc.	Net	30.62	.....
(Includes surtax of 12½ per cent of duty.)			
Panama	.....	.....	15
Salvador	Gross	13.81	.....
(A surtax of 1½ per cent of the duty is included.)			
Hawaii	.....	.....	Free
(Imports from foreign countries are subject to the provisions of the United States tariff.)			
Mexico—Auto tires	.....	24.85	.....
Truck tires	.....	12.43	.....
(A surtax of 10 per cent of the duty is included.)			
Newfoundland	.....	.....	49.5
(A surtax of 10 per cent of the duty is included.)			
West Indies—			
British—			
†Antigua	.....	.....	13.33
Bahamas	.....	.....	12.5
†Barbados	.....	.....	11.25
‡Bermuda	.....	.....	.....
†Dominica	.....	.....	12.5
†Grenada	.....	.....	15
Jamaica	.....	.....	16.66
†Montserrat	.....	.....	13.33
†St. Christopher-Nevis	.....	.....	11
†St. Lucia	.....	.....	16.5
†St. Vincent	.....	.....	10
†Trinidad and Tobago	.....	.....	15
Turks and Caicos Islands	.....	.....	10
Virgin Islands	.....	.....	10

*Imports for provinces of Limón, plus 5 per cent of duty. Imports for interior provinces, plus 2 per cent of duty.

†When imported from the United Kingdom, Canada or Newfoundland, admitted at a reduction of one-fifth of the duty. The cost of packing is excluded, except in Dominica, St. Lucia and Grenada, where it is included.

‡Automobiles and motorcycles prohibited.

Countries	Weight	Rate per 100 Pounds, U. S. Currency	Rate Per Cent Ad Valorem
Cuba	.....	.....	25
Dominican Republic—Tires for autos, bicycles, etc.	Net	5.67	.....
Tires for trucks	.....	Free	.....
French—			
Guadeloupe	.....	.....	6
Martinique (rates not specified)	.....	.....	.....
(Imports of other than French origin pay also the regular French import duties.)			
Haiti	.....	.....	24
Porto Rico	.....	.....	Free
(Imports from foreign countries are subject to the provisions of the United States tariff.)			
Virgin Islands of the United States	.....	.....	Free
(Imports from foreign countries are temporarily subject to the duties formerly in force in the Danish West Indies.)			
SOUTH AMERICA:			
Argentina—Rubber casings, Tubes	Legal	.....	32
Solid tires. (Valuation $105.06 per 100 pounds.)			
Non-skid casings	Legal	.....	32
(Valuation $78.79 per 100 pounds.)			
Pneumatic tires and tubes for cycles and motorcycles	Legal	.....	32
(Valuation $120.84 per 100 pounds.)			
(Rate per cent includes surtax of 7 per cent ad valorem.)			
Bolivia—Solid tires	Legal	17.64	.....
Pneumatic tires	Legal	52.93	.....
Brazil—Auto tires	.....	.....	46.28
Pneumatic tires of Pará rubber	.....	.....	20.57
(Duties given are actual ad valorem duties. Nominal ad valorem duties are 15 and 5 per cent respectively.)			
Chile	Gross	9.93	.....
Colombia	Gross	0.91	.....
Ecuador	Net	9.93	.....
Guiana—British	.....	.....	20
(When imported from the United Kingdom, Canada or Newfoundland, admitted at a reduction of one-fifth of the duty.)			
Dutch	.....	.....	11
French	.....	.....	5
(The regular French import duties are also collected on goods not of French origin.)			
Paraguay—Casings, tubes, solid tires	.....	.....	43.5
(Valuation, $140.07 per 100 pounds.)			
Non-skid attachments	.....	.....	43.5
(Valuation, $105.05 per 100 pounds. Includes surtax of 1.5 per cent ad valorem.)			
Peru—Articles of soft rubber, not specified	Legal	35.32	.....
Articles of hard rubber not specified	Legal	52.98	.....
(At Callao, Salaverry, Mollendo, Ilo, Paita and Pisco a surtax of 20 per cent of duty is levied; at other ports, 18 per cent.)			
Uruguay	.....	.....	45
Venezuela	Gross	6.57	.....
EUROPE:			
Austria-Hungary	Net	13.81‡	.....
Belgium—Solid tires	Net	11.38	.....
Casings for autos and motorcycles	Net	20.31	.....
Casings for other vehicles, weighing each:			
Under 600 grams	Net	15.76	.....
600 grams or more	Net	10.51	.....
Inner tubes for:			
Autos and motorcycles	Net	29.77	.....
Other vehicles	Net	26.26	.....
Bulgaria—Tires and tubes	Net	5.25	.....
Czecho-Slovakia—Pneumatic tires and tubes	.....	13.13	.....
Denmark—Auto tires	Net	6.08	.....
Solid tires	Net	.....	Free
Combined with textiles	Net	1.94	.....
Faroe Islands	.....	.....	Free
Finland—All tires, without rims	Net	52.12	.....
With rims	Net	31.51	.....
France—Auto tires and tubes	Net	17.08	.....
Solid tires	Net	11.38	.....
Cycle tires	Net	37.55	.....
Germany—Auto tires	Net	6.48	.....
Inner tubes	Net	6.48	.....
Gibraltar	.....	.....	Free
Greece	Net	1.03	.....
Iceland	Net	0.24	.....
Italy—Auto tires and tubes	Net	5.25	.....
Jugo-Slavia	.....	10.51	.....
(These duties to be increased 100 per cent. There is a 10 per cent surtax on luxuries.)			
Malta	.....	.....	15
Netherlands	.....	.....	5
Norway—Auto tires	Net	3.65	.....
Motorcycle tires	Net	3.65	.....
Poland	Legal	10.79	.....
Portugal	Net	1.60	.....
(Conversion to U. S. currency is based on the latest quotation of the paper milreis.)			

Countries	Weight	Rate per 100 Pounds, U. S. Currency	Rate Per Cent Ad Valorem
Rumania—Auto tires	Legal	8.75	.....
Solid tires	Legal	4.38	.....
Servia	Net	13.16	.....
Spain—Solid tires	Net	17.51	.....
Casings and inner tubes	Net	70.91	.....
Sweden—Solid tires	Net	9.73	.....
Tires for motorcycles	Net	19.45	.....
Auto tires, tubes, casings	Net	14.59	.....
Switzerland—Solid tires	Gross	0.09	.....
Pneumatic tires, tubes, casings	Gross	0.44	.....
Solid tires with fabric or metal	Gross	0.44	.....
Pneumatic tires, tubes, casings, with valves, etc.	Gross	0.70	.....
Non-skid tires with leather or steel protectors	Gross	2.20	.....
Turkey	.....	11.00	.....
United Kingdom	.....	.....	Free
ASIA:			
British—			
Aden	.....	.....	Free
Ceylon	.....	.....	7.5
(Duty based on wholesale cash price in bond, less trade discount at the port of entry.)			
Cyprus	.....	.....	8
(Duty based on export price with addition of cost of transport [including insurance] to the port of final discharge.)			
Federated Malay States	.....	.....	10
Hongkong	.....	.....	Free
India	.....	.....	20
(See note for Ceylon.)			
North Borneo	.....	.....	10
Sarawak	.....	.....	Free
Straits Settlements	.....	.....	Free
China	.....	.....	5
Dutch East Indies	.....	.....	10
French Indo-China	.....	.....	.....
(Imports from France are admitted free of duty, while imports from other countries are subject to the rates prescribed by the customs tariff of France.)			
Japan (including Formosa and Chosen)—			
Auto tires	.....	.....	25
Cycle tires	Net	42.92	.....
Persia	.....	.....	12
Siam	.....	.....	3
Syria	.....	.....	11%+ 1% if imported through Egypt.
AFRICA:			
Abyssinia	.....	.....	10
Belgian Congo	.....	.....	10
British—			
Mauritius	.....	.....	12
Nigeria	.....	.....	Free
Union of South Africa	.....	.....	20
(Duty based on the current value for home consumption at the place of purchase, including value of packing and agent's commission if it exceeds 5 per cent.)			
Zanzibar	.....	.....	7.5
(The dutiable value of imports from Europe or America is taken to be the cost price [with charges], increased by 5 per cent or the invoice price [exclusive of charges], increased by 15 per cent.)			
Egypt	.....	.....	8
(In Alexandria a wharfage tax of one-half of 1 per cent is added. At other ports different rates are imposed.)			
French Algeria	.....	.....	.....
(Imports from France are admitted free of duty, while imports from other countries are subject to the rates prescribed by the customs tariff of France.)			
Italian—			
Eritrea	.....	.....	8
Libia	.....	.....	11
Somaliland	.....	.....	15
Liberia	.....	.....	12.5
Morocco	.....	.....	12.5
OCEANIA:			
British—			
Australia	.....	.....	40
(Duty based on fair market value F. O. B. at port of export, plus 10 per cent. On casings weighing over 2½ pounds and inner tubes over 1 pound each, 48.6 cents per pound, if higher than the ad valorem rate.)			
New Zealand	.....	.....	1
Guam	.....	.....	Free
(Imports of foreign origin are taxed 25 per cent of their value.)			
Philippine Islands	.....	.....	Free
(Imports of foreign origin are taxed 25 per cent of their value.)			
Tutuila	.....	.....	10

Conversion made at normal rate of exchange except where otherwise stated.

Legal weight is not uniformly construed, but generally includes the weight of the immediate packing or container, though in some countries fixed tare allowances are made.

BUREAU OF AIRCRAFT PRODUCTION, UNITED STATES ARMY

SPECIFICATIONS OF ELASTIC CORD FOR HOLT FLARE BRACKET TENSION STRAP

Specification No. 26,503, November 14, 1918

GENERAL

1. This specification covers the requirements of the Bureau of Aircraft Production for an elastic cord for Holt flare bracket tension strap.

MATERIAL

2. The elastic cord shall be made of multiple strands of rubber tightly encased within two layers of cotton braid.

Braid

3. The inner braid shall consist of from 30 to 40 white threads with a soft finish of 16/4 ply or equivalent.
4. The outer braid shall consist of from 30 to 40 white threads with a hard finish of 16/4 ply or equivalent.
5. Both the inner and outer braids shall be wrapped over and under with two or three threads.

Rubber

6. The cord strands shall be made of a compound containing not less than 90 per cent of the best Pará rubber.

MANUFACTURE AND TOLERANCES

Strands

7. The rubber strands shall be square. In a given cord the strands must be of the same size in cross-section. This size shall be between 0.05 and 0.035-inch.
8. The strands shall be thoroughly treated with soapstone or talc to prevent them from adhering to each other in the finished cord.

Cord

9. The diameter specified is the overall diameter of the braid with rubber strands inclosed. A tolerance of minus zero or plus 3/64-inch will be allowed on the overall diameter.

TESTS

10. The extension of a rubber strand at breaking load must not be less than 700 per cent. The measurement shall be made on a two-inch length.
11. A specimen of each finished cord shall be tested by stretching to double its normal length. The braid must show no evidence of failure under this test. The load required to produce this extension must not be less than that given in Table 1. This test shall be made on a specimen with a gage length of six inches on specimen, at a temperature of 60 to 75 degrees F.
12. One test specimen shall be tested for each 500 feet of finished cord unless in the judgment of the inspector the uniformity of the cord can be ascertained with fewer samples.

TABLE 1

LOADS FOR 100 PER CENT EXTENSION

Diameter of finished cord, inch	Load to give 100 per cent extension, pounds
3/8	25-35

MARKING

13. Each roll of finished cord shall be plainly marked with the date of manufacture of the cord, preferably on a tag of permanent nature fixed to the cord.

INSPECTION

14. Elastic cord shall not be used for making Holt flare bracket tension straps after six months from the date of its manufacture.
15. Materials and finished cord shall be subject to inspection by the Inspection Department of the Bureau of Aircraft Production under its Manual of Inspection.
16. The Bureau of Aircraft Production inspector shall have full and free access to all parts of the manufacturer's plant concerned in the manufacture of the elastic cord.

EXERCISER ELASTIC CORD FOR AIRPLANE TYPES A AND B FLEXIBLE GUN MOUNTS

Specification No. 26,502, November 7, 1918

GENERAL

1. This specification covers the requirements of the Bureau of Aircraft Production for elastic cord to be used on airplane types A and B flexible gun mounts, to counteract the weight of one or two flexible guns.

MATERIAL

2. The elastic cord shall be made of multiple strands of rubber tightly encased within two layers of cotton braid.

Braid

3. The inner braid shall consist of from 36 to 48 white threads with a soft finish of 16/4 ply or equivalent. Single threads must have a tensile strength of four (4) pounds.
4. The outer braid shall consist of from 60 to 80 white threads with a hard finish of 16/4 ply or equivalent. Single threads must have a tensile strength of five and one-quarter (5¼) pounds.
5. Both the inner and outer braids shall be wrapped over and under with three or four threads.

Rubber

6. The cord strands shall be made of a compound containing not less than 90 per cent of the best Pará rubber.

MANUFACTURE AND TOLERANCES

Strands

7. The rubber strands shall be square. In a given cord the strands must be of the same size in cross-section. This size shall be between 0.05 and 0.035-inch.
8. The strands shall be thoroughly treated with soapstone or talc to prevent them from adhering to each other in the finished cord.

Cord

9. The overall diameter of the braid with rubber strands inclosed shall be 7/16-inch. A tolerance of minus zero or plus 1/16-inch will be allowed on the overall diameter.

TESTS

10. The extension of a rubber strand at breaking load must not be less than 700 per cent. The measurement shall be made on a two-inch length.
11. A specimen of each finished cord shall be tested by stretching to double its normal length. The braid must show no evidence of failure under this test. The load required to stretch a 7/16-inch cord from normal length of 12 inches to 18 inches shall be from 18 to 24 pounds.
12. One test specimen from each 500 feet of finished cord shall be tested unless, in the judgment of the inspector, the uniformity of the cord can be ascertained with fewer samples.

MARKING

13. Each roll of finished cord shall be plainly marked with the date of manufacture of the cord, preferably on a tag of permanent nature fixed to the cord.

INSPECTION

14. No elastic cord shall be used for making flexible gun mounts after six months from the date of its manufacture.
15. Materials and finished cord shall be subject to inspection by the Inspection Department of the Bureau of Aircraft Production under its Manual of Inspection.
16. The Bureau of Aircraft Production inspector shall have full and free access to all parts of the manufacturer's plant concerned in the manufacture of the elastic cord.

Communications regarding all technical matters pertaining to specifications should be addressed to the Specification Section, Bureau of Aircraft Production, United States Army, Dayton, Ohio.

SPECIFICATIONS OF THE BUREAU OF AIRCRAFT PRODUCTION, UNITED STATES ARMY

RUBBER BAGS FOR GASOLINE TANKS

Specification No. 16,024, October 30, 1918

GENERAL

1. This specification covers the general requirements of the Bureau of Aircraft Production for rubber bags for gasoline tanks.
2. Production engineering drawings for each size bag shall form a part of this specification, and may be obtained on application to the Instrument Department, Production Engineering.
3. Bureau of Standards Circular No. 38, on "The Testing of Rubber Goods," shall form a part of this specification.
4. USE. The bags are for use on airplane gasoline tanks to catch and conduct away gasoline which may leak from punctures in the tank.
5. DURABILITY. The bags must withstand the weather conditions encountered at varying altitudes and their life must be such as is indicated by the nature of the rubber compound.
6. DIMENSIONS. The bags shall conform to the dimensions called for on the drawings or in the order.

MATERIAL

7. The material from which the bags and other rubber pieces are made shall contain 92 per cent by weight of new washed and dried hard fine Pará or the highest grade only of new Hevea plantation rubber, 6 per cent by weight of sulphur and 2 per cent by weight of magnesium oxide.

8. The rubber compound shall be properly vulcanized and shall have all the characteristics of a compound of the above composition.

9. The fabric strips and all other fabric pieces shall be made of cotton duck weighing about ten (10) ounces to the square yard. The count per square inch of the warp and filler shall be approximately equal.

10. The fabric strips and all other fabric pieces shall be "frictioned" and "skim-coated" on both sides with the rubber compound specified in paragraph 7, and must be properly vulcanized to the bag to give a good adhesion.

Lacing Cord

11. The cord for lacing together the two portions of the bag shall be a Venetian blind cord or equal, of such size as to enable it to just pass through the holes of the eyelets. The ends of the cord shall be dipped in waterproof stiffening material to facilitate lacing.

Grass Mat

12. The mat to be used between the rubber bag and the gasoline tank shall be an unwoven grass mat, approved by the Instrument Department, Production Engineering.

MANUFACTURE

13. The bag shall be smooth and free from pitting or other imperfections. It shall have a uniform thickness of 1/16-inch, and shall be plied on the calender into a solid body, free from air. No minus variation in thickness will be allowed.

14. All pieces of fabric or rubber shall be vulcanized to the bag by heat at the same time the bag is vulcanized.

15. Joints shall be thoroughly cleaned before being overlapped or covered.

FACILITIES FOR TESTING

16. The manufacturer shall provide the necessary testing equipment, approved by the Inspection Department. He shall provide the necessary assistants for making the tests.

17. Tests shall be made at the manufacturer's plant or at a place designated by the Inspection Department.

18. The manufacturer shall bear the cost of all tests and shall supply the material ready for testing without additional cost to the purchaser. When bags are not tested at the manufacturer's plant, the manufacturer shall pay all cost of transportation in addition to the cost of the tests.

Test Specimens

19. The manufacturer shall, at his expense, furnish with each "heat" of bags a sample of vulcanized rubber at least eight (8) inches square and 1/16-inch thick. A fabric strip, one and three-quarters (1¾) inches wide and eight (8) inches long, shall be wholly vulcanized to the rubber along one edge.

20. The manufacturer shall guarantee that the sample furnished was vulcanized with and under the same conditions as the bag which it represents. He shall also guarantee that the materials in the sample are the same as those used in the bags.

Tensile Test Specimens

21. Tensile test specimens of the rubber shall be cut with a die from the sample furnished by the manufacturer or from a sample bag.

22. Additional test specimens of rubber shall be cut from the sample bag in such manner as to include a joint in the rubber between the component pieces of the bag. The sample must be cut at right angles to the joint so as to include the joint in the center of the constricted portion.

23. The constricted portion of the specimens shall be one-quarter (¼) inch wide, and shall have smooth edges.

Friction Test Specimens

24. Friction test specimens shall be cut to a width of one (1) inch from the sample furnished by the manufacturer or from a sample bag.

TESTS

Tensile Test

25. The tensile strength of the specimens selected as specified in paragraph 21, must be at least eighteen hundred (1800) pounds per square inch.

26. The elongation of a two-inch section at the breaking point must be at least 700 per cent.

27. The permanent elongation must not exceed 12½ per cent when the specimen is stretched from two inches to fifteen inches, held in the stretched position for ten minutes, and then released for ten minutes.

28. The specimens selected as specified in paragraph 22 must not fail in the joint.

Friction Test

29. The "friction," or the adhesion of the fabric strips to the rubber body, must be such that a load of 12 pounds shall not cause a separation at a rate greater than one inch per minute.

INSPECTION, REJECTION AND REPLACEMENNT

30. All finished bags, and all materials used in the construction thereof, shall be subject to inspection by the Inspection Department of the Bureau of Aircraft Production under its Manual of Inspection.

31. Acceptance or approval of materials in process shall in no case be construed as a guaranty of acceptance of the finished articles.

32. The inspector shall have full and free access to all parts of the manufacturer's plant concerned in the manufacture of these bags, and the manufacturer shall at all times afford him adequate facilities for determining that the materials and the bags conform to this specification. The inspector shall also be afforded opportunity to check and mark all materials in process or in stock.

33. The manufacturer shall furnish adequate private office space and office furniture for the use of the chief inspector and assistants.

34. All accepted bags shall be plainly stamped with the official acceptance stamp of the Bureau of Aircraft Production.

35. Rejected bags shall not be resubmitted after replacement of defective material without the express consent of the chief inspector.

36. The manufacturer's name or trade mark, the Bureau of Aircraft Production order number, size of bag, and the date of manufacture, shall be permanently impressed on the two sections of the bag.

37. The manufacturer shall pack with each bag the proper length of cord for lacing together the two portions of the bag.

38. The manufacturer shall also pack with each bag sufficient grass matting to completely envelop the tank.

39. The manufacturer shall furnish and pack with each bag printed instructions, approved by the Bureau of Aircraft Production, for its installation. A small envelope to contain these instructions shall be supplied, printed as follows:

IMPORTANT

Do Not Throw This Envelope Away. It Contains Instructions for Installing Rubber Bags on Gasoline Tanks.

40. The bags shall be packed for domestic or overseas shipment as directed by the purchaser.

RUBBER GASKETS FOR GASOLINE TANK FITTINGS

Specification No. 16,008-A, September 25, 1918.—Supersedes Specification No. 16,008

16,008

GENERAL

1. This specification covers the general requirements of the Bureau of Aircraft Production for rubber gaskets to be used on gasoline tank fittings.

MATERIAL

2. The material from which the gaskets are made shall contain not less than 32 per cent of washed and dried fine Pará or first latex crêpe, not more than 1 per cent of free sulphur, with the remainder suitable dry inorganic mineral fillers.

3. The rubber compound shall be properly vulcanized and have all the characteristics of a compound of the above composition.

MANUFACTURE

4. Gaskets shall be cut on a lathe, molded or stamped from the vulcanized rubber compound.

5. Gaskets must have smooth faces.

6. Dimensions. Gaskets shall conform to the dimensions called for on the drawings or in the order.

INSPECTION

7. The inspector shall have free access to all parts of the plant where the gaskets are being manufactured and shall be afforded every reasonable facility to satisfy himself that they are in accordance with this specification.

Communications regarding all technical matters pertaining to specifications should be addressed to the Specification Section, Bureau of Aircraft Production, U. S. Army, Dayton, Ohio.

What the Rubber Chemists Are Doing

THE RELATIVE ACTIVITY OF VARIOUS ALLOTROPIC FORMS OF SULPHUR TOWARDS CAOUTCHOUC[1]

By D. F. Twiss and F. Thomas

The investigations in recent years of the allotropic forms of sulphur capable of existence within the range of temperature used in ordinary vulcanization, naturally prompt enquiries as to a possible difference in the activity of these various modifications of the vulcanizing agent. The forms most likely to be involved are (*a*) $S\lambda$, the modification represented by ordinary crystalline sulphur, (*b*) $S\mu$, the insoluble modification constituting part of genuine "flowers of sulphur" and corresponding with the viscous constituent of molten sulphur, and (*c*) $S\pi$, a more brightly colored and more soluble variety, present in a small proportion with much $S\lambda$ in the equilibrium mixture yielded by ordinary sulphur at temperatures a little above its melting point; the proportion of $S\pi$ increases markedly if the temperature is raised to 140 degrees or higher.

Tests made with mixtures of rubber with soluble sulphur ($S\lambda$) and insoluble sulphur ($S\mu$) respectively, under ordinary technical conditions, indicate that the vulcanizing effect of these two varieties is practically the same; this result, however, is probably to be attributed to the rapid change of $S\mu$ at such temperatures into the equilibrium mixture consisting mainly of $S\lambda$ with some $S\pi$.

Between 128 degrees and 168 degrees C. the temperature coefficient of the chemical reaction between rubber and sulphur, i.e. the proportion by which the rate is increased on raising the temperature 10 degrees C., is surprisingly constant, and in view of the alteration of the composition of the equilibrium mixture with rise of temperature, the comment has been made that this is indicative of comparable vulcanizing capacity on the part of the modifications present.

Although the difference observable between the forms of sulphur naturally existent at ordinary vulcanizing temperatures is thus shown to be relatively slight, it must be remembered that under such conditions the sulphur will undergo fusion and then rapidly yield the equilibrium mixture. If the temperature could be maintained much lower, the rate of attainment of equilibrium could be reduced and the increased persistence of each form would afford greater opportunity for observing any difference in vulcanizing capacity. The use of a suitable vulcanization catalyst, e. g., aldehyde-ammonia, enables experiments to be made at a sufficiently low temperature. It is a little unfortunate that the powerful organic catalysts generally should be basic substances such as also tend to catalyze the mutual interconversion of the sulphur allotropes, but as is demonstrated by the results now submitted, the disturbance from this direction is not sufficient to mask completely the sought effect.

In the first set of experiments the varieties of sulphur used were (*a*) a high grade finely powdered sulphur soluble in carbon bisulphide and consisting entirely of $S\lambda$, and (*b*) an extracted sublimed flowers of sulphur 93 per cent insoluble in carbon bisulphide and consisting mainly of $S\mu$. Mixtures were made of each of these with selected pale crêpe rubber of known rate of vulcanization; the composition in each case was rubber 90 parts, sulphur 10 parts, and aldehyde-ammonia 1 part. In order to ensure as closely comparable composition and conditions as possible, the sulphur in both cases was first mixed with an equal weight of the rubber and the composition of each stock checked before introducing the correct amount of each into the final mixtures. Similarly the aldehyde-ammonia was first mixed with nine times its weight of the rubber so as to increase the accuracy with which equal proportions of this "stock" could be introduced into the two batches of equally "worked" rubber. Vulcanization was effected, with the two mixtures simultaneously, at 98 degrees, 108 degrees, and 118 degrees C.

It will be noted that under the conditions of these experiments the vulcanizing effect of $S\mu$, particularly at the lowest temperature, is definitely inferior to that of $S\lambda$.

Taking an extensibility of 700 per cent as a standard for comparison, the difference in the rate of vulcanization of the two mixtures is clearly seen from the respective periods required, and the more rapid conversion of $S\mu$ into $S\lambda$ with rise of temperature is reflected in the corresponding decrease in the temperature coefficient.[2]

	Rate of vulcanization				
	$S\mu$ (93%)		$S\lambda$		
Degrees C	Time required	Temp. coefft.	Time required	Temp. coefft.	Relative effect. $S\mu:S\lambda$.
98	32 hours	—	23 hours	—	1:1.4
108	550 mins.	3.5	440 mins.	3.1	1:1.3
118	185 mins.	3.0	140 mins.	3.1	1:1.3

An experiment with similar mixings of the same rubber and two forms of sulphur in the same proportions, but without the catalyst and at 148 degrees, confirmed the earlier observations as to the closely comparable effectiveness of the $S\mu$ and $S\lambda$ at this temperature, the relative effectiveness calculated in the same way as above being 1:1.06.

These results as a whole demonstrate that at the ordinary vulcanizing temperatures, e. g., 148 degrees, $S\mu$ changes so rapidly into $S\lambda$ that no appreciable difference can be detected in the rate of vulcanization, the effect in each case being that actually produced by $S\lambda$. At lower temperatures it is possible to detect a distinctly feebler effect in the mixture containing $S\mu$. The possibility that this difference may be characteristic not of $S\mu$ but of $S\pi$, which is formed together with $S\lambda$ from the less stable $S\mu$ at such temperatures, is hardly in accord with the almost identical effect observed at 148 degrees C. (see above) and with the results given below. In all likelihood therefore the difference arises from the $S\mu$ itself and is probably not explained completely by the lower solubility of this form of sulphur.

From the constancy of the temperature co-efficient of the reaction between ordinary sulphur and rubber at 138 degrees—168 degrees C., over which range $S\lambda$ gives rise to an increasing proportion of $S\pi$, it would appear that $S\pi$ and $S\lambda$ are of almost equal activity in this direction.

There appeared to be some hope of obtaining more evidence of the activity of $S\mu$ relative to $S\lambda$ by making vulcanization experiments with rubber at higher temperatures, at which sulphur is known to undergo a marked change in molecular complexity probably corresponding with a rapidly increasing proportion of $S\mu$ in the equilibrium mixture. Unfortunately with ordinary rubber the chemical change accompanying vulcanization would then be too rapid for convenient examination, and recourse was therefore had to the use of synthetic rubber which, as is well known, is relatively sluggish in vulcanization; the sample used was of "methyl-rubber," i. e., polymerized dimethylbutadiene, which was free from artificial catalysts and "elasticators." On account of the hardness of the vulcanized products obtained with such synthetic rubber, no physical tests were possible and the rate of re-

[1] Journal of the Society of Chemical Industry, February 28, 1921.

[2] In these experiments vulcanization was effected uninterruptedly for the full periods, the temperature of the oil bath being maintained constant for the whole of the time. The greater value of the temperature coefficient obtained previously with $S\lambda$ for the interval 98 degrees-108 degrees C. is to be ascribed to the fact that the earlier experiment at 98 degrees C. was made in two stages, with the result that the vulcanization would be retarded somewhat on account of the partial separation of sulphur from solution in the rubber halfway through the experiment.

action was followed only by the gradual disappearance of sulphur into combination. The composition of the original mixture was sulphur ($S\lambda$) 10.4 per cent, methyl-rubber 89.6 per cent. Experiments were made at 168 degrees, 178 degrees, and 188 degrees C.

It is remarkable that the disappearance of most of the sulphur into combination appears to follow the approximately rectilinear course already observed with natural rubber. If, as suggested by van Iterson, this is due to autocatalysis it is evident that the non-caoutchouc constituents of natural rubber are not responsible.

The results are not quite as smooth as could be desired, but if comparison is made of the time required for the attainment of the various degrees of vulcanization at different temperatures, the temperature coefficients in each case are greater for the interval 168 degrees—178 degrees than for 178 degrees—188 degrees.

The apparent slight increase in the temperature appears to indicate the existence of a very brief initial period of greater reactivity. This may be due to the fact that the sulphur initially is composed practically entirely of $S\lambda$, which rapidly undergoes conversion into the less active equilibrium mixture; it might, however, be caused by the presence in the synthetic rubber of a small proportion of some more active material. There is no such regular alteration observable in the figures calculated in a similar way from the experiments with ordinary rubber and sulphur at 138 degrees—168 degrees C.

A better comparison of the temperature coefficients is probably given by the ratio of the tangents of the angles included between the horizontal axis and the line between the origin and the point representing the end of the "rectilinear" course of the vulcanization process. This method of comparison likewise shows a smaller increase in the rate of reaction for the second interval.

	Time (minutes)			Temperature coefficient	
Vulcanizing coefficient	168°	178°	188°	178°-168°	188°-178°
4	25	14	—	1.8	—
5	34	18	10	1.9	1.8
6	43	21	11	2.0	1.9
7	52	24	12	2.2	2.0
8	61	28	14	2.2	2.0
9	73	31	15	2.4	2.1
angle	33°	56°	71°	—	—
tan. angle.....	0.65	1.48	2.90	2.3	2.0

The smaller coefficient for the higher temperature interval suggests that the sulphur equilibrium mixture at the higher temperature is relatively less effective than the equilibrium mixture existent at the lower temperature; as the difference in the composition of the two equilibrium mixtures will be a smaller proportion of $S\lambda$ and a greater proportion of $S\pi$ and $S\mu$ at the higher temperature, and as the earlier considerations lead to the view that the effectiveness of $S\pi$ is very little different from that of $S\lambda$, it follows that the results again indicate a somewhat inferior vulcanizing capacity for $S\mu$. It must be remembered, however, that the observed differences in such experiments, based on the relative activity of interchangeable modifications of a chemical substance, will be diminished by the tendency of the equilibrium automatically to adjust itself as the more active form disappears.

Although these results indicate a difference between the activity of $S\mu$ and of $S\lambda$ or $S\pi$ the outstanding fact is not the existence of this difference but its relatively small magnitude. The three forms are of such diverse general characteristics that much greater differences might have been expected. Under the conditions of ordinary technical practice indeed, the possibility of alteration in the relative proportions of the various modifications of sulphur is not likely to form an appreciable disturbing factor in vulcanization, and the only instance of any special form of sulphur (as such) showing special vulcanization features appears to be that possibly involved in the recently discovered method of treating raw rubber with sulphur dioxide and hydrogen sulphide.

METHODS OF ANALYSIS

DETERMINATION OF ANTIMONY IN RUBBER GOODS

The method for determining antimony in rubber goods as given by S. Collier, M. Levin, and J. A. Scherrer[1], follows:

The sample (0.5-gram) is extracted with acetone and, if mineral oil or "substitute" is present, further with chloroform until the extract is no longer colored; after drying in a vacuum, the material is heated with 25 cc. cymene at 130 degrees — 140 degrees C. in a 300 cc. flask until the rubber has completely dissolved; the cooled liquid is diluted with 250 cc. of light petroleum spirit (maximum boiling point 45 degrees C.) and the mixture left overnight, being then decanted through a Gooch crucible. After washing ten times with petroleum spirit the residue is dried and shaken with 30 cc. hydrochloric acid, until the antimony sulphide has passed into solution. The solution is filtered slowly through the dried Gooch crucible and after dilution, the antimony is precipitated with hydrogen sulphide. The antimony is then estimated, e. g., by heating with 12 to 15 cc. sulphuric acid and 5 grams potassium sulphate in a Kjeldahl flask until a colorless solution is obtained, diluting to about 100 cc. with water, adding 20 cc. hydrochloric acid and 1 to 2 grams sodium sulphite, boiling to expel all sulphur dioxide, and titrating with tenth normal permanganate.

DETERMINATION OF TOTAL SULPHUR IN RUBBER

The following methods for rubber analysis are given by A. R. Pearson in *Analyst*, 1920, 45, 405-409.

Twenty cc. of nitric acid (sp. gr. 1.5) is placed in a flask and 0.5-gram of the rubber is added in small pieces at a time; the mixture is heated gradually and kept on a water-bath for 30 minutes. Small successive quantities of permanganate are added until some manganese oxide remains unreduced after one hour's heating, 20 cc. of concentrated hydrochloric acid is added, the mixture again heated, evaporated to dryness, the residue treated with hydrochloric acid, again evaporated, the residue treated with hot dilute hydrochloric acid, the solution filtered, and the sulphuric acid in the filtrate determined gravimetrically.

DETERMINATION OF CARBONATES IN RUBBER MIXINGS

One gram of the finely divided sample is heated with 25 cc. of glacial acetic acid in a flask provided with a short reflux condenser, the latter being connected with a U-tube containing solid lead acetate, a U-tube containing in one limb sodium acetate and in the other calcium chloride, and two weighed tubes containing soda-lime and calcium chloride. The contents of the first two U-tubes must be saturated with carbon dioxide before use. A current of air is aspirated through the apparatus during the whole operation.

[1]The India-Rubber Journal, 1920, 60, 1297-1298.

CHEMICAL PATENTS

THE UNITED STATES

Rubber Mix and Process of Compounding Rubber, consisting in adding to rubber, water carrying in suspension hydroxide of aluminum, mixing the water and aluminum hydroxide with the rubber, driving off the water, and heating the mix with a vulcanizing agent to effect vulcanization.—Robert C. Hartong, assignor to The Goodyear Tire & Rubber Co., both of Akron, Ohio. United States patent No. 1,370,965.

Heat-Insulating Material and Method of Making It. Heat insulating material capable of maintaining its rigidity, at ordinary temperatures of artificial refrigeration the material being cellular and of approximately the following composition: asphaltum 27.0; infusorial earth 11.0; magnesium carbonate 5.0; crude rubber 26.9; sulphur 14.9; sulphur treated corn oil 2.6; petroleum tailings 5.8; bicarbonate of soda 6.0; alum 0.8.—Clark H. Bennett, Chicago, Illinois, John F. Palmer, St. Joseph, Michigan, and Frank V. Wedlock, Chicago, Illinois, assignors to Bentex Co., Chicago, Illinois. United States patent No. 1,371,016.

Art of Vulcanizing Caoutchouc which consists in bringing together under reacting conditions sulphur and a nitrogen accelerator to produce a sulphur-nitrogen accelerator, and subsequently incorporating the sulphur-nitrogen accelerator in the caoutchouc mix and vulcanizing it.—Clayton W. Bedford, assignor to The Goodyear Tire & Rubber Co., both of Akron, Ohio. United States patent No. 1,371,662.

Art of Vulcanizing Caoutchouc which consists in bringing together under reacting conditions sulphur and a nitroso derivative of an aromatic amin to form a sulphur-nitrogen accelerator, incorporating the sulphur-nitrogen accelerator in the caoutchouc mix and vulcanizing it.—Clayton W. Bedford, assignor to The Goodyear Tire & Rubber Co., both of Akron, Ohio. United States patent No. 1,371,663.

Art of Vulcanizing Caoutchouc Substances, which consists in bringing together under reacting conditions sulphur and a methylene group-containing Schiff base to form a sulphur-nitrogen accelerator, incorporating the sulphur-nitrogen accelerator in the caoutchouc mix and vulcanizing the same.—Clayton W. Bedford, assignor to The Goodyear Tire & Rubber Co., both of Akron, Ohio. United States patent No. 1,371,664.

Process of Compounding Lubricated Sulphur and Rubber and vulcanizing, which consists in first mixing together the rubber and other ingredients of the compound, with the exception of the vulcanizing agent, then adding and mixing sulphur which has been treated with a lubricant, and vulcanizing the resultant mixture.—Daniel Repony, assignor to The Manhattan Rubber Manufacturing Co., both of Passaic, New Jersey. United States patent No. 1,372,041.

Molded Article and Method of Making It which consists in heating tung oil to a relatively high temperature while avoiding its solidification, molding a mixture comprising the treated oil compounded with a suitable filling material, baking the molded article, and applying thereto an external insoluble coating.—Leo H. Baekeland, Yonkers, New York, assignor to General Bakelite Co., New York, N. Y. United States patent No. 1,372,114.

THE DOMINION OF CANADA

Leather Preserving Composition comprising a varnish having copal gum 96 parts, colophony 11 parts, linseed oil 200 parts, turpentine 320 parts, camphor 4 parts, proxyline 9 parts, acetone 32 parts, Pará rubber 3 parts, benzol 16 parts and benzine 6 parts.—Joseph Raoul Montpetit and James Scott Adamson, both of Ottawa, Ontario. Canadian patent No. 208,911.

Puncture Proof Composition for pneumatic tires comprising a combination of flakes of flexible material and a paste of finely ground or precipitated clay, china clay, silica, chalk, French chalk, or alumina, which will not affect or injure the rubber.—William Malem Brothers, Ruddington, Nottinghamshire, England. Canadian patent No. 209,182.

Process of Vulcanization consisting in intimately mixing crude rubber with a vulcanizing agent comprising barium thiosulphate and heating the mixture to produce a vulcanized compound combined with inert and stable filling material.—Edgar Levinstein, Boston, Massachusetts, U. S. A. Canadian patent No. 209,239.

Wrapping Material for Protection of Crude Rubber. A separable protective covering for wrapping crude rubber for shipment consisting of a sheet of relatively tough, pliable, air impervious, chemically parchmentized vegetable fiber.—The Diamond State Fibre Co., Bridgeport, Pennsylvania. Canadian patent No. 209,322.

Solution for Use in Manufacture of Boots and Shoes. An adhesive solution consisting of about 15 ounces of Venezuelan balata, about 20 ounces of tumaca block balata and about 15 ounces of solvent naphtha.—George Emanuel Haldinstein, assignee of Frederick Lu, both of Norwich, Norfolk, England. Canadian patent No. 209,580.

OTHER CHEMICAL PATENTS

THE UNITED KINGDOM

No. 156,116 Diolefines and their polymerization products prepared by heating molecular proportions of an ethelene hydrocarbon and an acetylene hydrocarbon under pressure.

156,117 Vinyl halides and esters and their polymerization products prepared by heating acetylene hydrocarbons with balogen hydrides or with methyl halides under pressure.

156,118 Rubber compositions, synthetic rubber and vulcanizing rubber are prepared by condensing an alkyl- or aryl-amine with acrolein.

156,119 Synthetic rubber diolefine hydrocarbons converted into rubber-like substances.

156,120 Vinyl halides produced by heating calcium carbide with hydrogen halides dissolved in water or an organic solvent in the presence of a catalysist.

156,121 Preparation of vinyl compounds useful for the manufacture of varnishes, artificial resins and synthetic rubber substitutes.

156,122 Diolefines and their halogen derivatives. Production and utilization for rubber synthesis.

156,137 Plastic compositions. A resinous body, prepared by condensation of a ketone and an aldehyde and treatment with an alkali.

156,143 India rubber substitutes from a fatty acid and fish oil or other vulcanizable oil by treatment with sulphur dichloride.

156,144 Rubber substitutes made from fish oil, oleic acid and sulphur.

156,149 Coating composition in the form of suspensoid colloidal solution of rubber in benzol with or without addition of accelerating agents.

156,150 Reclaiming waste rubber. Waste rubber free from fibrous matter is highly dispersed by treatment in a colloid mill with water, or benzene or petroleum accelerated by addition of soaps or glue, etc. The sulphur is dissolved and removed by filtration.

All the above patents (not yet accepted) are in the names of H. Plauson, 14, Huxter, Hamburg, Germany, and J. A. Vielle, 17 Waterloo Place, Pall Mall, Westminster, London.

156,542 Puncture sealing composition comprising ground mica and cork mixed with water. F. A. McCarty, 31 Queen Street, Melbourne, Australia. Not yet accepted.

LABORATORY APPARATUS

FLEXIBLE ARM FOR LIGHTING

Localized lighting is frequently desirable in laboratory and testing work as well as for many industrial operations. The illustration shows a flexible arm lighting unit which can be used with any system of wiring, either open or conduit. The support for the arm is a 30-inch length of ¾-inch conduit, firmly attached by cleats to wall, ceiling or floor. The joint between this conduit length and the rigid section of the arm is a ball-and-socket box which makes a strong self-adjusting joint. The rigid portion of the arm is a half-inch conduit of any length desired, to which is clamped a length of flexible conduit terminating in a lamp socket connection. This arrangement permits the light to be located exactly and securely where desired.—Sampson Axcess System, Inc., 434 Union street, Lynn, Massachusetts.

Adjustable Lighting Unit

PREVENTING VIBRATION OF BALANCES

The following means, according to Walter C. Durfee in a recent issue of *The Analyst,* are effective for protecting fine chemical balances from vibrations.

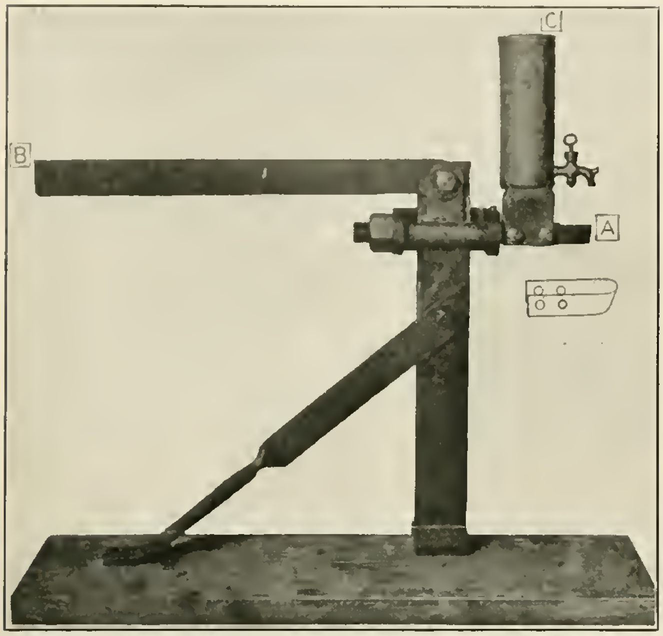
The balances are placed on a heavy slab which is supported by three balls of solid rubber resting on a strong table top. The balls are about 1½ inches in diameter and under the weight become flattened sufficiently to prevent any tendency to roll. In the beginning the balls should be fastened in some way, as for example by a short nail from underneath, by saucers or by a packing of cotton between the table and slab.

"MICRONEX"

"Micronex" is the copyrighted trade mark name of specially prepared carbon or gas black for use in rubber compounding. The name is symbolical of its extremely minute particle size. It is chemically inert and has physical activity in retarding oxidation.

MACHINES FOR RETREADING AND REGROOVING SOLID TIRES

Repairers and users mourn because the solid tire does not lead itself to repair as does the pneumatic. In other words, retreading—that is, attaching a new tread, slipping in new sections and all ordinary air-tire repairs, are not done. Nevertheless, the big tires are retreaded, but by cutting away the worn

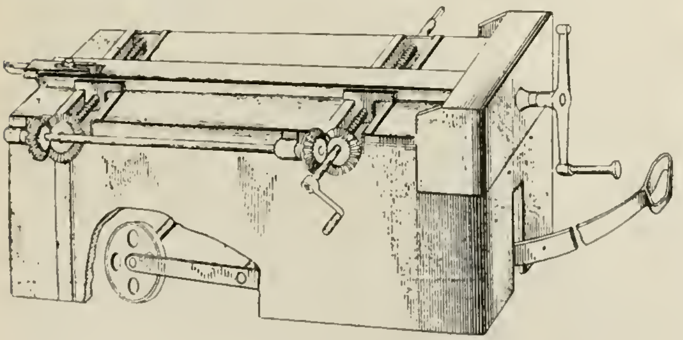


Firestone Solid-Tire Grooving Machine

outer surface and getting down to a new unworn one. So also the double or treble grooved tire, if worn down or ground down, must be regrooved.

For this purpose, several machines are employed. What is known as the Firestone machine is shown in the accompanying illustration. This employs a V-shaped knife *A* which is forced against the tire by means of a lever *B* swinging on a bolt in a steel standard fastened to a wood base. A can *C* bolted above the knife allows water to drip on the blade to facilitate cutting the rubber. While forcing the knife against the tire, the operator steadies the machine by standing on the wood base. This very simple and compact tool has been in effective use in many solid tire applying stations.

Another machine for trimming and grooving worn solid truck tires has a wooden base, reenforced with angle iron to prevent



Boucher's Solid-Tire Trimming and Grooving Machine

vibration, and is movable on steel wheels controlled by a handle. The knife on the machine is so designed that its tendency is to sharpen itself rather than to get dull with use. Four tires can be trimmed with it in fifteen minutes.' The motive power of the truck is used for turning the rear wheels when the latter are presented to the trimming machine, but the front wheels are turned by hand. When the machine is set against a solid tire and the latter is revolved the turning of the crank at the side causes the carriage holding the knife to travel transversely on the tire, cutting its surface perfectly flat. The motion is reversed with a crank on the opposite side. The depth of a groove can be determined and then made by first setting the carriage and turning the crank at the end of the machine, the crank being connected with an adjusting screw at the end of which is the knife. The machine weighs 100 pounds.

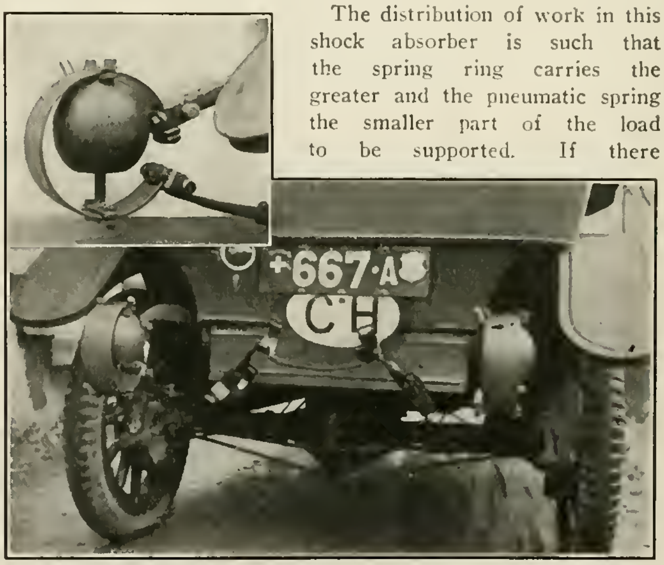
It is claimed that with this device, the life of many solid tires, ready to be discarded because badly cupped and flattened, can be greatly prolonged and a service offered solid tire owners that has often been unobtainable.—Atkin & Boucher, 8414 South Figueroa street, Los Angeles, California.

A NEW SHOCK ABSORBER

The wide use of automobiles for pleasure touring has created a great demand for shock absorbers to smooth out the roughness of country highways. Metal shock absorbers or combinations of metal and liquid, have been found of little use in improving the spring action of the car as a whole. Air shock absorbers have usually been somewhat impractical because of voluminous receptacles and high air-pressure.

The newest shock absorber "J. H.—AR" (a-r or air) combines the metal with the pneumatic spring in such manner as to take away from each kind of spring its disadvantages and to produce an auxiliary spring with no after-vibration, as it possesses the power of checking its own oscillations. The construction includes a ring made of spring band steel which is inserted between the existing laminated spring and the frame of the chassis in place of the shackles. This ring supports an air spring consisting of a cylinder ball containing a rubber air cushion and a piston working against it. The cylinder is clamped to the upper part of the ring and the piston to the lower by means of flanges.

The distribution of work in this shock absorber is such that the spring ring carries the greater and the pneumatic spring the smaller part of the load to be supported. If there



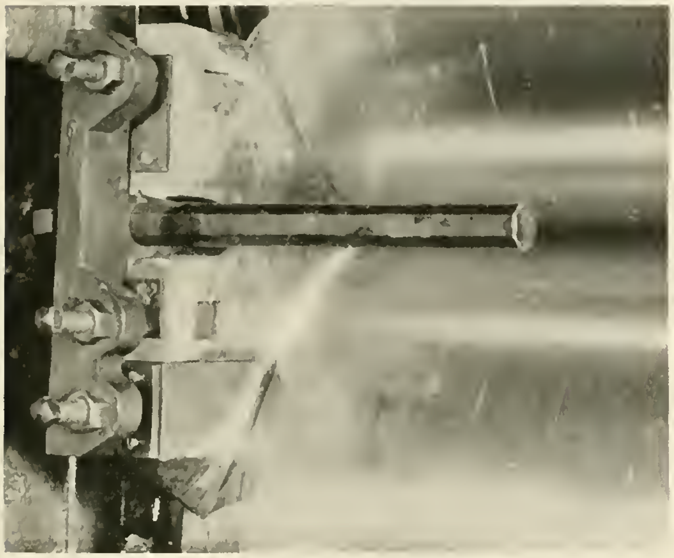
The "J. H.—AR" Pneumatic Spring

is no air in the rubber air cushion the ring will be nearly closed. By pumping air into the rubber air spring the upper part of the auto body is lifted into its normal position, which balances the car. By increasing the air pressure according to the weight to be carried the metal spring can always be kept in its open position and it is thus possible to give the shock absorber its original resistance. There are no frictional parts, therefore the absorber does not require lubricating bolts or grease cups. The simple action of the piston compressing the air in the rubber cylinder ball absorbs all shocks. —W. A. Wetterwald Co., 160 Fifth avenue, New York, N. Y.

New Machines and Appliances

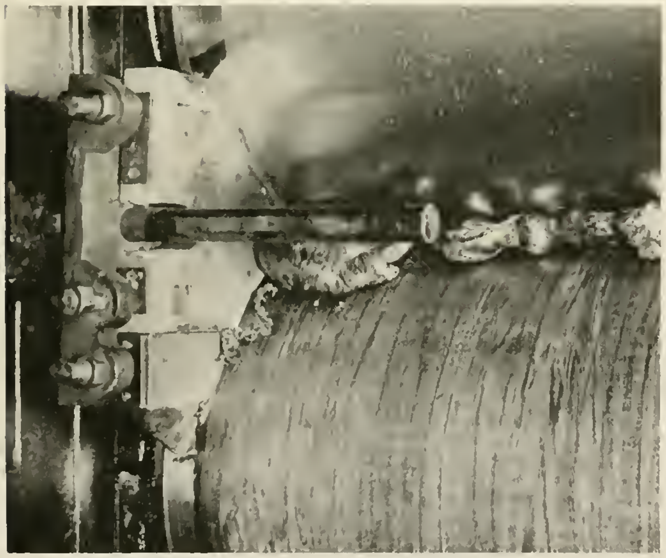
THE PERFECTED CALENDER GUIDE

In calendering rubber, considerable annoyance and waste of rubber is caused by the rubber on the roll working under the guide and depositing on the roll bearings where it interferes with lubrication, and becoming impregnated with oil and dust, is a source of trouble to both calender operators and repair men.



Calender Guide in Position

The usual type of guide consists of a cast-iron holder fitted with a deflector made entirely of wood which is difficult to keep fitted close enough to the roll to prevent the rubber from working under it. Practically all guide trouble is experienced at the first point of contact between rubber on the roll and the guide, or, at what might be termed the "heel" of the guide.

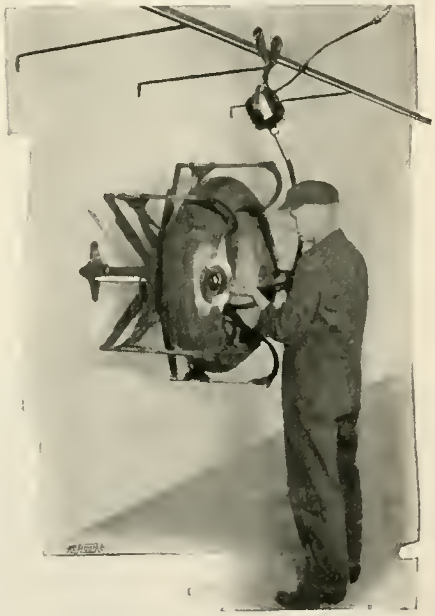


Calender Guide in Operation

The perfected patent guide shown in the illustration, is composed of three parts, the cast-iron holder, the bronze heel and the wood or metal filler. The holder is practically a duplicate of the common guide holder, extended and arranged to carry the bronze heel which does all the work. It is fitted accurately to the roll when first assembled, and is kept in place against the roll by adjusting the set-screw in the guide holder. The wood or metal part of the guide once in place and fitted to the rolls requires no adjusting, as all the wear is taken by the bronze heel, which is separate from although alined with the wood filler. The wood or metal filler will not damage the roll, as no pressure is required, because it only guides the rubber which has been deflected by the bronze heel. The excessive pressure necessary on the old type guide is entirely eliminated, for the slight pressure on the bronze heel is insignificant, as the arc of contact is about one-fifth of what was necessary with the old style guide.—Farrel Foundry & Machine Co., Ansonia, Connecticut.

A NEW TIRE SPREADER

An aid to the garage man is the tire spreader shown herewith. It is attached to the wall or a post capable of sustaining a weight of 150 pounds and the weight of the casing. All the sliding rods and working parts are of chrome-nickel steel. The heavier castings are of gray iron. Careful machining and accurate lathe work insure continuous operation with freedom of repairs.



The KeHawKe Spreader

The machine is set for a smaller casing than that which is to be spread. This is done by turning the large wheel in the center. A hidden spring holds all the hooks open and out of the way until a slight pressure returns them to place. The casing is lifted from the floor and suspended from the two top inside hooks. The bottom set of hooks is closed and the whole machine is turned slowly, closing each hook as it comes to the bottom. The larger of the two wheels in the center is turned to the right. This fits the hooks to the diameter of the casing. By turning the small hand-wheel to the right the tire is spread open. The action is easy and the time required is less than twenty seconds. There is no flattening of the tread and the spreading takes place where it should—in the side-walls close to the beads, thus facilitating the workman in placing the reliner, removing a frozen tube, or buffing the inside or outside of the casing.—KeHawKe Manufacturing Co., Minneapolis, Minnesota.

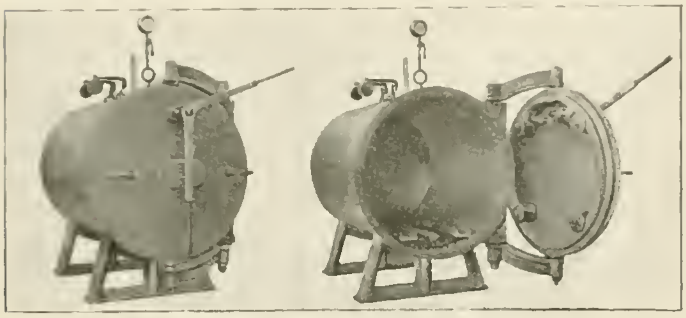
A QUICK-LOCKING VULCANIZER DOOR

A quick-locking door for vulcanizers, distinct in design from the types that depend on the action of wedges, broken screws or the bayonet lock principle, is here shown.

Both shell and door are provided with inward flanges. A circular steel spring, the most essential element of the device, is mounted in the door. This spring has a groove in which an elastic packing ring is fitted. When closed, a groove in this

circular spring fits over both of the flanges so that the axial strains between door and shell are supported.

For the operation of the mechanism of the door, a double lever is provided. The circular spring is guided and supported by four flanged rollers fixed to the inner surface of the door. The spring ring is not a full circle, but is open at the top, bridged by a steel spring which presses the packing tightly against the flanges. In the center of the door is a small cock for testing the internal pressure and safeguarding the operation of the unlocking lever while pressure is on. The design of the hinge makes it possible to turn the door away from the front of the vulcanizer, affording ready access.—The Ensink-Hilversum Engineering Works, Holland. Hugh Griffiths, sole representative, 15 New Bridge street, London, E. C. 4.

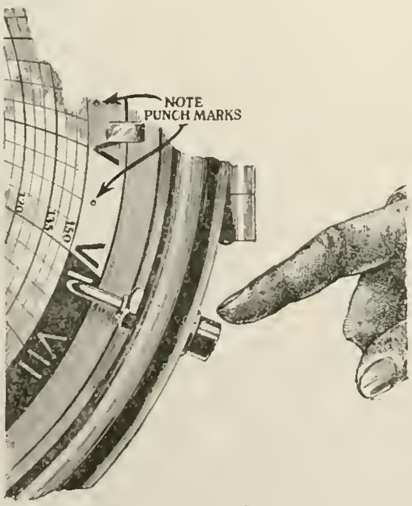


The Ensink Vulcanizer Head

TIME PUNCH FOR RECORDING THERMOMETER

A notable improvement in recording thermometers consists of a simple time-punch device attached to the well-known Columbia recording thermometer, making it a two-in-one instrument that does double duty. Every fluctuation in temperature is recorded, but the record shows whether the operator in charge has been watching these fluctuations as he should.

The chief function of the time punch is to prevent negligence and to promote vigilance by checking the inspection of the record made by the operator, who records his inspection by pressing the button shown in the illustration. This effects a punch mark on the chart of the instrument recording the time of observation and regulation of the temperature conditions.—The Schaeffer & Budenburg Manufacturing Co., Brooklyn, New York.



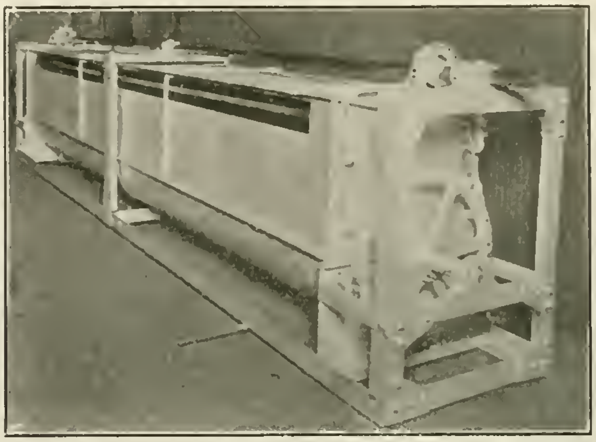
S. & B. Time Punch

DRIER FOR COMPOUNDING INGREDIENTS

The drier shown in the illustration can be used as a "batch" or a continuous flow drier for powdered compounding ingredients.

The drier itself is stationary and flights are used to keep the material thoroughly agitated, bringing it up and dropping it on the inside core or heating chamber. As the material drops a strong circulation of air passes through it, which removes the moisture and vapors.

The apparatus, when steam-operated, requires not exceeding five horse-power. Where excessive heat is required a perfected oil-heater attachment is used, circulating oil in place of steam, and by this means an average temperature of 500 degrees F. can be obtained. This method is the most easily controlled source of heat known.—The Lewis Drier Co., New York Life Building, Kansas City, Missouri.

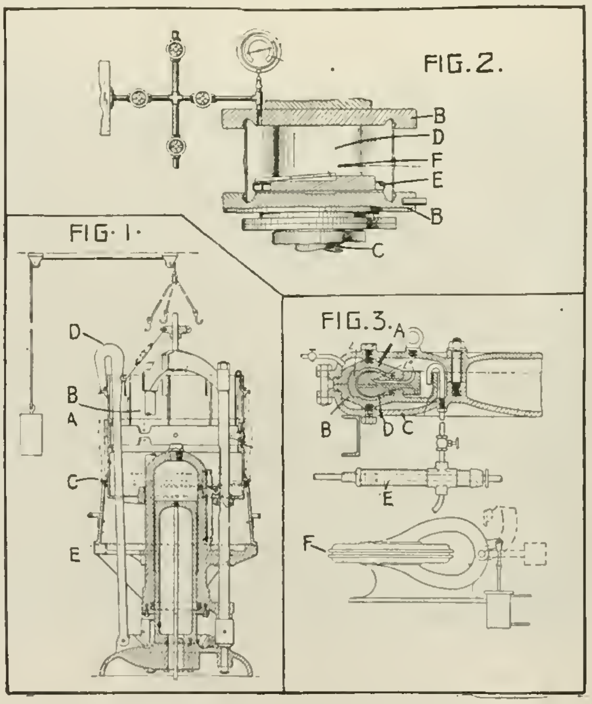


The Lewis Drier

MACHINERY PATENTS

TIRE-SHAPING MACHINE

A shaped tire casing is produced from a flat band through the use of an apparatus illustrated by Fig. 1. In operation, one edge of the band is held against a fixed abutment towards which the other edge is pressed, while the mid-portion of the band is forced radially outwards. The band *A* is fited over a drum formed by three rings, between stop rings *B*, *C*. The upper ring is held stationary by the hooked ends of arms *D*, which are pivoted to the base and also adjustably linked to a movable head. The lower ring *C* is carried on a drum which is fitted on a flange *E* of a cylindrical plunger raised by hydraulic pressure. The plunger is fitted with racks which, through pinions engaging the fixed racks, transmit a slower movement to a spider supporting the lower drum ring. An inflatable tube mounted on the middle



Internal Pressure Tire-Casing Machines

drum-ring is used to distend the band *A*. Owing to the differential movements of the cylinder and the spider, the expanding pressure is applied throughout at the center of the band. At the end of the upward travel, split rings snap into grooves in the middle drum-ring, which is removed with the shaped casing and tube for the finishing operations. The plunger is lowered, the arms *D* are swung centrally inwards to clear the drum structure, which is then removed by the tackle. The machine is adapted for shaping tire casings of various sizes by the substitution of graded rings and drums.—E. Hopkinson, New York, N. Y., and H. V. Lough, Hartford, Connecticut, U. S. A. British patent No. 149,577.

MACHINE FOR MAKING TIRES

This apparatus shown in Fig. 2 consists of a series of plates, connected to a ram, with necessary air reservoir, valves, gages, and a mechanically expanded ring. In operation, a partially vulcanized flat-sectioned tire cover is expanded to the form of an ordinary tire cover by the direct action of pressure. It is retained in its expanded condition for vulcanizing purposes by a mechanically expanded internal ring. The tire cover is placed between the plates *B*. The ram *C*, automatically operated, advances the lower plate towards the upper. Air admitted to the chamber *D* from the reservoir or compression tank, expands the tire cover. The center part is forced outwards to give the desired shape. During this process, the expansion ring *E* is held in its contracted form by a pin and the lever *F*. When the free end of the lever comes in contact with the upper plate, the ring is released. It then expands under the action of internal springs until it fills the space within the expanded tire cover. After the air has been allowed to escape, the plates are separated. The tire cover is removed in its expanded form on the ring and vulcanized. A fluid-tight joint between the tire cover and the plates is made for beaded tires by means of a separate ring and a packing ring, or, for wired-on tires, by means of an L-section packing ring.—T. Sloper, Southgate, Devizes, Wiltshire, England. British patent No. 150,792.

MOLDING AND VULCANIZING TIRES

This machine relates to the method of manufacturing rubber tires by the internal-pressure system. Referring to Fig. 3, the mold shells *A* and *B* for the tire casing are mounted inside of, or form part of the containers *C*. These containers are constructed to provide the necessary space for the pressure. Such spaces form a continuous passageway for the pressure from the supply pipe, which is supplied as soon as the mold is closed. The shells *A* are mounted in the containers *C* by screws. The containers are held together by bolts and provide a pressure tight space. Pressure enters by way of a channel formed between an upstanding flange and the inner surface of the core *D*. A vent in the core allows the air to escape from the inside of the tire casing. The heating spaces around the mold may have a separate supply of heating fluid. In order to heat up quickly a reserve of hot fluid is provided in a steam heated vessel *E*.

The containers *C* are preferably horizontal, as shown at *F*, the lower one being fixed in a permanent position while the upper half is hinged to it and operated by a hydraulic cylinder with balance weight. When arranged in rows, the molds are served by an overhead carrier. While one group is being emptied another may be closed with casings under treatment. The cores may be solid, collapsible, or in the form of an inflatable tube.—Dunlop Rubber Co., Westminster, London, and C. Macbeth, Birmingham, England. British patent No. 150,373.

OTHER MACHINERY PATENTS

THE UNITED STATES

No. 1,369,826 Machine for manufacturing cord binding. F. J. MacDonald, assignor to the Firestone Tire & Rubber Co.—both of Akron, Ohio.

1,369,932 Rubber conveying and soapstoning apparatus. L. R. McGuire, assignor to the Firestone Tire & Rubber Co.—both of Akron, Ohio.

1,370,100 Tire band making machine. J. L. G. Dykes, Chicago, Ill., assignor to E. Hopkinson, New York, N. Y.

1,370,101 Tire band stretching machine. J. L. G. Dykes, Chicago, Ill., assignor to E. Hopkinson, New York, N. Y.

1,370,102 Tire band stretching and vulcanizing machine. J. L. G. Dykes, Chicago, Ill., assignor to E. Hopkinson, New York, N. Y.

1,370,268 Stock winding device for calenders. H. B. Batchelder, Springfield, assignor to The Fisk Rubber Co., Chicopee Falls—both in Mass.

1,370,287 Mold for cushion heels. M. C. Clark, Franklin, Mass.

1,370,398 Machine for treating rubber and other heavy plastic materials. F. H. Banbury, Ansonia, assignor to Birmingham Iron Foundry, Derby—both in Conn.

1,370,438 Repair vulcanizer. A. O. Harris, St. Louis, Mo.

1,370,597 Apparatus and method for making belts. H. M. Lambert, Portland, Ore.

1,370,911 Apparatus for covering tire heads. E. D. Putt, assignor to the Firestone Tire & Rubber Co.—both in Akron, Ohio.

1,371,046 Rubber masticator. C. C. Mosher, Lima, Ohio.

1,371,779 Tire repair mold for pneumatics. John Flynn, assignor to The Williams Foundry & Machine Co.—both of Akron, Ohio.

1,371,853 Plaiting machine. J. W. Brundage, assignor to The Miller Rubber Co.—both of Akron, Ohio.

1,371,914 Solvent recovery apparatus. W. K. Lewis and W. Green—both of Newton, Mass.

1,372,179 Repair outfit for rubber boots, rubber overshoes and like articles. F. C. McCollum and C. F. Everett, both of Jackson, Mich.

1,372,181 Apparatus for compressing carbon black and other pulverulent materials. W. W. McMahan, Detroit, Mich., assignor to Morgan & Wright, a corporation of Michigan.

1,372,190 Apparatus for compacting pulverulent material. C. J. Randall and R. R. Taylor, Naugatuck, Conn., assignors to the Goodyear Metallic Rubber Shoe Co., a corporation of Connecticut.

1,372,215 Mold for curing and forming blow-out patches. C. M. Anderson, Batavia, Ill.

1,372,545 Apparatus for pulling tire fabric plies or the like. J. A. Purvis and H. A. Sessions—both of Traverse City, Mich.

1,372,567 Method of manufacturing the covers of pneumatic tires. T. Sloper, Devizes, England.

1.372,660 Tire mounting device. J. Hoffer, Carlisle, Wash.

REISSUES

15,060 Machine for cleaning plastic materials. A. Suehy, Jr., Newark, N. J. Original No. 1,247,173, November 20, 1917.

THE DOMINION OF CANADA

208,953 Tire stand and buffing machine. C. L. Durham, Kansas City, Mo., U. S. A.

209,094 Trimming machine. The Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, assignee of The Goodyear Tire & Rubber Co. of Canada, Ltd., Toronto, assignee of J. Clayton, Bowmanville, all in Ontario.

209,128 Tire rasping disk. The Smith One-Heat System, assignee of C. L. Smith and E. S. Webster, co-inventors—all of South Bend, Indiana, U. S. A.

209,129 Tire rasping wheel. The Smith One-Heat System, assignee of C. L. Smith and E. S. Webster, co-inventors—all of South Bend, Indiana, U. S. A.

209,131 Machine for making storage battery jars. Joseph Stokes Rubber Co., Trenton, N. J., assignee of T. A. Willard, Cleveland Heights, Ohio—both in U. S. A.

209,166 Apparatus for reclaiming rubber waste. F. L. Kryder and E. W. Snyder, co-inventors—both of Akron, Ohio, U. S. A.

209,196 Repair vulcanizer. J. H. Dougherty, Los Angeles, Calif., U. S. A.

209,328 Rubber mixer. The Farrel Foundry & Machine Co., assignee of D. R. Bowen, both of Ansonia, and C. F. Schnuck, New Haven—both in Connecticut, U. S. A.

209,736 Apparatus for producing rubber soles. The United Shoe Machinery Co. of Canada, Ltd., Maison-neuve, Quebec, Canada, assignee of G. Ferguson, Wollaston, Massachusetts, U. S. A.

GERMANY

DESIGN PATENTS ISSUED, WITH DATES OF ISSUE

767,018 (October 8, 1920). Brake for winding machine for making ring-shaped rubber goods like covers for pneumatic tires. Schmidts Gummiwarenfabrik A. Schmidt, Stade, i. Hann.

PROCESS PATENTS

THE UNITED STATES

No. 1,370,339 Covering strands of cord fabric with rubber. T. Midgley, Hampden, assignor to The Fisk Rubber Co., Chicopee Falls—both in Mass.

1,370,800 Forming extruded fibrous articles containing partly cured phenolic condensation cementing material. H. C. Egerton, Ridgewood, N. J.

1,370,805 Manufacture of sponge rubber playing balls. C. F. Flemming, assignor to The Miller Rubber Co.—both of Akron, O.

1,371,804 Manufacture of artificial fur, comprising a fabric base, a coating of somewhat elastic vulcanizable material on the face side, having a large number of hairs stuck into it endwise, said coating being vulcanized to hold the ends of the hairs. H. T. Nowell, New Rochelle, N. Y.

THE DOMINION OF CANADA

208,966 Manufacture of cellular rubber and apparatus therefor. K. H. Fulton, Pittsburgh, Pa., U. S. A.

209,738 Forming foxing and applying to rubber footwear and apparatus therefor. The United Shoe Machinery Co. of Canada, Ltd, Maisonneuve, Que., assignee of L. A. Casgrain, Beverly, Mass., U. S. A.

THE UNITED KINGDOM

155,469 Finishing rubber-proofed fabrics to resemble silk, etc., by applying film or coating of mica while rubber is still adhesive. L. Minton, Trevelyan Buildings, Corporation street, Manchester.

New Goods and Specialties

DURABLE RUBBER APRON

Those interested in protecting clothing while moving about kitchen and kitchenette will be interested in a new and attractive household apron made of pretty percales, rubberized and vulcanized in white on the reverse side of the cloth. In outside appearance these aprons resemble the tailored percale ones not having the protection of the rubberized back. They are made in a large assortment of colors and patterns, and the manufacturer guarantees them not to crack if the directions given with each apron are followed closely. Sizes for women are 36 inches long by 24 inches wide, and for children 25 inches long by 18 inches wide.


The "Aproneet"

Aprons are also made in a tan, durable base fabric rubberized on both sides, with a large pattern of double thickness at the wearing area, for both men and women for use in kitchen, shop, laboratory or school.—The Holley Company, Rochester, New York.

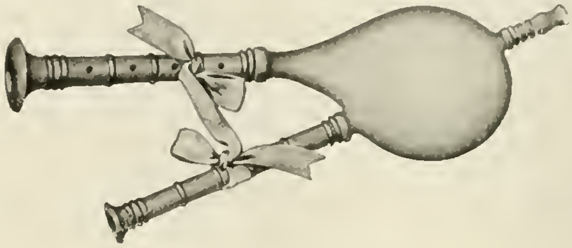
WEBBED SWIMMING GLOVE TO INDUCE CONFIDENCE

Of interest to swimmers and would-be swimmers is the "Duxfut" webbed glove for swimming. This glove is made in a two-piece mold, the back being flat and the inside conforming to the shape of the hand, the result being a webbed rubber glove with a flat back and a web between the thumb and each finger. The glove shapes to a fit about the wrist. Another style of glove is made of rubberized silk, consisting of a flat back and an inside one-piece cutout for thumb and four fingers, being stitched or cemented upon the back. In the illustration the young woman is wearing the rubberized silk glove while the man, who is the inventor, has on the pure rubber one. The idea of these gloves is to give confidence to swimmers and beginners, capitalizing the tendency to forget and spread the fingers while swimming.—A. K. Zawadzki, Wrightstown, New Jersey.


"Duxfut" Rubber Swimming Gloves

A RUBBER TOY BAGPIPE

For the younger boys who delight in the bagpipes as the Highlanders march by, the "Eagle Brand" bagpipe will hold a great fascination. It is substantially made and guaranteed against defects in workmanship. The bags are of the finest quality extra heavy weight rubber which insures a long period of service. The pipes are of selected maple, highly polished and shellacked, and their special and careful construction is such that their operation is simple and easy. The chanter has four notes while the drone pipe supplies one continuous sound as does the original Scotch bagpipe. A neat silk tassel attached to the chanter supports the drone pipe in proper position. Though having half the notes of the original bagpipe, the tones closely resemble those of the prototype.—The Eagle Rubber Co., Ashland, Ohio.


"Eagle Brand" Toy Bagpipe

RIBBED CORD TIRE ADDED TO LINE

To make its line more nearly complete, the manufacturer of "Quaker" tires has added a ribbed cord tire with ebony-black tread, which is built oversize. The cross-section being much larger than that of fabric tires prescribes an oversize tube, also. The size of the tire provides more air space and a thicker tread, increasing the mileage, but at the same time insuring easier riding. "Quaker" tires have been tested under road conditions of all kinds, on different makes of cars, to demonstrate that they were properly constructed to withstand the varying road conditions a tire would encounter.

The company also manufactures a ribbed fabric tire, which has an ebony-black tread, besides the "T. T. T." non-skid fabric tire, the "T. T. T." non-skid cord described in our March issue, and "Quaker Multi-Tubes," made by the laminated process in which a number of layers of rubber are placed layer upon layer and integrally vulcanized.—Quaker City Rubber Co., Philadelphia, Pennsylvania.


"Quaker" Ribbed Cord

"BRITE MAWNIN" JAR RINGS

One of the signs of spring and a hint to home canners to prepare for action is the rubber jar ring. Among the newest brands, recently trade marked, is "Brite Mawnin," which may be had in red, white, or gray.—Amboy Products Co., 35th and Morgan streets, Chicago, Illinois.

ATTRACTIVE, UNBREAKABLE, WASHABLE TOYS

Many manufacturers are earnestly endeavoring to meet the desires of the insatiable youngsters of today for novelty toys. "Ketson" toys made up in dolls and the most popular animals are charming additions to the playroom. These toys have for their foundation two rubber balls, the larger one for the body and the smaller one for the head. The balls, together with featherweight stuffing fill out the eiderdown

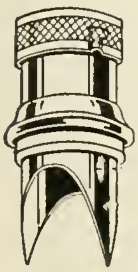
form of the animal. They are extremely light and as eider-down is washable, are sanitary. The elephant's legs and

Kitten Bunnie Puppie Bunnie Elephant

trunk are packed in such a manner as to make him very sturdy on his feet, while the kitten, puppie and bunnie have an inside cardboard base upon which they sit firmly. Despite the two rubber balls, they do not bounce, being hampered by the base stiffening. The animals average about 6 inches in height, being very convenient for small children to handle.—The Ketcheson Supply Co., Springfield, Massachusetts.

AN IMPROVED SANITARY CAN SPOUT

Not only the housewife, but the "furnished-roomer" and bachelor who utilize condensed milk will be interested in the improved "Easy Serve" can spout. This has a spout approximately one inch in diameter which will permit any liquid, no matter how thick, to flow through. The double blades at the bottom cut a round hole, larger than a 25-cent piece, in the top of the can, folding the piece of tin inside so that it will not interfere with the flow of the liquid, or fall into the can. Projections on the side of the blades hold the spout in place with the rubber washer resting tightly against the top of the can. The removable cap on the top of the spout locks firmly in place with a slight turn. To pour liquid remove the cap.



"Easy Serve" Can Spout

This spout is sanitary, easily cleaned, and made of a non-corrosive and rust-proof material. Besides use on the milk can, it serves on boxes of cereals, soda, washing powder, etc. This device turns any can into a pitcher, protecting the contents from dust, flies and other foreign substances.—Baird-Daniels Co., Inc., 143 West Broadway, New York.

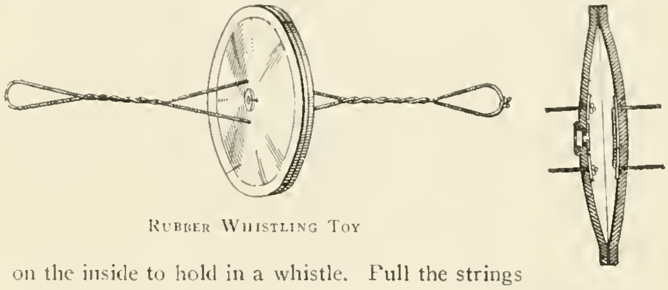
NEW CONSTRUCTION IN HEEL RUBBER INSERT

"Rotor" heels, which are on all "Ground Gripper" shoes sold outside of New England have lately been modified by moving the rubber plug or insert back from the outer forward corner of the heel and extending it back to the rear part of the heel. This new construction provides a yielding surface where it is most needed at the rear of the heel where contact with the ground first comes, lessening the wear of the heel at that point. It also avoids the liability of the catching of the rubber insert in ladies' skirts as sometimes happens with the rubber at the outside forward corner. The heel is constructed on low, broad and flat lines which make walking easier. The "Rotor" insert takes the jar off the heel, while the back part of the rubber insert is yielding and tends to balance the tread. The first suction cup in the middle of the insert has the effect of rotating the foot, while the second one provides the essential non-slipping feature. In front of this is the mechanical pivoting point.—E. W. Burt & Co., Inc., Boston, Massachusetts.

Ground Gripper "Rotor" Heel with Rubber Insert

A WHISTLING RUBBER TWIRLER

The illustration shows a rubber toy consisting of two rubber disks fastened together at the circumference. Into one disk is inserted a string, the ends of which are tied together on the outside. Into the other disk are inserted both ends of a string, knotted



Rubber Whistling Toy

on the inside to hold in a whistle. Pull the strings and the toy revolves and bellies, and the air is forced in through the whistle. Slacken the strings and the disks reverse their revolutions and the air is again forced through the whistle. Being made of rubber, this toy is harmless, and being inflated with air when in motion is an added attraction for children.—Jerry Rossi, Box 14, Times Plaza Station, Brooklyn, N. Y.

A SEVENTY-FIVE-MILES-TO-THE-GALLON AUTOMOBILE

One of the latest automotive novelties is the two-passenger automobile with a total weight under 150 pounds. This little car is claimed to have a maximum speed of 30 miles an hour; will travel 75 miles on a gallon of gasoline, and will be completely closed in for protection in all kinds of weather. The car is made almost entirely of aluminum-alloy and magnesium metal, has a 5 h.p. opposed motor and sliding gear transmission,

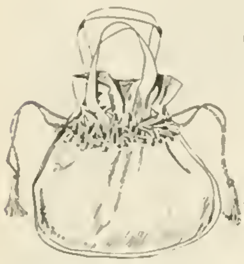
Martin "Scootamobile"

and no universal joints or differential. It is amply strong to withstand all kinds of road shocks, and the wheel arrangements and spring construction make it ride as comfortably as a heavy and expensive car. The machine is narrow enough to be pushed through an ordinary doorway, and can be parked in the office or the front hall. The car is equipped with disk wheels and pneumatic tires.—Martin Rocking Fifth Wheel Co., Springfield, Massachusetts.

It is a good rule not to carry a spare too long. Interchange it with the other tires every month. Of course it should be carried covered. When left out of service too long, its endurance and longevity are seriously handicapped.—*Miller News Service.*

RUBBER SHOPPING BAGS IN ENGLAND

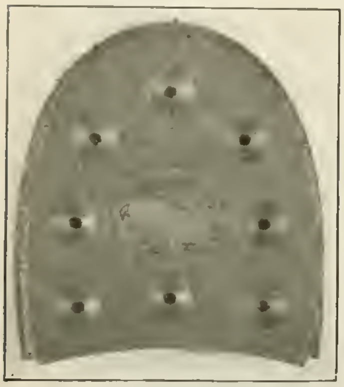
Our English cousins have devised a practical means of shopping in stormy weather without harm to the dainty shopping bag of fair days. A rubber-covered "holdall" takes the place of the one of fabric or other material. These holdalls, called message bags, made in delicate shades of fawn, blue, saxe, heliotrope, or gray, besides black, are lined throughout, and drawn in at the neck with cords. Double strap handles are provided, after the English fashion, and the shape is called the "Dorothy." The sizes vary from 10 by 10½ inches to 13 by 15½, and the proportions also vary.—*Rubber Leaves*, Fowlers (Aberdeen) Limited, Imperial Place, Aberdeen, Scotland.



"Dorothy" Holdall

LEATHER BASE RUBBER HEEL

One of the newest developments in solid rubber heels for repair work is that shown in the illustration. The special feature is a ply of heavy sole leather formed as a heel seat. This heel commends itself to shoe manufacturers and repair men who cater to high-class trade. The leather base heel can be attached more quickly than a half heel and produces a very workmanlike job. In the case of a repair the old heel is removed entirely and the leather base heel substituted in one operation without the use of cement, requiring only to be trimmed and finished.—Panther Rubber Manufacturing Co., Stoughton, Massachusetts.



Panther Leather Base Heel

TIRE WITH RAISED TREAD—"HERRINGBONE"

A new "Globe" tire has recently been introduced that combines the sturdy wearing qualities of the former "Globe" tire with an attractive and long-wearing raised black tread, named from its distinctive pattern, the "Herringbone." This tough, rugged tread is made of a special compound heretofore used only on racing cars, and made to withstand racing conditions of excessive heat and unusual strain. The carcass is built of many plies of high-grade cord fabric and specially compounded rubber and the materials throughout are of the most lasting quality. The maker asserts a "Globe" carcass has never been known to wear out, and covers this statement with a satisfaction certificate.—Globe Rubber Tire Manufacturing Co., Trenton, New Jersey.

Globe "Herringbone"

A BRITISH PUNCTURE-SEALING INNER TUBE

What promises to be a novel and simple method of overcoming puncture trouble is the use of mastic rubber in the "Challenger" puncture-sealing inner tube, a recent British invention. The tube is made of thick, soft, red rubber; the half corresponding to the tread is split and the cavity filled with mastic rubber, vulcanized in place, but soft and sticky enough to exude through the puncture and prevent the escape of air. "Challenger" puncture-sealing inner tubes are made in all sizes for cars and motorcycles. Their slight extra initial cost is more than compensated for by the long wear and the extra protection they afford the casings.—British patents, Nos. 22,450 and 30,720 of 1920. J. P. Cochrane & Co., Edinburgh, Scotland.

ENGLISH RUBBER HATS FOR OUTDOOR WEAR

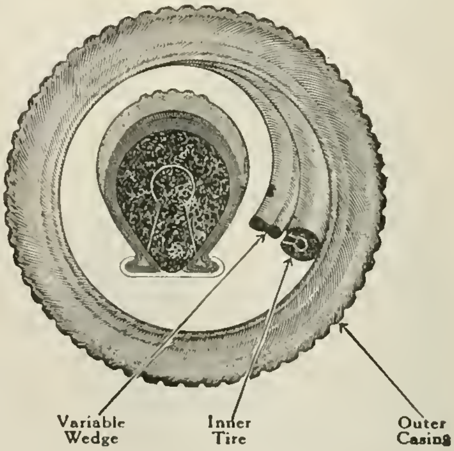
Our British cousins have solved the problem of looking chic and well-dressed, even in stormy weather, by evolving the rubber hat. Of the five styles shown here, the upper left-hand one is of plain colored rubber cloth, with interlined and stitched brim and band binding of bright black leather cloth with colored strips to match ground. The lower left-hand one has a striped leather cloth brim, with points turned back and finished with a button. The upper right-hand hat is similar, but the band and brim are of plain leather cloth. The finish is a bow and button in front. The lower right-hand design is of colored rubber cloth with band and brim binding of contrasting shade, and comes in assorted colors. The center hat on the model is of natural-colored rubber cloth with band and brim binding of bright black leather cloth. The soft brim is pliable enough to be pulled into the shape desired. This also comes in popular colors.—*Rubber Leaves*, Fowlers (Aberdeen) Limited, Imperial Place, Aberdeen, Scotland.

Rubber Hats From the British Isles

"RUBBER ACE" INNER TIRE

A new development in anti-puncture substitutes for inner tubes is the "Rubber Ace" inner tire, United States patent No. 1,351,894. The device consists of molded rubber sponge in two sections as shown in the illustration. These are ring form although not endless, molded to fit one within the other, both together snugly fitting the interior of a tire casing. When in place they form an "inner tire" or resilient body compactly filling any casing whether of clincher or straight-side form.

The wedge-shaped ring occupies a central position and is of variable sizes. Its function is to spread out the filler ring so that any casing may be completely filled at a uniform pressure. The wedge ring fills the space between the beads of the casing and fits tightly against the center of the rim. The larger the wedge used the more the air cells are compressed and the greater the pressure in the tire.



New "Rubber Ace" Inner Tire

The countless air cells form a shock-absorbing cushion that rides more easily than the single air-inflated inner tube, insures absolute freedom from punctures, and lasts indefinitely.—Elgin Rubber Ace Co., Elgin, Illinois.

Annual Report of the United States Rubber Co.

The twenty-ninth annual report of the United States Rubber Co., presented at the annual meeting, April 19, 1921, showed a new high record of sales and gratifying earnings for the calender year 1920. Net sales amounted to $256,150,130, compared with $225,589,465 for the preceding year. In 1913, the year before the war, net sales amounted to only $87,349,692. Net profits for 1920, after interest deductions, and provision for depreciation of plants and adequate reserves for Federal, Canadian and British taxes on income and profits, were $21,220,983, compared with $17,730,237 in 1919. From this there remained to be deducted $5,200,000 for dividends on preferred stock, including dividends payable January 31, 1921, $18,718 for dividends on minority stock of subsidiaries, leaving a surplus for the year of $16,002,265 applicable to the common stock, which was equivalent to $19.75 a share on the $81,000,000 of common stock outstanding, compared with $24.18 a share earned in 1919.

The annual report follows in full.

THE CHAIRMAN'S REPORT

To the Stockholders of the United States Rubber Co.:

Complying with the by-laws of the company, the chairman of the board of directors hereby submits to the stockholders the annual report for the fiscal year ended December 31, 1920.

On February 3, 1921, there was sent to the stockholders a preliminary statement of the operations of the company during the year 1920, and of the position of the company at the close of the year. This was done in order to give the stockholders as prompt information as possible as to the affairs of the company, owing to the unsettled business conditions then existing. The results reported in the preliminary statement were substantially the same as those shown herein.

The consolidated general balance sheet as of December 31, 1920, of the United States Rubber Co. and its subsidiaries, after eliminating all offsetting accounts between the companies, compiled by the comptroller and certified by public accountants, is appended hereto and made a part hereof.

VOLUME OF BUSINESS AND PROFITS

The net sales of the company for the year 1920 were $256,150,130, being an increase of $30,560,665 over the sales of the previous year.

The net income before interest, but after making provision for depreciation of plants and adequate reserves for Federal, Canadian and British taxes on income and profits amounted to		$26,864,297
The net interest charges amounted to		5,643,314
Thus leaving net profits for the year		$21,220,983
The dividends on the preferred stock including dividend payable January 31, 1921, amounted to	$5,200,000	
The dividends on minority stock of subsidiary companies amounted to	18,718	
Making a total of		5,218,718
Leaving surplus for the year applicable to the common stock		$16,002,265
Dividends on common stock (8 per cent) including dividend payable January 31, 1921, amounted to		6,480,000
Leaving balance of surplus for the year		$9,522,265
To which there was added for adjustments made during the year		492,952
Making a total of		$10,015,217
From which there was appropriated and set aside as a reserve to provide for any contingencies that might arise hereafter in connection with inventory valuations, contracts or other matters.		6,000,000
Leaving a balance to be carried to surplus account December 31, 1920, of		$4,015,217
The total surplus at the beginning of the year 1920 amounted to	$52,310,163	
From which there was distributed a common stock dividend of 12½ per cent, February 19, 1920	9,000,000	
Thus leaving surplus amounting to		43,310,163
Which added to the surplus for the year, i. e., $4,015,217, makes the surplus as of December 31, 1920		$47,325,380

DIVIDENDS

Dividends at the rate of 8 per cent have been paid upon both the preferred and common stocks for the year 1920.

TEN-YEAR GOLD NOTES

The company, on August 1, 1920, issued and sold $20,000,000 of 10-year 7½ per cent gold notes which were secured by $25,000,000 of its first and refunding mortgage bonds issued under the terms of the mortgage. As the time was not then favorable for selling bonds, the company sold these notes, the proceeds of which were used in payment for additions to fixed properties.

CHANGES IN ORGANIZATION

After the death of Elisha S. Williams, who, as vice-president, had general charge of the mechanical goods division, the operating departments of the company were reorganized in accordance with the plan of organization indicated elsewhere in this report. The office of second vice-president was created and several of our valuable men in their respective departments elected to such office. It is believed that increased efficiency will result from such change in organization.

STOCK CARRIED FOR EMPLOYES

The item of notes receivable of employes, $7,430,207, appearing in the general balance sheet, is represented by notes of employes given for purchase of shares of the common capital stock of the company secured by 98,326 shares of such stock. Your chairman is of opinion that the making of it practicable under our profit and value sharing plans for our employes to acquire and hold a greater amount of stock than they themselves would otherwise be able to own, thus increasing the personal interest in the prosperity of the company, is of advantage to both company and employe.

In addition to the above, common stock in the amount of $2,427,705 (book value) is being carried under service contracts and agreements with some of the principal officers of the company, as shown in the balance sheet.

INVENTORIES

To meet the heavy decline in prices of certain materials, notably cotton fabrics, inventories have been written down $11,151,444 below cost, thus bringing the inventory valuations down to a conservative basis. This reduction was charged against reserves previously created in anticipation of such a decline in prices. In addition to this write-off of $11,151,444, there was appropriated out of the income for the year 1920 and set up as a reserve the sum of $6,000,000, which your chairman believes is sufficient to take care of any contingencies that might arise hereafter in connection with inventory valuations, contracts, or other matters.

PLANTS AND FIXED PROPERTIES

There has been expended upon the plants and fixed properties of the company during the year 1920, $28,616,616, notably in the enlargement of our tire plants at Detroit, Michigan; Hartford, Connecticut; Providence, Rhode Island, and Indianapolis, Indiana. The work is practically completed and paid for and your chairman feels there will be no necessity for additional expansion of plants or fixed properties for some time to come.

EXPORT BUSINESS

The export sales of the company increased 9.66 per cent, compared with those for the previous year.

Export business during the latter part of the year suffered in common with domestic business from greatly reduced buying.

Plans for further expansion of export business have been temporarily held awaiting more favorable general conditions, but already there are some indications of revival and it is hoped that the company will be justified during 1921 in executing plans which will make the products of the company available, through direct distribution, in every important market of the world.

CRUDE RUBBER AND RUBBER PLANTATIONS

The year 1920 opened with crude rubber (first latex crêpe) at 55 cents a pound and closed below 20 cents a pound. Your company carried over about seven months' supply of crude on hand and to arrive at .2679 cents, which is below the average cost of production, and with the revival of business the price of crude rubber is certain to advance.

While we did not push the production of our estates in Sumatra, owing to the low prices, the amount of rubber received therefrom in 1920 was in excess of the previous year. During the year we have increased the area of our plantations both by development

of land previously owned and by further purchases at favorable prices.

INCREASE IN NUMBER OF STOCKHOLDERS

The following tabulation shows the number of stockholders of the company as of January 15, 1919, and January 15, 1921, respectively:

	January 15, 1919	January 15, 1921
Common stockholders	4,009	11,878
Preferred stockholders	15,030	17,353
Totals	19,039	29,231
		19,039
Increase		10,192

OUTLOOK FOR 1921

The policy of the company for the coming year will be a continuance of the conservatism exercised in the past. It is not proposed to extend its business by any plan involving new construction or otherwise requiring the outlay of further capital, but with the completion of the much needed enlargement of the capacity of its tire plants it is intended to confine the business of the company within its present facilities and to conserve its assets in conformity with the times. Your chairman feels that adherence to this policy will not only insure safety, but that it may reasonably be expected that the profits of the business will be adequate to meet all charges and also provide satisfactory earnings upon the capital stock.

During the year 1920 we lost by death three of our valuable directors: Harry E. Converse, who succeeded his father, Elisha S. Converse, as president of the Boston Rubber Shoe Co., one of our large subsidiaries; Elisha S. Williams, who came to us when we acquired the Revere Rubber Co., and who was a vice-president of our company, and Theodore N. Vail, president of the American Telephone & Telegraph Co., who was an active member of our board, manifesting in every way a deep interest in the affairs of our company and showing every confidence in its future prosperity; also Francis Lynde Stetson, our general counsel for nearly twenty years and one time member of our board. We deeply deplore the losses thus sustained.

It gives me pleasure to refer again to the continued fidelity and ability shown by the officers, heads of departments, our far eastern and foreign staffs, and other employes of the company and its subsidiaries under the somewhat trying conditions of the past year.

Respectfully submitted,

Samuel P. Colt, Chairman.

MANAGEMENT

The management of the United States Rubber Co. is in the following competent hands:

DIRECTORS

James S. Alexander, Walter S. Ballou, James G. Brady, Nicholas F. Brady, Middleton S. Burrill, Samuel P. Colt, George R. Deshler, Sir Mortimer B. Davis, James Deshler, James B. Ford, James Newton Gunn, Francis L. Hine, Ernest Hopkinson, Henry L. Hotchkiss, Lester Leland, John W. Davis, Samuel M. Nicholson, Raymond B. Price, Homer E. Sawyer, Charles B. Seger, William H. Truesdale, Frank A. Vanderlip.

The Board of Directors of the United States Rubber Co. met April 21, 1921, for organization and elected the following officers. Executive Committee and Operating Council for the ensuing year, namely:

OFFICERS

Samuel P. Colt, chairman; Lester Leland, vice-chairman; Charles B. Seger, president; James B. Ford, vice-president. Footwear, mechanical goods and miscellaneous: Homer E. Sawyer, vice-president in general charge; Edward J. Coughlin, second vice-president in charge of manufacturing; George H. Mayo, second vice-president in charge of sales. Development and patent departments: Ernest Hopkinson, vice-president in general charge. Tires and accessories: J. Newton Gunn, vice-president in general charge; Charles J. Butler, second vice-president in charge of manufacturing; Samuel Norris, secretary; John D. Carberry, assistant secretary and assistant treasurer. Treasury and accounting: W. G. Parsons, vice-president in general charge; W. H. Blackwell, treasurer; Sherwood S. Green and H. H. Nance, assistant treasurers; William O. Cutter, comptroller; Harold B. Grouse and Herbert M. James, assistant comptrollers; Henry B. Hubbard, financial manager of sales. Purchasing, stores and transportation: Raymond S. Willis, second vice-president in general charge; George E. Smith, auditor; John W. Davis, general counsel; Richard V. Lindabury, New Jersey counsel.

EXECUTIVE COMMITTEE

Samuel P. Colt, chairman; Lester Leland, Charles B. Seger, James B. Ford, Walter S. Ballou, Nicholas F. Brady, James S. Alexander.

OPERATING COUNCIL

Charles B. Seger, chairman; Homer E. Sawyer, J. Newton Gunn, Ernest Hopkinson, W. G. Parsons, R. S. Willis and W. O. Cutter.

THE COMPTROLLER'S REPORT

UNITED STATES RUBBER CO. AND SUBSIDIARY COMPANIES

Consolidated General Balance Sheet, December 31, 1920

ASSETS

Cash	$14,534,846.15	
Accounts receivable	46,329,738.62	
Notes and loans receivable	2,760,589.82	
Finished goods	77,353,921.59	
Material and supplies, including goods in process	46,149,108.89	
Total current assets		$187,128,205.07
Notes receivable of employes given for purchase of common stock and secured by such stock	$7,430,207.04	
Common stock of United States Rubber Co. held under service contracts and agreements	2,427,705.49	
Securities owned and held in insurance fund	2,486,920.05	
Securities owned, including stock of United States Rubber Co. held by a subsidiary company	7,167,536.14	
Plants, properties, and investments, including rubber plantations	177,227,137.18	
Prepaid and deferred assets	5,384,985.94	202,124,491.84
Total assets		$389,252,696.91

LIABILITIES, RESERVES AND CAPITAL

Accounts payable, including acceptances payable for importation of crude rubber			$14,094,388.85
Accrued liabilities			3,874,158.18
Notes and loans payable			49,405,000.00
Total current liabilities			$67,373,547.03
United States Rubber Co., first and refunding mortgage gold bonds, due 1947 ($67,426,800 5 per cent and $25,000,000 6 per cent)		$92,426,800.00	
Less treasury bonds deposited as security for: United States Rubber Co. 5-year 7 per cent secured gold notes	$9,000,000.00		
United States Rubber Co. 10-year 7½ per cent secured gold notes	25,000,000.00	34,000,000.00	
		$58,426,800.00	
United States Rubber Co. 5-year 7 per cent secured gold notes due December 1, 1923		6,000,000.00	
United States Rubber Co. 10-year 7½ per cent secured gold notes, due August 1, 1930		20,000,000.00	
Canadian Consolidated Rubber Co., Limited, 6 per cent gold bonds due 1946		2,600,000.00	87,026,800.00
Total liabilities			$154,400,347.03
Reserve for depreciation of property and plant		$16,648,727.19	
General operating reserves		8,022,615.10	
Reserves for insurance		2,855,277.88	
Reserve for federal taxes and other contingent payments		4,093,874.53	
Reserve for dividends on preferred and common stocks, payable January 31, 1921		2,920,000.00	
Total reserves			$34,540,494.70
Capital stock—preferred		$65,000,000.00	
Capital stock—common		81,000,000.00	
Minority—Canadian Consolidated Rubber Co., Limited, stock		277,200.00	
Total capital stock		$146,277,200.00	
Fixed surpluses—subsidiary companies		$6,709,275.22	
Surplus		47,325,379.96	
Total surpluses		$54,034,655.18	
Total capital stock and surpluses			200,311,855.18
Total liabilities, reserves and capital			$389,252,696.91

Respectfully submitted,

William O. Cutter, Comptroller.

News of the American Rubber Industry

GOODYEAR'S FINANCIAL PLAN COMPLETED

The final step in restoring The Goodyear Tire & Rubber Co. to a sound financial position with a readjusted management under the direction of three voting trustees, was taken April 21, 1921, when a group of bankers offered $30,000,000 of the company's first mortgage 20-year 8 per cent sinking fund gold bonds at 99 and interest. Provision is made for the retirement by lot on each of the semi-annual interest dates of $750,000 of the bonds.

Another banking group will underwrite an issue of $27,500,000 of its 10-year 8 per cent debentures, which are to be offered to its stockholders for subscription. Under the recapitalization the $65,000,000 of the company's old preferred stock remains unaffected. There are authorized $40,000,000 of its prior preferences, of which about $30,000,000 has been taken by merchandise creditors. There will be outstanding about 900,000 shares of its common stock of no par value carried on the books at $1,000,000. Giving effect to the new financing, the company will have as of May 1 total resources of $177,000,000; total property value, less $11,000,000 depreciation, amounting to $54,000,000; current assets, $72,700,000, of which $11,000,000 is cash; total current liabilities, $9,600,000, and working capital in excess of $63,000,000. Reserves of $14,000,000 are set up and all inventories of raw materials as well as all contracts have been written down to the present market. In addition, a total of $43,000,000 has been provided for adjustment of inventories and raw materials not delivered.

During the life of the 20-year first mortgage bonds above referred to, control of the management of the company through the right to elect the majority of the board of directors will be vested in Messrs. Clarence Dillon, of Dillon, Read & Co.; John Sherwin, chairman of the board of the Union Trust Co. of Cleveland, and Owen D. Young, vice-president of the General Electric Co., or their successors, either through management stock or a voting trust.

The problem of readjusting the management will be undertaken at once. Its solution will include, according to general understanding, the withdrawal of Frank A. Seiberling, the president, from active participation in the management.

To consummate this recapitalization took months of effort, more than 100,000 individual consents being required before it could be done. Consents were given by holders of $65,000,000 of the company's preferred stock, $60,000,000 of its common stock and of $85,000,000 of its debt, including contracts and contingent liabilities.

GOODRICH ANNUAL MEETING

At the annual meeting of the stockholders of The B. F. Goodrich Co., held April 20, B. G. Work, Waddill Catchings, H. K. Raymond and W. O. Rutherford were reelected to the board of directors. A. A. Tilney, vice-president of the Bankers Trust Co. and Harold Stanley, vice-president of the Guaranty Trust Co., were elected directors in the places of A. H. Marks and A. B. Jones, whose terms expired and who both resigned. All officers were reelected at the directors' meeting, with the exception of H. E. Raymond, vice-chairman of the board, who, due to retirement from all active business, resigned. C. B. Raymond, former vice-president, was elected vice-chairman of the Board.

Under existing conditions the directors did not deem it wise to declare at this time the dividend on the common stock usually paid May 15. The company is, however, in a strong position and with the resumption of a normal business may be expected to show satisfactory earnings. In accordance with the provisions of the charter, 11,880 shares of the preferred stock were retired.

ANNUAL REPORT OF THE INTERCONTINENTAL RUBBER CO.

The following report of the Intercontinental Rubber Co., 15 Exchange Place, Jersey City, New Jersey, covers the fiscal year ended December 31, 1920:

CONDENSED BALANCE SHEET—DECEMBER 31, 1920

Assets		
Investments in merged and subsidiary companies:		
By cash	$4,478,944.09	
By stock issues	28,198,575.30	$32,677,519.39
Patents (exclusive of subsidiary companies)		15,141.77
Accounts and notes receivable, etc.:		
Advances to subsidiary companies	$361,097.25	
Sundry accounts	75,936.30	437,033.55
Advances on rubber		148,298.48
Investment securities		1,014,030.50
Cash		5,219.63
		$34,297,243.32
Liabilities		
Capital stock: common		$29,031,000.00
Bills and accounts payable, taxes accrued, etc.		219,707.39
Reserve accounts		564,321.21
Surplus (as below)		4,482,214.72
		$34,297,243.32
Surplus Account		
Surplus December 31, 1919		$4,446,079.57
Total profits and income from investments, etc.	$201,666.40	
Less:		
Administration, general expenses and taxes	67,498.42	
	134,167.98	
Depreciation in market value of securities at December 31, 1920	71,837.25	62,330.73
		$4,508,410.30
Charges against surplus:		
Cost of caring for Mexican properties (shut-down expenses) and experimental expenses 1920		26,195.58
Surplus December 31, 1920		$4,482,214.72

Important experimental and preliminary development work has been continued on the company's Arizona guayule plantation, and further work is being undertaken this year in California.

Operations at Torreon, Mexico, were resumed December 15, 1919, but revolutionary activity, fuel shortage and other hindrances forced the suspension of operations. During the campaign 2,004,062 pounds of dry rubber were produced. Pending the bearing stage of the Sumatra plantation where planting began in the spring of 1918 and which is now comprised of approximately 3,300 acres of young trees, a portion of the company's surplus resources has been employed in purchasing rubber and establishing or expanding trade relations with consumers.

FINANCIAL NOTES

The Federal Rubber Co., Cudahy, Wisconsin, reports net loss for 1920 of $20,737 after charges and taxes. A deficit of $719,490 is reported after deducting cost of selling additional preferred stock. For 1919 the company showed surplus of $725,440. Net sales amounted to $13,911,990 as compared with $13,964,580 for 1919 when the surplus for the year amounted to $725,440.

The Rubber Corporation of America, 240 West 55th street, New York, N. Y., had filed against it an involuntary petition in bankruptcy on April 14, 1921, in the United States District Court, by three creditors whose claims aggregated approximately $146,-

542. The petitioners are the Equitable Trust Co., $70,042; National Park Bank, $72,500, and Blauvelt Brothers, Inc., $4,000. Liabilities are placed at $1,000,000 and no estimate of assets is given.

On March 16, 1920, the company's assets were placed at $1,477,889 and liabilities at $475,925. Until it is learned whether a receivership is necessary the appointment of a receiver has been postponed.

The Rubber Corporation of America is a Delaware corporation, dealing in tires, with branches in six of the large cities.

DIVIDENDS DECLARED

Company	Stock	Rate		Payable	Stock of Record
Corn Products Refining Co	Com.	$1.00	q.	Apr. 20	Apr. 4
Corn Products Refining Co	Com.	$0.50	ex.	Apr. 20	Apr. 4
Corn Products Refining Co	Pfd.	$1.75	q.	Apr. 15	Apr. 4
Hodgman Rubber Co	Pfd.	2%	q.	May 1	Apr. 15
Hood Rubber Co	Com.	$1.00	q.	Mar. 31	Mar. 19
Hood Rubber Co	Pfd.	1¾%	q.	May 2	Apr. 20
India Tire & Rubber Co., The	Com	2%	q.	Apr. 1	....
India Tire & Rubber Co., The	Pfd.	1¾%	q.	Apr. 1	....
Kelly-Springfield Tire Co	Com.	3%	q. stk.	May 2	Apr. 15
Kelly-Springfield Tire Co	8% Pfd.	$2.00	q.	May 16	May 2
Monatiquot Rubber Works	Pfd.	$1.75	q.	Apr. 1	Mar. 24
New Jersey Zinc Co., Inc	Com.	2%	q.	Apr. 30 July 30	May 10 Aug. 10
United Shoe Machinery Co	Com.	$0.50	q.	Apr. 5	Mar. 21
United Shoe Machinery Co	Pfd.	$0.37½	q.	Apr. 5	Mar. 21
United States Rubber Co	Com.	2%	q.	Apr. 30	Apr. 15
United States Rubber Co	1st pfd.	2%	q.	Apr. 30	Apr. 15
Westinghouse Electric & Manufacturing Co.	Com.	$1.00	q.	Apr. 30	Mar. 31
Westinghouse Electric & Manufacturing Co.	Pfd.	$1.00	q.	Apr. 30	Mar. 31

NEW YORK STOCK EXCHANGE QUOTATIONS

April 25, 1921

	High	Low	Last
Ajax Rubber Co., Inc	35⅞	35⅛	35⅛
The Fisk Rubber Co	16⅜	15¾	15¾
The B. F. Goodrich Co	38⅝	38⅛	38⅛
The B. F. Goodrich Co., pfd	....	....	...
Kelly-Springfield Tire Co	44	43	43½
Kelly-Springfield Tire Co., pfd	....	....	....
Keystone T. & R. Co	15⅞	15⅜	15⅜
Lee R. & T. Corp	29	28½	28½
United States Rubber Co	76	74	74¾
United States Rubber Co., 1st pfd	101¼	101¼	101¼

AKRON RUBBER STOCK QUOTATIONS

The following are closing quotations of April 19, supplied by The App-Hillman Co., Second National Building, Akron, Ohio:

	Bid	Asked
American R. & T. Co., com	40	60
Amazon Rubber Co., The	25	35
Firestone T. & R., com	85	90
Firestone T. & R., 6% pfd	85	..
Firestone T. & R., 7% pfd	75	76
General T. & R. Co., The, com	190	250
General T. & R. Co., The, 7% pfd	75	85
Goodrich, B. F., The, com	37	38
Goodrich, B. F., The, pfd	75	78
Goodrich, B. F., The, 5-yr. 7% notes	90	91
Goodyear T. & R. Co., The, com	12½	13
Goodyear T. & R. Co., The, 7% pfd	36½	37½
India T. & R. Co., com	100	130
India T. & R. Co., 7% pfd	..	80
Mason T. & R. Co., The, com	15	18
Mason T. & R. Co., The, 7% pfd	55	60
Marathon T. & R. Co., com	3	4
Miller Rubber Co., The, com	..	75
Miller Rubber Co., The, 8% pfd	73	76
Mohawk Rubber Co., The	100	125
Phoenix Rubber Co., com	..	18
Phoenix Rubber Co., pfd	..	88
Portage Rubber Co., The, com	20	24
Portage Rubber Co., The, 7% pfd	30	35
Republic Rubber, com	¾	1
Republic Rubber, 7% pfd	14	16
Republic Rubber, 8% pfd	8	10
Rubber Products Co., The	..	100
Standard Tire Co., com	..	100
Standard Tire Co., pfd	..	90
Star Rubber Co., com	..	95
Star Rubber Co., 8% pfd	..	100
Swinehart T. & R., com	30	50
Swinehart T. & R., 7% pfd	..	70

NEW INCORPORATIONS

Barash Bros., March 30 (New York), $10,000. A., H., and S. Barash; L. Lerner—all of 116 Nassau street, New York City. To manufacture belting and elastic notions.

Ceylon Products Mfg. Co., Inc., April 14 (New York), $5,000. F. M. Dayton; H. Tresselt, both of 2122 La Fontaine avenue, Bronx, New York; C. Douglas, 272 Pacific avenue, Jersey City, New Jersey. To manufacture rubber products.

Cross Laboratories, Inc., March 24 (New York), $50,000. J. H. Sears; J. L. Watson, both of 37 Wall street, New York City; F. H. Butehorn, 764 St. Johns Place, Brooklyn—both in New York. To manufacture rubber cement, tires, etc.

Currie Brothers Co., April 19 (Delaware), $500,000. Corporation Service Co., Wilmington, Delaware. To manufacture tires.

Direct Rubber Co., March 15 (New Jersey), $500,000. J. J. Moriarty, 206 Conant street, Hillside; S. C. Clark, 1074 North avenue, Elizabeth; W. S. Chinery, 30 Nye street, Newark—all in New Jersey. Principal office, 46 Paterson street, New Brunswick, New Jersey. Agent in charge, J. P. Kirkpatrick. To manufacture, purchase and sell tires and tubes.

F. & L. Battery & Supply Co., April 12 (New Jersey), $100,000. R. Feldsher, 114 South Warren street; C. Fishberg, 475 Hamilton avenue; J. Lens, 11 Cooper street—all of Trenton, New Jersey. Principal office, Room 817, Broad Street Bank Building, Trenton, New Jersey. Agent in charge, Forman & Levy. To buy, sell, repair and manufacture automobile supplies and equipment.

Liberty Distributors, Inc., April 13 (Delaware), $100,000. H. G. Eastburn; W. F. Bouzarth; M. E. Doto—all of Wilmington, Delaware. To manufacture tires and tubes.

Middlesex Rubber Co., March 29 (Massachusetts), $50,000. G. E. Jeandheur, 1277 Commonwealth avenue, Boston; M. F. Culliney, 15 Olney street, Dorchester; H. M. Clifford, 51 Palmer street, Arlington—all in Massachusetts. Principal office, Reading, Massachusetts. To manufacture and sell all kinds of rubber goods.

Oppenheimer Trading Corp., April 12 (New York), $500. W. S. Dryfoos, 80 Woodland avenue, New Rochelle; I. B. Levine, 408 Greene avenue, Brooklyn; L. H. Axman, 1229 Park avenue, New York City—all in New York. To manufacture rubber, etc.

Perfection Tire Distributors, Inc., April 4 (New York), $25,000. B. Levy, 234 Pulaski street; C. Haas, 1320 53rd street—both in Brooklyn, New York. To manufacture tires.

Ray Puncture Proof Tire Co., March 14 (Illinois), $1,000,000. H. E. Henke, 205 West Harrison street; J. C. Le Due, 2415 Michigan avenue; G. H. Bryant, 410 South Michigan avenue; H. C. Rowe, 4401 Sheridan Road—all in Chicago; F. C. Huwen, Glen Ellyn, both in Illinois. Principal office, 322 South Michigan avenue, Chicago, Illinois. To manufacture tires.

Rochester Rubber Cement Corp., March 24 (New York), $10,000. G. A. Veomett, 565 Conkey avenue; J. T. Voll, 342 avenue D; F. E. Frey, 86 Stillson street—all of Rochester, New York. Principal office, Rochester, New York. To manufacture rubber cement.

Rubber Fusing Company of New England, Inc., March 28 (New York), $10,000. M. A. Newman, Sr. and Jr., both of 870 East 170th street; M. Ade, 1372 Gray street—both in Bronx, New York. To manufacture rubber tires.

Scottish Tire & Rubber Co., Inc., April 14 (New York), $200,000. J. J. Graham, 248 75th street; W. J. Gillespie, 30 Church street, both of Brooklyn; D. C. McHarg, 116 Nassau street, New York City—both in New York. To manufacture tires, etc.

Security Stopper Co., March 1 (Massachusetts), $50,000. H. P. Roberts; F. H. Mills; F. H. Rowe—all of 50 Congress street, Boston, Massachusetts. Principal office, Boston, Massachusetts. To manufacture and sell a newly invented detachable stopper composed of steel, nickel and rubber.

Solimine Sales Corp., April 6 (New York), $10,000. F. Vitale, 226 Greene avenue; D. Silverman, 110 Louisa street, both of Brooklyn; R. Blando, 20 Broad street, New York City—both in New York. To sell rubber goods.

Storer Rubber Co., April 8 (Massachusetts), $200,000. F. E. Storer, 26 Fellesway West; F. E. Barnes, 456 Medford street, both of Somerville; W. R. Storer, 118 Glenville avenue, Allston—both in Massachusetts. Principal office, Boston, Massachusetts. To deal in druggists' rubber goods, etc.

Synthoid Co., Inc., The, January 31 (Massachusetts), $50,000. T. L. Bronkhorst, president, 128 Oxford street, Cambridge; F. W. Smith, treasurer, 37 Warner street, Boston; A. V. Grimes, clerk, 51 Columbia street, Brookline—all in Massachusetts. Principal office, Boston, Massachusetts. To manufacture and deal in rubber, rubber cement, etc.

Tiretite Rubber Co., April 13 (Delaware), $100,000. Delaware Registration and Incorporators Co., Wilmington, Delaware. To manufacture and sell tubes, tires and casings.

Union Tire Co., March 7 (Indiana), $100,000. S. A. Deming, president; G. M. Medlam, vice-president; J. K. Redmond, secretary and treasurer. Principal office, 154 South Illinois street, Indianapolis, Indiana. To distribute tires and tubes.

RUBBER BUSINESS IMPROVING, SAYS COLONEL COLT

The following message of encouragement and confidence in the immediate future of the rubber industry, comes from Colonel Samuel P. Colt, chairman of the Board of Directors of the United States Rubber Co.

"Our company has every cause to be doubly proud of its record during the past twelve months. Notwithstanding the stringency of money and the tremendous fall in prices,—for instance crude rubber which receded from 55 cents to below 20 cents a pound, and cotton fabric prices cut in two—we have been able to meet all shrinkages from reserves previously provided and have further, out of the surplus earnings for the year 1920 set up another reserve of $6,000,000 to meet any contingency that may hereafter arise, not that we expect it will be needed, but in order to be on the safe side.

"Our earnings for the year 1920 showed about $10,000,000 over and above all dividend requirements and we have made our regular dividends of 8 per cent upon both preferred and common stocks. It is not that, however, that we feel so proud of, as the fact that every bill has been paid on the day it was due.

"Now it is always somewhat risky to predict as to the future, but I do feel satisfied that we have seen the worst of the depression and that from now on business is going to be on the mend—our business is on the mend in its various departments today. The tire trade, which during the blue days was predicted would never return, has almost reached normal, and I still believe and predict that the number of tires used in the year 1921 will be greater than in 1919 or 1920, or in any previous year in the history of the world, and our company is going to get its fair share of the tire business and, therefore, my message is one of encouragement and confidence in the future."

A WELL-KNOWN RUBBER RECLAIMER

CLARK W. HARRISON, president and treasurer of the Bloomingdale Rubber Co., New York, N. Y., was born in Glasgow, Missouri, in 1868. He received his education at Pritchett College, Glasgow, and Washington University, St. Louis, Missouri, graduating in 1888.

Underwood & Underwood, N. Y.

CLARK W. HARRISON

His first business connection was with the Shickle, Harrison & Howard Iron Co., St. Louis, Missouri, cast iron pipe founders. In 1891 he was made secretary and treasurer of the Howard, Harrison Iron Co., Bessemer, Alabama; in 1894, vice-president and manager of the South Pittsburg Pipe Works, Tennessee; in 1899, foreign sales manager of the United States Cast Iron Pipe & Foundry Co. with headquarters in London, England; in 1906, waterworks engineer in London, England, and in 1911 became identified with the rubber industry as treasurer and manager of the Bloomingdale Rubber Co., rubber reclaimers, New York, N. Y. In 1919 he was elected president in addition to the office of treasurer.

Mr. Harrison is a member of The Rubber Association of America, Inc., in which he holds the office of vice-chairman of the Reclaimers' Division. His clubs are the Engineers' Club, New York, N. Y., Wykagyl Golf Club, New Rochelle, N. Y., and Governors Island Club, New York, N. Y.

NEW YORK RUBBER INDUSTRIES INCREASE EMPLOYMENT

According to the Bureau of Statistics and Information of the New York State Industrial Commission, which has drawn its conclusion from reports by 1,648 firms with over 475,000 employes, more than one-third of the factory workers in the state, and a weekly pay-roll of over $12,500,000, the fur, leather and rubber goods group of industries shows a six per cent increase in working forces in February. Among the gains reported are five per cent in rubber goods, and three per cent in boots and shoes.

The percentage of change in the New York State rubber and gutta percha goods industry in employes from December, 1920, to January, 1921, was —9.2; from January, 1921, to February, 1921, was +4.9; in total wages from December, 1920, to January, 1921, was —15.8; from January, 1921, to February, 1921, was +0.9; in employes from January, 1920, to January, 1921, was —34.6; for February, 1920, to February, 1921, was —29.7; in total wages from January, 1920, to January, 1921, was —39.6; from February, 1920, to February, 1921, was —31.6. The ratio of February, 1921, to June, 1914, the latter as one hundred per cent basis shows employes 116 and total wages 234. The percentage of distribution of employes reported in February was 0.8.

THE RUBBER TRADE IN THE EAST AND SOUTH

By Our Regular Correspondent

NEW YORK

ALBERT V. W. TALLMAN, broker in crude rubber, etc., will occupy new offices at 35 Stone street, New York, N. Y., to which the business will be removed from 280 Broadway on May 1.

G. E. Habich, dealing in crude rubber, is now located at 24 Stone street, New York.

On May 1, Richard H. Toeplitz, dealer in crude rubber, will consolidate his business with the Crude Rubber Brokerage Co., Inc., 198 Broadway, conducting the business of both concerns under the name of the Crude Rubber Brokerage Co., Inc., with offices at 99 Water street, New York, N. Y.

J. Frank Dunbar Co., Inc., dealer in crude rubber, on April 18 moved from 82 Beaver street to 113-115 Broad street, New York, N. Y.

The Goodyear Tire & Rubber Co.'s eight-story and basement building located at the northeast corner of Jackson avenue and Honeywell street, Long Island City, was purchased by W. C. Durant for the use of the Durant Motor Co., of New York. The transaction is reported to have involved $2,000,000.

John S. Lamson & Bro., Inc., successor to Reese, Lamson & Buckley, Inc., importer and dealer in manganese, asphaltum, pitch, waxes and chemicals, and eastern and foreign selling agent for Robertson process "M-R" mineral rubber, formerly at 347 Madison avenue, expects to occupy its new offices at 100 John street, New York, on May 1. The entire building has been taken and the basement and first floor will be used for warehousing stock, including a number of items used by the rubber trade.

The Prospect Tire & Rubber Co., Inc., 735 Main street, Buffalo, New York, which was incorporated March 18, 1919, under the laws of Delaware, with a capital of $500,000, to manufacture cord tires and acquire property for the planting, cultivation and growing of rubber trees, has elected the following officers and directors for the current year: J. T. Barnes, president; J. H. Prendergast, vice-president; J. L. Rosenblatt, general manager and treasurer; F. E. Grubb, secretary; D. Rosenblatt, assistant treasurer; and H. Mathias, superintendent. For the time being, Prospect cord tires will be manufactured by reliable tire manufacturers, according to specifications and from equipment belonging to the company. Original intentions were to build a factory at Prospect, New York, but now the purchase of a factory in Buffalo is being considered.

The Master-Craft Fountain Pen Corporation was incorporated at Albany, New York, on February 8, 1921, with a capital stock of $250,000. The executive offices are at 59 Park Place, New York.

PENNSYLVANIA

The Hydro-United Tire Co., 10th street and Columbia Avenue, Philadelphia, Pennsylvania, manufacturers of the toronized tire, has increased its capital stock from $1,000,000 to $100,000,000.

The Link-Belt Building & Loan Association, capitalized at $2,000,000, has been incorporated under the laws of Pennsylvania by the employes of the Link-Belt Company, under the building association laws of the state and of the banking commissioner. It has the endorsement and support but is not a subsidiary of the Link-Belt Co., the management being entirely in the hands of the employees.

Meyer Davis has begun a trip of over 20,000 miles as the first representative of the H. H. Robertson Co., Pittsburgh, Pennsylvania, to visit Chinese, Japanese, Philippine and other

Far Eastern points. He sailed from San Francisco on April 8, for Honolulu.

SOUTHERN NOTES

The present officers of the Armorcord Rubber Co., Morgantown, West Virginia, are: J. H. McDermott, president; J. A. McLane, vice-president and F. M. Cain, secretary-treasurer.

H. Githens, general sales manager of the Federal Rubber Co., Cudahy, Wisconsin, is at the present time making a tour of Federal warehouses in the south and southwest.

KELLY-SPRINGFIELD'S NEW TIRE FACTORY

Increasing demands made it necessary for the Kelly-Springfield Tire Co. to choose a site for another plant in addition to that in Akron, and Cumberland, Maryland, was selected as the most advantageous spot. The plant was erected on property of more than one hundred acres along the Potomac River, about a mile from the heart of the city. The plant is served by three trunk line railroads, one of which skirts the property.

The property consists of power plant, pump house, machine shop, chemical building and the main factory building. The latter is two stories high with mezzanine and basement, and consists of a main wing 760 by 120 feet, to which is connected five wings, each being 405 by 60 feet, and each wing is connected to the other. The floor area is approximately 20 acres. The entire building and its foundations are of extra heavy construction and have been designed to carry additional stories. The machinery contained therein is of the most modern designs. The arrangement from the receipt of raw materials, through the various processes of manufacture to the shipping of finished goods is one continuous progressive movement, no back haul nor rehandling of any materials or goods in process is necessary.

The power plant is equipped with the most modern apparatus and has ready for operation six 750 horsepower boilers capable of developing a total of from 9,000 to 12,000 horsepower. All coal and ash are handled by automatic machinery, making labor unnecessary.

There are also installed and ready for operation mammoth turbines as well as condensers, motor generator sets, pumps and all other necessary apparatus for efficient operation. The circulating pumps are capable of pumping thirty million gallons of water each day. The electric current is carried into the main factory distributing stations by large copper bars through tunnels, and from there to the various sub-stations by lead cable.

The pump house contains a most complete equipment of modern standard and special pumps from a 500-gallon to a 6,000,000-gallon compound pump, together with accumulators, air compressors, tanks, etc. Water is taken from the river through seven-foot tunnels into a pit in the pump house; all construction is below the river bed.

The chemical building is about 300 feet long, 55 feet wide and the greater portion two stories high, and contains complete apparatus and equipment for every conceivable character of rubber industry experimental work. Two large general laboratory rooms are provided as well as a number of special rooms for research work. Complete equipment for experimental tire-making on full-sized scale is also installed in this building.

In addition to the buildings mentioned, a temporary hospital building is erected as well as a large fireproof garage and several smaller auxiliary buildings, all of the finest modern design and construction, and properly equipped for their purpose.

The entire plant is completely protected by automatic sprinkler system, fire hydrants, hose and necessary apparatus of this character. One and one-half years were consumed in building this plant.

A VETERAN IN RUBBER MANUFACTURE

Robert E. Hotchkiss, whose likeness is here shown, has a record of service that few can equal. Very briefly he lists his activities as follows: Born in 1849, the year the Naugatuck railroad was completed to Waterbury, Connecticut. He was with Goodyear's India Rubber Glove Manufacturing Co., Naugatuck, Connecticut, from boyhood until 1881, when he went to the Boston Rubber Co., Chelsea, Massachusetts, as superintendent. With this firm he remained until the end of 1894, including a few months during which he was transferred to the Granby Rubber Co., Granby, Canada.

Robert E. Hotchkiss

Poor health then led him into advisory and consulting work. In 1894 he returned to Goodyear's India Rubber Glove Manufacturing Co. in a clerical capacity for two years, followed by two years in the pay of the Liverpool Rubber Co., Limited, Liverpool, England, although actually employed only one year. Part of 1898 and 1899 he was with Augustus O. Bourne in Providence, Rhode Island, and part of 1899 and 1900 with George H. Hood in Boston, Massachusetts, engaged on special work pertaining to litigation, etc.

In 1900 he went abroad and remained eight years before returning to America. For four years he was with the Liverpool Rubber Co., Limited, Liverpool, England, followed by nearly two years with the North British Rubber Co., Limited, Edinburgh,

Plant of the Kelly-Springfield Tire Co., Cumberland, Maryland

Scotland, this latter connection having been established by an advertisement seen by Mr. Hotchkiss in The India Rubber World. He then went to the Norway Rubber Co., Mjondalen, Norway, as advisory superintendent, returning to the United States in September, 1908. He is now retired, living at Vineland, New Jersey, healthy, happy and as much interested in rubber as ever.

THE RUBBER TRADE IN NEW JERSEY

By Our Regular Correspondent

TRENTON NOTES

Trenton rubber manufacturers are greatly pleased with the outlook in the tire and mechanical goods trade, and report that the situation is gradually showing signs of improvement. The plants manufacturing tires have not yet reached capacity output, but the situation is regarded as much better than at the close of the year 1920. With many of the factories working on only part time, it is believed that the regular amount of buying during the past few months will eventually result in a tire shortage. This is one of the things that causes optimism among the tire manufacturers. The Essex Rubber Co., manufacturers of tubes and heels, has been running to capacity for several weeks. Company officials report that they have enough work on hand to last for some time.

C. Edward Murray, Jr., vice-president of the Empire Rubber & Tire Corporation, Trenton, in discussing the situation, said: "The tire industry has been under the influence of unfavorable circumstances for more than nine months past. There is a much better tone noticeable now, and the next two or three months will undoubtedly bring further improvement. Our tire and tube departments are running 70 per cent capacity."

John S. Broughton, president of the United & Globe Rubber Co., Trenton, says he believes the tire crisis has been reached, judging from the number of new orders his plant is receiving. The Thermoid, Ajax and Bergougnan companies also report an increase in business, with more men at work.

Judge Joseph L. Bodine, in the United States District Court at Trenton, has issued an order authorizing Arthur H. Wood and C. Edward Murray, Jr., as receivers for the Empire Rubber & Tire Corporation, to issue receivers' certificates in the sum of $300,000. The receivers were first authorized to borrow $50,000 on behalf of the company, and the court allowed $250,000 additional, to give sufficient funds to conduct the plant. The receivership was requested by the Big Bend Mining Co., of Philadelphia, Pennsylvania, who claimed that while the company is solvent, its obligations amount to more than its ready cash. The mining company alleged that the Empire company owed $12,710.35 for coal, of which $5,760.35 was for coal delivered during January and February last, and long overdue. The mining company also holds notes of the rubber company to the amount of $6,950. The complainant expressed unwillingness to start suit, as other companies were on the verge of suing the defendant company, which would result in a multiplicity of actions and the rubber company's business would thereby be destroyed.

The Empire rubber plant is appraised at over $2,000,000, and with merchandise and other assets of about $3,500,000, the business would eventually be put on a paying basis. The liabilities, excluding capital stock, were given as $1,500,000. The answer of the Empire company admitted all the charges in the bill of complaint. The decree of Judge Bodine, in naming the receivers, stated that the company was judged solvent, but had no funds to meet its obligations.

The Empire company, which is one of the largest and oldest companies of its kind in this section, was chartered under the laws of Virginia, and has its only factory in Trenton. The plant employs more than 1,000 hands when in full operation.

Edmund W. Craft and A. H. Greywacz, of the Thermoid Rubber Co., recently read papers on the rubber industry before the Engineers' Club of Trenton. Mr. Craft showed how the rubber was cultivated and prepared, while Mr. Greywacz gave technical features of the process of manufacture. Both papers were illustrated with lantern slides.

The Puritan Rubber Co., whose storehouse was destroyed by fire some time ago, has decided not to rebuild but to use another section of the plant for storage purposes. The Fineburg Rubber Co., whose plant near the Puritan works was also destroyed by fire, has decided not to rebuild at this time.

The Luzerne Rubber Co. has completed its new addition on Muirheid avenue, a two-story structure 60 by 60 feet, which is now in operation. The company has additional land in East Trenton for future plant extensions.

The Acme Rubber Manufacturing Co. has dropped temporarily the idea of enlarging its Trenton plant. Some time ago the company had plans drawn for a one-story addition, 90 by 300 feet, to be erected on East State street at a cost of $60,000. When the plans were completed and the contract awarded the slump hit the rubber industry and the Acme company decided not to rebuild until the business situation brightened somewhat.

The United Tire Co., Trenton, is the first tire company to announce a free tire service to motorists, no matter what make of tire they use.

The John E. Thropp Sons Co., Trenton, manufacturer of automobile tire molds and tire-making machinery, is erecting a new forge shop and other additions to the works. The company is now manufacturing a new tire-making machine designed for the manufacture of cord tires.

Some of the Trenton rubber establishments still employ women in the tire-making departments. During the war, when male help was at a premium, women were given jobs in the rubber plants to learn tire-making. At the close of the war some of the manufacturers laid off the women workers. One tire manufacturer states that there was no saving in hiring women, because it was necessary to hire either men or boys to assist them in the heavy work.

Joseph S. Papier, proprietor of the Papier Auto Supply Co., has been made the Trenton agent for Lee tires.

MISCELLANEOUS NEW JERSEY NOTES

The Sterling Tire Corporation, Rutherford, New Jersey, announces that in the future it will not sell its own products through the Rubber Corporation of America. The Sterling company reports a revival of business and the plant is now running about 70 per cent of its capacity. The plant is expected to be in full operation in a short time.

Papers in two suits against John P. Kilpatrick, appointed by the Court of Chancery last November as receiver of the Stanwood Rubber Co., an insolvent concern, have been filed in the county clerk's office at Elizabeth, New Jersey. One plaintiff, Edward Hutchins of Eau Claire, Wisconsin, alleges that he performed service as engineer and architect for the company's plant on the Newark-Elizabeth line. He avers that he was promised compensation at the rate of 7½ per cent of the total cost of all work accomplished, which amounted to $393,293.50 on November 22, the day the concern went into the hands of a receiver Mr. Hutchins claims compensation of $29,497.01, a portion of which has been paid, and he seeks $20,000 covering the remainder and interest. The Union County Trust Co. holds a $300,000 mortgage made by the rubber company, and claims that this is subject to the lien claim. The other plaintiff is the Gillette Rubber Co., who claims $75,000 for machinery and other equipment, for which no recompense has been received.

THE RUBBER TRADE IN RHODE ISLAND

By Our Regular Correspondent

May Day found little change in the industrial situation among the rubber manufacturing concerns of Rhode Island. And the same applies to textile concerns, whose products enter into tire manufacture. Several of the rubber plants are entirely closed, others are operating on shortened time schedules or with curtailed wage, or both, and few are receiving any volume of orders for production.

While the situation has been very discouraging for several months past, the immediate future does not seem to hold out any very roseate prospects. Although there have been announcements of an opening of some of the plants early in May, the outlook is not especially reassuring to either the manufacturers or the operatives. Some of the concerns that have been running their plants without material curtailment report that, while they are holding their own, they are not receiving many new orders.

Official announcement was made on April 18 that the Alice mill of the Woonsocket Rubber Co. would reopen on May 9, when the calender room resumes operations. The reopening, department by department, as customary, is expected to bring about resumption of work in the making room about May 13. This applies only to the Alice mill, no plans having been decided upon for the opening at that time of the Millville mill, which has been shut down since before Christmas. The Alice mill has been closed since February 19.

It was announced that production would probably be limited to from 60 to 75 per cent. At first a five-days-a-week schedule will be in force, and the number of employes will be reduced. It was stated at the mill that probably about 1,200 operatives would be put to work. In normal times the plant gives employment to about 1,800. The schedule of wages will be the same as was in effect at the time of closing on February 19.

Bristol's small army of unemployed took courage the day following the announcement at Woonsocket, when notice was given that, beginning May 9, the output was to be substantially increased in the Keds (shoe) division of the National India Rubber Co. It is also said that with additional orders, work in other departments of the plant will also be gradually increased. About 3,200 persons are now on the pay-roll of the National company, as against 4,600 during the rush periods of the war.

The following appointments and changes have been made at the factory of the National company during the past month: George Fleck, to be assistant foreman in charge of all rack system work, including machine lasting work and rack method in men's making department, and to assist Mr. Edmonds in the packing room: James McGovern, to be section foreman in charge of the stock room.

A contract has been awarded by the joint standing committee of the Woonsocket Fire Department to the Fabric Fire Hose Co., of New York, of 950 feet of hose at $1.25 per foot. The hose selected is double-jacketed and wax and gum treated. The same company submitted bids on other grades at $1.15 and $1.08. Other bidders were Bilateral Fire Hose Co., Eureka Fire Hose Co., Rubber Combination of America, C. C. C. Fire Hose Co., W. M. Farwell, American-LaFrance Fire Engine Co., and Combination Ladder Co.

The Manhasset Manufacturing Co., with main office at Providence, Rhode Island, manufacturer of tire fabrics and yarns, announce that Robert W. Boys has accepted the position of agent in Putnam, Connecticut.

ENGINEERING SCHOOL OF DRAWING

In rubber manufacturing practice there is constant need for trained engineering ability and facilities for the development of new ideas and inventions, designing new tools and machines, and otherwise perfecting equipment for production from an engineering standpoint. To provide facilities of this sort the Engineering School of Drawing has been established at 457 Main street, Springfield, Massachusetts, by William Roberts, who has specialized in such work, particularly in hard rubber and tires, as production and efficiency engineer.

THE RUBBER TRADE IN MASSACHUSETTS

By Our Regular Correspondent

A canvass of the rubber goods manufacturing situation in Massachusetts indicates that general business conditions have not improved as rapidly as had been expected at the beginning of the year. Since February there has been an increase in orders and a more confident feeling regarding the future. A marked improvement in most lines has been felt since April 1, and as jobbers' stocks are small, an increased volume is looked for in all lines. The belief seems to be general that if Congress promptly enacts an equitable and reasonably simple tax law and a tariff bill protecting American capital and labor against the low wages of Europe, business should gradually become normal and be on a much sounder basis than it has been for the past eight years.

Proofed fabric manufacturers report that business is gradually getting back to normal and some companies hope by autumn to be running practically to capacity. While conditions in the rubber heel, sole and molded goods trade are not yet normal, the outlook appears much brighter than it did two months ago. One company reports running on full time for eight weeks past with business showing a decided improvement. Winter rubber footwear is, of course, at a standstill with autumn orders coming in late and in decreased volume. Canvas footwear, however, has started very well. With dealers' stocks below normal and an unusually early spring, dealers are ordering briskly to replenish broken stocks. Tires are much less in demand than during the past few years, but with greatly increased activity in the automotive industry since April 1 a fairly good spring and summer tire business is anticipated.

MISCELLANEOUS MASSACHUSETTS NOTES

The newly elected officers of the Acushnet Process Co., Inc., New Bedford, Massachusetts, are as follows: Philip E. Young, president: John S. Lowman, vice-president; Lothar E. Weber, secretary and treasurer; Flora M. Stewart, assistant treasurer.

The Stedman Products Co., South Braintree, Massachusetts, has been organized as a subsidiary of the Monatiquot Rubber Works Co., maker of "Naturized" rubber, to market its sole, heel and flooring products.

The New England Tire & Rubber Co. has completed its new factory at Holyoke, Massachusetts, which has a capacity of 1,000 tires a day. The Boston agent for Holyoke cord tires, the City Rubber Co., 288 Columbus avenue, announces that the fire departments of Boston, Cambridge and Somerville are using these tires.

Frederick N. Hamerstrom, for the past two years vice-president and director of sales for the Essex Rubber Co., Trenton, New Jersey, has been appointed sales manager for the Converse Rubber Shoe Co., Malden, succeeding E. B. Pearson, who has been made manager of the finance department of the Converse company.

The window displays of Converse tire and footwear making which have been attracting attention in Boston recently formed one of the most interesting exhibits at the Malden Industrial Exposition, held under the auspices of the Malden Chamber of Commerce, an event in which some fifty different manufacturing firms were represented.

B. H. Pratt, general manager of the Federal Rubber Co., Cudahy, Wisconsin, has just completed a business tour of the New England states.

After a brief shut-down the Converse Rubber Shoe Co., Malden, Massachusetts, resumed operations on a five-day week April 1, and reports the demand for tennis lines of footwear considerably above normal.

BOSTON NOTES

The Rubber Proofing and Rubber Clothing Divisions of The Rubber Association of America, Inc., composed of representatives of plants throughout the country, held postponed annual business meetings, election of officers and a joint luncheon at the Copley-Plaza Hotel on March 30. In the morning, following a round-table discussion of business conditions, manufacturing and technical problems, the Proofing Division elected A. W. Warren, of the Hodgman Rubber Co., Tuckahoe, New York, as chairman, and J. T. Callahan, of the Archer Rubber Co., Milford, Massachusetts, as vice-chairman. At the meeting of the clothing division in the afternoon, N. Lincoln Greene, of the United States Rubber Co., Boston, was reelected chairman, and William H. Tenney, of the Clifton Manufacturing Co., Boston, as vice-chairman.

All of the district managers for the Grow Tire Co., Canton Junction, Massachusetts, in the larger New England cities were recently guests of the company at a dinner in the Copley Square Hotel, Boston, about fifty persons being present. It was given primarily to celebrate the inception of the Grow tire idea five years ago. In his address, George Grow, president of the company, stated his belief that the company's business would be larger this year than last. The factory is now running two shifts, a day and a night force with orders booked to insure operation at capacity for many months. He also announced that the factory will be enlarged immediately to make available some 16,500 feet of floor space for manufacturing purposes.

GENERAL MANAGER OF THE WILSON RUBBER CO.

Fred J. Wilson, whose long and comprehensive experience in rubber goods manufacture is responsible for the remarkable success of the Wilson Rubber Co., Canton, Ohio, was born in Galion, Ohio, in 1877 and educated in the public schools of Akron, Ohio.

Fred J. Wilson

His first employment was with The B. F. Goodrich Co., where he was foreman of the molded goods department for eight years, going in 1903 to the Republic Rubber Co., Youngstown, Ohio, for one year. In 1904 he went as foreman to the Canton Rubber Co., Canton, Ohio, with which firm he remained until July, 1916, except for one year with the Faultless Rubber Co., Ashland, Ohio, in charge of molded goods. His return to the Canton Rubber Co. was as superintendent, and in July, 1916, he organized the Wilson Rubber Co., of which he was elected vice-president and general manager, which position he now holds.

Under Mr. Wilson's management the company has become the largest exclusive rubber glove manufacturing concern in the country, and a large three-story plant extension to increase production is nearing completion.

Mr. Wilson is a member of The Rubber Association of America, Inc., the Rotary Club, Adcraft Club and the Canton Transportation Club.

THE RUBBER TRADE IN OHIO

By Our Regular Correspondent

AKRON NOTES

The situation in the retail tire business was brought out at a recent meeting of one of the larger companies in Akron at which discussion of trade and sales methods gradually developed the facts in the new situation.

The retail sale of tires has undergone a revolution during the past three years which has placed tires in country blacksmith shops, country drug stores and general stores in addition to the garages and dealers to which the retail trade was confined previous to the war. Men who have sold tires from three to fifteen years, many of them actual pioneers in the business, assert that previous to the war the tire dealers were closely connected with the automotive industry and that tire salesmen seldom met men selling tires on the road. Today, however, it is not unusual for a man to walk into a small town tire dealer's place of business in the afternoon and find that no less than eight or ten men have been in to see the dealer during the early part of the day. Lines as to who shall handle tires have completely broken down. The general storekeeper, the drug store, and in some instances even banks have become tire agencies, and the result has been that the shoddy tire which was formerly kept out of the market because the men who dealt in tires had reputations to work up or maintain have now become one of the "staple" lines sold in many small communities.

Many of the small tire companies which were organized primarily for stock selling purposes have actually entered production to some extent, and knowing that they do not intend to stay in the business for any length of time have made every effort to sell their inferior product. The old-time dealers, of course, refused to take on the agencies for their product, knowing good tires and the necessity of giving automobile owners the value of their money, and the salesmen of this class of goods worked upon the desire for profits, regardless of service, of many of the merchants of small towns, and succeeded in having them take over the sale of their product.

The Akron Chamber of Commerce has entered a free balloon, "The City of Akron," in the national balloon races to start from Birmingham, Alabama, May 21. W. T. Van Orman, well-known Akron flyer, and Willard Seiberling will be in the cage of the Akron car. The balloon was built for the national races in 1918 when it was flown for the Akron flying club. Every Akron balloon flown in national meets, with the exception of one, has taken either first or third places and the Akron balloon which won the national race in 1914 also won the international race. Ralph Upson, formerly with The Goodyear Tire & Rubber Co., flew the international winner.

W. W. Hall, traffic commissioner of the Chamber of Commerce, recently placed in charge of the Akron bureau of the United States Department of Commerce, is making wide plans to have the smaller Akron manufacturing companies of all lines, including the rubber factories, represented at the International Foreign Trade Convention in Cleveland, Ohio, May 4 to 7. The larger companies will be represented by their foreign department managers and assistants, but heretofore the smaller companies have paid little attention to export business, feeling that they are able to sell their product in this country.

The Akron Home Owners' Investment Co., formed by the rubber men and other manufacturers of Akron two years ago to help solve the housing shortage and obtain homes for families who had saved some money, but were unable to finance their home building desires through banks and building and loan associations, has closed its business after building 450 homes. The company has received several bids for the collection business which alone remains and indications are that before another month the company will be entirely out of business. H. S. Firestone, president of the

Firestone Tire & Rubber Co., was president of the company. Stock holdings amounted to more than $2,500,000, and the money will be refunded to the stockholders as rapidly as payments are collected from the owners of the homes.

More than sixty Akron business men, representing every line of industry, with a good number of rubber men, made the first trade extension trip to the communities west of Akron on April 14. The delegation went on a special train to five small towns, the farthest away being 68 miles west of the city. J. B. Huber, president of the Chamber of Commerce, originated the idea. Crannell Morgan, of the Hardware & Supply Co., was chairman of the committee which made arrangements for the trip.

When delays in collecting taxes made it impossible to compel payment in March, The B. F. Goodrich Co. was one of the large companies which responded to appeals for assistance by paying taxes amounting to almost one-quarter of a million dollars, when under the law payment could have been deferred until June. The officials of the company, however, were shown the dire need in which the city and county would find itself if the large taxpayers held up their payments any longer and responded quickly.

Lee R. Miller, who with his brother Harvey and Jacob Pfeiffer, organized The Miller Rubber Co. 26 years ago, has organized a new company with a capital of $50,000 to manufacture surgical rubber gloves at Cuyahoga Falls, Ohio. The new corporation is known as the Surgeon Rubber Glove Co. Plans regarding building and production have not yet been announced, but the new company is being watched with interest by rubber men who wonder whether the future will see the $50,000 company expand into another Miller plant within the next few years. Mr. Miller was instrumental in starting production of the standard rubber glove by the Miller company. Recently this department was sold to a Cleveland concern. Associated with Mr. Miller in the new project are H. C. Osborne, C. N. Snook, J. P. Carney and L. J. Miller.

The Mason Tire & Rubber Co. has paid in common and preferred dividends more than $1,000,000 since its organization in 1915, according to official announcement by the company, accompanying declaration of the regular quarterly dividend on the preferred stock on April 1.

H. G. Wilson, formerly editor of the *Goodyear Tire News*, is now connected with the *Firestone Non-Skid*. The *Goodyear Tire News* has been temporarily discontinued.

W. T. Behoteguy, for the past ten years manager of The Goodyear Tire & Rubber Co.'s automobile tire sales, has been placed in charge of company tire sales, to succeed W. G. Palmer, who has retired because of ill health. Mr. Behoteguy is succeeded by Fred L. Morgan, who for the past ten years has been in charge of the Cleveland branch of the company sales department. C. W. Santee has been placed in charge of the reorganized sales department of The Goodyear Tire & Rubber Co. Under Mr. Santee will be R. W. Clark, sales promotion department manager; W. H. Sorn, service department manager; P. R. Baugh, dealer development manager; H. H. Tolman, government sales division manager; C. A. Reed, manager of stock clearance division, and A. R. Kooh, who will continue to lecture on farm field work.

L. M. Barton, who resigned from the publicity department of The B. F. Goodrich Co. a year ago, has been named sales manager of the Republic Tire & Rubber Co., of Youngstown and Canton, Ohio.

The affairs of the Interlocking Tire & Rubber Co., which recently ended disastrously in a receivership, remain in the same condition in which they were reported a month ago. The stockholders, working through a committee, have raised $50,000 to take over the operation of the plant, but thus far neither the receiver nor the court under which he is holding the company property have felt it wise to turn the plant over to the stockholders' committee. Meetings are being held weekly with the view of placing the company back on its feet financially.

With the increased interest shown by Akron manufacturers in foreign trade, the remarks of Bertram G. Work, president of The B. F. Goodrich Co., upon his return from his annual visit to Germany and France, were of even greater importance this year than heretofore. In Germany the industrial conditions and food supply have shown improvement over the past year and the spirit of the people has changed for the better, Mr. Work said. Prices of meat remain very high in Germany, although supplies were sufficiently large to warrant the abrogation of the meat restriction last November. From the social standpoint France has improved, Mr. Work said, but business is bad. The motor industry has been hard hit. With gasoline at 80 cents a gallon, economy can naturally be expected. But the last two months have shown signs of improvement. Bankers reflect this better condition of business.

The mute colony of Akron, which at the peak contained 3,000 men and women, has practically disappeared. With the general lay-off of men the mutes returned to their homes. They expressed the desire, however, to return to Akron when business conditions made it possible to obtain work. The mutes were found to be very skillful and efficient workers.

The Board of Education has honored the Seiberling family for its loyalty to Akron and interest in public questions by naming the $1,000,000 high school building to be erected in Goodyear Heights, the company home site allotment, for the Seiberling family. Bonds for the school have been sold. The land upon which the school is to be built was donated by F. A. Seiberling, president of the Goodyear Tire & Rubber Co. The plans for the building are along lines approved by Mr. Seiberling and the building will be one of the most modern in the country.

Two men were killed and four others injured in an explosion at The Miller Rubber Co. cement house April 12. The cause of the explosion has not been determined, although William Pfeiffer, secretary and treasurer of the company, has made a personal investigation. The explosion broke hundreds of windows in the main plant, but the general material damage was small.

Plans for building a manor house on the Portage Country Club grounds, to replace the club house partially destroyed by fire two months ago, have been completed. The total cost of the buildings has not been announced. The former club house was the center of much of the social activity of the rubber men in Akron.

W. W. Hall, foreign trade director of the Chamber of Commerce, and E. E. Titus, export manager of The B. F. Goodrich Co., a member of the Chamber's foreign trade committee, have been honored by important appointments at the International Trade Conference to be held in Cleveland, Ohio, May 4 to 7. Mr. Titus has been named a member of the special advisory committee which is to assist beginners in the export field, and Mr Hall has been named secretary of the motion picture group, which will study motion pictures in connection with foreign trade development.

At the recent annual stockholders' meeting of The India Tire & Rubber Co., Akron, the same officers were reelected. They are: J. M. Aldefer, president; J. K. William, vice-president; D. A. Grubb, secretary and P. C. Searless, treasurer.

The Mohawk Rubber Company, Akron, manufacture a complete line of odd size casings and tubes, as follows:

31x3½	N. S. Cl.	37x4½	N. S. S. S. and Q. D.
34x3½	N. S. S. S. and Q. D.	36x5	N. S. Q. D. and Cl.
35x4	N. S. S. S. and Q. D.	36x5½	N. S. Cl.
36x4	N. S. S. S. and Q. D.	37x5½	N. S. Q. D.
		38x5½	N. S. Q. D.

NEW HOME FOR AKRON ADVERTISING AGENCY CO.

The Akron Advertising Agency Co. has acquired its own building at 115 South Union street, in the residential section of Akron. Improved business and staff additions necessitated removal into larger quarters. When built this residence was the finest and

largest in the city. It is surrounded by spacious lawns and well-kept shrubbery. The old-fashioned building with large, high-ceilinged rooms and numerous windows necessitated few alterations to fulfill the purposes of the new tenants.

The private office of the president, Gordon Cook, the space buyer's office and the administrative and production offices, including accounting, mechanical, checking, filing and forwarding departments, are located on the first floor. The entire second floor is occupied by the creative branches of the agency's work, including the private office of vice-president Edward S. Babcox, and the service and copy departments, and each account supervisor has his own private office. The art director and his staff take advantage of the exceptionally good lighting on the third floor.

Being close to the activities of the city, yet away from the noise and distractions of a busy office building, the new quarters are particularly well adapted to the needs of the agency, tending to still greater improve the service rendered clients.

CLEVELAND

Otis Cook, formerly sales manager of the Kelly-Springfield Tire Co., has acquired an interest in the Howe Rubber Co., New Brunswick, New Jersey. McCook was elected vice-president and general sales manager of the company on April 19 and will have his headquarters in Cleveland. Associated with him will be H. H. Grobe, formerly of the Kelly-Springfield sales organization.

The Automotive Industry Convention will be held in Cleveland May 4—7 inclusive. The program for this Eighth National Foreign Trade Convention has been outlined and is quite constructive in its scope. The general theme is "American Foreign Trade and Its Present Problems."

The Columbia Products Co., agricultural and industrial chemicals, including whiting for the rubber trade, has removed from 1012 National City Building to 623 Union Building, 1836 Euclid avenue, Cleveland.

MISCELLANEOUS OHIO NOTES

L. M. Barton, who has been appointed manager of pneumatic tire sales of The Republic Rubber Co., Youngstown, came to the company in 1920, after five years with The B. F. Goodrich Co., Akron, first as a member of the advertising staff, then for several years as special representative of the executive committee. In 1919, he took charge of the dealers' specialization department of the Goodrich company's tire sales division. Having spent five years as an automobile, accessory and tire distributer in Iowa, he has a wide acquaintance among the automotive trade throughout the Middle West.

E. F. Jones has resigned as president of The Republic Rubber Co., Youngstown. He was with the Republic for a little over a year, coming to them from Worcester, Massachusetts, where he was an officer in the Morgan Wire & Spring Co., to which he has now returned. Until his successor is appointed William Wilms, chairman of the board of directors, will assume the management of the Republic company.

The Wooster Rubber Co., Wooster, Ohio, manufactures exclusively "Artcraft" toy balloons, from small airweight sizes up to its famous "Giant," which inflates to 50 inches in diameter, all in assorted colors. It also manufactures the popular airship balloons in assorted colors and in all sizes and weights.

The Ashland Tire & Rubber Co., Ashland, Ohio, has built its factory consisting of a main building, powerhouse, reclaiming plant and a transformer house. The main building is 200 by 125 feet, one floor and basement, with a floor space of 45,000 square feet. The buildings are modernly equipped throughout and the factory has a capacity of 1,000 tires and 1,500 tubes per day. Operations were commenced February 24 and the approximate production is 300 tires per day. The company manufactures high-grade cord and fabric tires; also a special brand tire. Since commencing operations sales connections have been made in all the principal cities of the East and Middle West.

At the second annual meeting of the stockholders, the following directors were elected: George Hildebrand, Judge F. N. Patterson, F. L. Fickel, G. C. Weyher, A. A. Fickel, W. H. Roberts, T. T. Elliott, and H. C. Bate. At the directors' meeting following the same, officers were elected, as follows: Jacob Fickel, president; G. C. Weyher, vice-president; A. A. Fickel, secretary and treasurer; W. H. Roberts, second vice-president; T. T. Elliott, assistant treasurer; H. C. Bate, assistant secretary.

The Barr Rubber Products Co., Lorain, manufacturers of high grade toy balloons having absolutely fast colors, states that its factory has been running continually for the past year, at no time having been closed down.

Francis Gaskins has been appointed general manager of The Avon Tire & Supply Co., Cincinnati, which claims to be the largest company of its kind in the state. Because of his proven ability as an executive and his success in handling men, Mr. Gaskins was chosen for this position.

J. C. Kearns has been appointed acting sales manager of The Republic Rubber Co., Youngstown, to fill the vacancy made by the resignation of H. J. Woodward, vice-president, in charge of sales, Mr. Kearns is one of the oldest employes of the company, starting in the sales department in 1907, then New York traveling salesman; manager of the Boston branch, and after three years' service was given the more important post of manager of the Detroit branch.

J. C. Kearns

In 1914 Mr. Kearns was made traveling auditor and occupied this position until 1916, when he was called to Youngstown and made assistant manager of mechanical goods sales. In December of last year he was further advanced to manager of mechanical goods sales department and following his appointment last week as acting sales manager he now becomes head of the entire Republic sales organization.

Mr. Kearns was born and has spent much of his life in Youngstown where he has made a wide circle of friends. Through his years of service with The Republic Rubber Corporation he has doubtless carried the name "Youngstown, Ohio" into more places throughout the United States than has any other salesman calling Youngstown his home.

EVERY MOTOR A TUBE VULCANIZER

The B. F. Goodrich Co., makes the surprising announcement that every automobile carries an excellent tube vulcanizer, which has been proven by ingenious motorists, who, when miles away from anywhere, find a tube in need of patching. The hot radiator is a very satisfactory vulcanizer for inner tubes, and can be used to advantage. A little vulcanizing cement is smeared on the rubber patch and around the hole in the tube and then the two are put together, placed patch downward on the radiator and held firmly with the pressure of the hand until the rubber is cured. If no vulcanizing cement is at hand a little tube rubber dissolved in gasoline may be used as a substitute.

PRESIDENT OF THE MASON TIRE & RUBBER CO.

Owen Merideth Mason, president of The Mason Tire & Rubber Co., Kent, Ohio, and also president of The Mason Rubber Plantations Co., was born in Carrollton, Kentucky, and received his education in the public schools of Des Moines, Iowa.

Owen M. Mason

His first venture into business was as a bond salesman in Chicago, Illinois. In 1915, with the assistance of his brother, D. M. Mason, treasurer and general manager of The Mason Tire & Rubber Co., Kent, Ohio, he organized the investment security house of Mason Brothers in Cleveland, Ohio, following this by the organization of The Mason Tire & Rubber Co., The Mason Cotton Fabrics Co. (since absorbed by the tire company) and The Mason Rubber Plantations Co.

During the past year he visited Singapore in the interests of The Mason Rubber Plantations Co.

Mr. Mason is a director in The Mason Tire & Rubber Co., director in The Mason Rubber Plantations Co., and a member of the firm of Mason Bros., Cleveland, Ohio.

He is a member of the Masonic Lodge, Cleveland, Ohio, Chamber of Commerce, Kent Board of Trade, and Willowick Country Club, Wickliffe, Ohio.

UNDERWRITERS' LABORATORIES TEST

The Underwriters' Laboratories, 207 East Ohio Street, Chicago, Illinois, chemically tests the rubber lining of fire hose and rubber-covered wire to show the grade of material used, and also conducts from 300 to 500 physical tests a month, including tensile, elongation, and recovery. These are mainly counter-checks on the work of the Laboratories' inspecting engineers at factories. Samples are obtained on the market, from factories, and in the field from lots of wire and hose bearing Underwriters' Laboratories serially numbered labels.

Testing Rubber at the Underwriters' Laboratories

In the illustration at the right muffle-furnaces may be seen for determining the ash in rubber-lined fire hose and rubber-covered wire. In a compartment below each furnace the hot junction of a thermo couple is available for measuring and controlling the temperature at which the test is conducted. The cold end of the couples is connected to an automatic recording pyrometer mounted in an adjoining room. The chemist at the left is separating some of the ingredients of a rubber compound, while the one in the center is conducting a fusion in a silver crucible, to determine the percentage of sulphur in rubber.

THE RUBBER TRADE IN THE MID-WEST

By Our Regular Correspondent

THE MID-WEST RUBBER MANUFACTURERS' ASSOCIATION

The Mid-West Rubber Manufacturers' Association held a luncheon at the Chicago Athletic Association, April 12, 1921, presided over by President D. M. Mason. Forty-four members attended. The "get together spirit" was a feature of the meeting. President Mason read telegrams of regrets of absence from members unable to attend. Some of the associate members made interesting talks and furnished some valuable forecasts of business trend.

Frederick Merritt, of the *India Rubber Review,* gave the last minute rubber news.

W. L. Burgess, of the Surety Tire & Rubber Co., St. Louis, Missouri, stated that although in the far southwest, trade improvement is not very large, the St. Louis district shows a splendid increase and his factory is operating four nights a week overtime.

Paul Bloom of Fred Stern & Co., Chicago, Illinois, said rubber is going up a little in price and a firmer market is expected by May 1.

Edward T. Meyer of F. R. Henderson & Co., New York, New York, advised that imports of rubber will increase in April, that rubber in New York was in strong hands which stimulates the market and dealers in both Singapore and New York are holding their stocks.

C. F. H. Johnson of Brighton Mills, Passaic, New Jersey, stated that mill shipments of fabrics were increasing and demand becoming greater.

W. F. Harrah, of the National-Standard Co., Niles, Michigan, is of the opinion that the tide of business is improving and that we are on the threshold of extraordinary prosperity.

The directors' meeting was well attended and many important matters discussed. After May 1, the association offices will be Nos. 1534 and 1535, on the fifteenth floor of the McCormick Building, 332 South Michigan avenue, Chicago, Illinois.

The next regular monthly meeting of the Mid-West Rubber Manufacturers' Association will be held at the Chicago Athletic Association, 12 South Michigan avenue, Chicago, Illinois, on Tuesday, May 10, 1921.

MISCELLANEOUS MIDWESTERN NOTES

The Federal Rubber Co., Cudahy, Wisconsin, announces that production has gone steadily forward and since April 1 all departments have been actively engaged five days a week. A. A. Frank, factory manager, has informed the workers that under the present rate of increase of production a full time week will shortly be had throughout the entire plant.

Arthur E. Swanson, formerly of the Firestone Tire & Rubber Co., Akron, has associated himself with A. W. T. Ogilvie, Chicago, in the Swanson Ogilvie Co., 1545 First National Bank Building, Chicago, industrial engineers. This organization expects to specialize to a considerable extent in the rubber industry because of Mr. Swanson's special experience in that field. A branch office has also been opened in Akron, Ohio.

The Security Rubber & Belting Co., 2837 South La Salle street, Chicago, has been organized by Harry E. Dennie and James W. Mowrey, formerly of the Imperial Belting Co., to handle a complete line of mechanical rubber goods. Mr. Dennie

has been connected with the rubber and belting industries for 25 years and Mr. Mowrey for about 20 years, while both are very well known among jobbers and dealers throughout the country. With the intention to handle only quality products and backed by years of experience, they are hopeful of quickly establishing a reputation for their products.

J. C. Finck Mineral Milling Co. and the Nulsen Corporation are consolidated under the name "National Pigments & Chemical Co." with headquarters at Levee and Sydney streets, St. Louis, Missouri.

R. W. Smith was recently elected secretary of the Milwaukee Tire Dealers' Association, 142 Oneida street, Milwaukee, Wisconsin.

The Wildman Rubber Co., Bay City, Michigan, advises that they will let the contract for their new factory at Bay City within the next thirty days. The main structure will be 365 by 160 feet, three stories and basement, of reinforced concrete construction. The total cost, including power plant and office building, will be approximately $1,250,000. All the excavating and the concrete footers have been completed. The company hopes to have the new plant in operation the latter part of September.

The Hawkeye Tire & Rubber Co., Des Moines, Iowa, announce the officers of their company as follows: J. T. Christie, president and treasurer, and John Frederick, vice-president.

The American Insulated Wire & Cable Co., 954 West 21st street, Chicago, Illinois, are preparing plans to remodel a one-story plant, 198 by 200 feet, at the northeast corner of 22nd and Fisk streets, to cost $100,000. The equipment will involve an outlay of $200,000.

The Jefferson Rubber Co., Jefferson, Wisconsin, made the first shipment of tires and tubes from its new factory about the middle of March and is now in position to make daily deliveries of 125 tires, including both cord and fabric, and of 300 red and gray tubes. The company reports a good volume of future business booked and hopes the rubber industry generally "will be as bothered with business" as it is.

THE RUBBER TRADE ON THE PACIFIC COAST

By Our Regular Correspondent

A cheerful tone is heard among the rubber manufacturers and the larger distributers of rubber goods on the Pacific Coast, and preparations are being made for a brisk spring business and probably a lively trade during the remainder of the year. The buyers' strike did not perceptibly affect far west makers and dealers in rubber goods. If trade halted, it was rather because dealers were temporarily overstocked than because retail purchasers were delaying orders in the hope of effecting a price drop. Generally speaking, prices on rubber goods have not been much above pre-war prices, despite increased costs of production. Goods for which there is reported an especially increased inquiry include hose, belting, cement, matting, packing, tires and tubes.

The spring trade has been coming along strong and the industry is fast nearing normalcy. Factory extensions temporarily postponed are now being actively undertaken, and the number of unemployed rubber workers is rapidly decreasing. With returning activity in the industry, several new rubber companies have recently been organized, and projects long dormant are being revived.

SAN FRANCISCO AND VICINITY

George S. Towne, vice-president and general manager of the Pioneer Rubber Mills, Pittsburg, Contra Costa County, California, has been in the southern part of the state studying conditions, which are said to be uncommonly good, so far as the Pioneer Mills are concerned. Full time and much overtime in some departments has been the rule all winter at the Pioneer works. The company has just completed a full-molded hose unit and is planning to add other sections in the future.

J. D. Pasha, who has been in the tire business ten years and was for four years general sales manager of The Portage Rubber Co., Barberton, Ohio, has been appointed general sales manager of the new Coast Tire & Rubber Co., Oakland, California. The factory has established a sales force in all the west coast states, and its first unit is prepared to turn out 1,500 tires and 2,000 tubes daily.

Ray Willis, for three years sales manager in the Southern States for the Hood Tire Co., Watertown, Massachusetts, has succeeded L. B. Tichenor as district manager for the Hood concern in San Francisco. He has already begun to increase the sales force.

The California Rubber Co., a new $5,000,000 corporation, will build the first unit of its plant at Alameda where tires, tubes, and other rubber goods will be manufactured and 700 men employed on an eight-hour shift.

LOS ANGELES AND VICINITY

That The Goodyear Tire & Rubber Company of California has 7,907 accredited service stations in twelve western states, and that up to the beginning of its present fiscal year it had sold 493,000 tires of all kinds and 495,000 tubes, was some of the information imparted by A. F. Osterloh, vice-president and general manager, at the second annual meeting of the stockholders, held on March 3. He stated that the company was then producing 700 tires a day, but felt sure that with improving business conditions the output would be increased to 1,000 tires a day in April. Mr. Osterloh stated that the combined business of the Akron and the California companies for January, 1921, was $9,000,000. The company wrote off an inventory loss of $600,000 representing depreciated values of raw materials, paid $400,000 in dividends, and yet showed a deficit of but $28,000 for the year.

The Goodyear stockholders elected as directors: J. E. Jardine, H. H. Fair, L. A. Phillips, F. A. Seiberling, A. F. Osterloh, C. C. Slusser, W. A. M. Vaughan, J. R. Reilly and J. S. Willaman. The directors chose these officers: F. A. Seiberling, president; A. F. Osterloh, vice-president and general manager; W. A. M. Vaughan, secretary and treasurer; D. J. Koonce, assistant treasurer.

After ten years' connection with The B. F. Goodrich Rubber Co. in San Francisco and twenty-seven years' experience in the rubber trade, Robert J. McNeilly, one of the best-known rubber men on the coast, has been promoted to the post of branch manager for the company in Los Angeles with a territory including all of southern California south of Mt. Tehachepi, all of Arizona, and the western part of New Mexico. For the same company and territory Frank L. Ryan, formerly manager of the Goodrich Sacramento branch, has been appointed tire sales manager. The company does a large business in pneumatic and solid tires and a wide variety of mechanical rubber goods in the Southwest, and its branches will deal wholly with wholesale buyers.

H. A. Farr, assistant to J. B. Brady, manager of the western division of the United States Rubber Co., and who is head of the company's tire division on the coast, has been visiting J. B. Magee, manager of the company's southern California and Arizona branches, in Los Angeles. Mr. Farr and Mr. Magee have been studying conditions in southern California and Arizona and they declare that the trade prospects are very encouraging. Especially notable is a steadily

growing depletion of accumulated tire stocks in the Southwest.

W. V. Goar, who occupied a similar position in Seattle for the Pennsylvania Rubber Co., Jeannette, Pennsylvania, has been promoted to take charge of sales at the Los Angeles branch, 950 South Main street, succeeding H. C. Edelman, resigned. F. J. Ritchie is office manager. The branch will specialize in vacuum non-skid tires.

Brimfield & Ashton, formerly of Egg Harbor City, New Jersey, have bought the business of the Voight Rubber Co., 722 East Colorado street, Pasadena, and under the name of the Ashton Rubber Co. will specialize in Fisk tires and tubes.

"A decidedly improving tendency in trade," is reported by Nelson & Price, 1056 South Olive street, one of the largest tire distributers in Los Angeles. Mr. Price is president of the Los Angeles Tire Dealers' Association.

F. C. Howland, 6680 Hollywood Boulevard, Hollywood, one of the pioneer tire dealers in that section of Los Angeles, has taken the agency for Hartford tires.

The Westport Tire Co., large dealers in tires and tubes, has removed from San Francisco to Los Angeles.

C. R. Prentice, formerly secretary of the West American Rubber Co., has started the Cushion Pedal Co., and will deal in rubber automatic accessories.

Guasti, House & Giulii have been appointed sole truck tire distributers for Los Angeles, including Hollywood, by the Kelly-Springfield Tire Co.

Thermoid tires and tubes will be distributed by the Maxon Tire Co. in its new quarters at Main and South Tenth streets, Los Angeles.

The Mechanical Rubber Co., 5411 South Hoover street, Los Angeles, specializes in patented novelties and experimental work, making rubber heels and soles, plumbers' supplies, and various kinds of mechanical rubber goods. The active factors are Thomas J. Hill, president; T. Kirk Hill, secretary, and W. P. Heickert.

Lee tires will be handled in Los Angeles by E. Bruce Conlee in cooperation with Chanslor & Lyon, which firm has had the agency for several years.

A new monthly shipping service between Los Angeles and the Orient, touching at Singapore and Javanese ports, has just been started.

The Elaterite Varnish & Rubber Co., 55th and Alameda streets, Los Angeles, maker of elaterite mineral rubber, which is sold to rubber manufacturers in the East and Mid-West, is a California corporation with $2,500,000 capital. C. H. Judd is president; John B. Brokaw, vice-president; and D. H. McDonald, secretary and general manager.

Fay A. Bates, a Los Angeles tire worker in the Goodyear plant, recently broke all records, it is claimed, for finishing tires, having completed 112 double-molded clincher tires in eight hours.

Operations have begun in the new plant of the West Coast Asbestos Co. at Downey, California, that was started last fall. Associated with the original promoters, E. M. and W. G. Smith, rubber manufacturers of Los Angeles, is the United States Asbestos Co. of Manheim, Pennsylvania, one of the largest producers of asbestos goods in America. The capital stock will be increased to $600,000 and the originally planned output doubled. Asbestos-rubber belting, high-pressure packing, brake linings, gaskets, valve-stem packings, etc., will be manufactured. The spinning and weaving mill will consume 8,000 pounds of asbestos yarn daily, the raw material being brought from Canada, Arizona, and Southern California. It is said to be the only asbestos mill west of Chicago.

F. C. Harris, formerly of the San Francisco branch of the Kelly-Springfield Tire Co., has been appointed manager of the Los Angeles branch, succeeding G. J. Brooks, who has been put in charge of the San Francisco branch.

It is rumored that a large Ohio rubber concern will soon establish a factory on an 88-acre tract adjoining the Southern Pacific Railway between Glendale and Burbank. It is stated that a tire factory will be erected first, then a rubber reclaiming plant, and finally a fabric mill.

NORTHWESTERN NOTES

O. O. Gooch, for seven years a representative of the United States Rubber Co. in Portland, Oregon, has been appointed sales manager for the Oregon territory by the Howell-Swift Tire Co., makers of Mystic tires.

To serve its steadily growing trade, the Puritan Rubber Co., of Yakima, Washington, is planning to establish a chain of eight factory units on the Pacific Coast.

CANADIAN NOTES

The annual financial statement of the Ames Holden McCready Co., Limited, for the year 1920, includes tire sales of $224,313; felt sales $151,194, and shoe sales $6,514,552. Sales of shoes for the previous year were $6,658,263. The figures showed a deficit of $46,542 on tires, $7,227 on felts, and $639,836 on shoes. The felt plant was not in operation until August last, although sufficient orders were on the books to keep the plant in full operation up to that time. Orders filled during the last months of the year showed insufficient profit to provide for a surplus, as stated. The report states that the mild winter was not conducive to good buying, but that the demand was showing up well.

After all deductions, the net loss in 1920, and three quarterly preferred dividends, the deficit for the year totaled $639,836, against a surplus of $176,150 in the previous statement, and $323,322 in 1918-1919. The position as to working capital was reduced to $551,513, a decline in the year of approximately two millions. Inventories were lowered by upwards of $600,000 at the end of 1920, aggregating $3,396,824, as against over $4,000,000 in 1919.

The earnings of the Canadian Westinghouse Company, Limited, for the last year totaled $1,251,080, and the net profits $916,080, as shown in the report presented at the annual meeting held March 29, 1921, at Hamilton, Ontario.

During the year the outstanding capital stock was increased from $6,229,400 to $7,417,900 by the issuance of 11,885 new shares.

The Gregory Tire & Rubber Co., Ltd., Vancouver, British Columbia, incorporated under the laws of that province with a capital of $1,500,000 to manufacture tires, tubes and accessories, has now commenced manufacturing, the capacity to be five hundred tires and 1,000 tubes a day. Morton Gregory, a chemist of considerable experience, is president and managing director; A. B. Weeks is vice-president; S. A. Madge is treasurer, and Frank Parsons is secretary. R. O. Kellogg, superintendent, was formerly superintendent of the American Tire & Rubber Co.; F. B. Roesel is foreman of the tire construction department; Martin Nelson, foreman of the mill and calender department, and W. T. Simpson, foreman of the tube and accessory department. The main building is of reinforced concrete construction, 70 by 180 feet, two stories and basement. Modern machinery to the value of about $150,000 has been installed.

The Goodyear Tire & Rubber Co. of Canada, Limited, has asked permission of the Ontario legislature to permit reorganization of the Canadian company by reducing the capital stock of the company from $100 to $10 per share and to permit the issuance of prior preference stock to take care of various liabilities. Note holders, whose claims aggregate $1,219,920, are to receive three-year eight-per cent notes. Rubber commitment creditors are to

receive 20 per cent in cash on deliveries and the balance in seven per cent 90-day notes. Fabric creditors will receive 25 per cent in prior preference stock or preferred stock at par and 75 per cent in cash. The $3,000,000 owed to the parent Goodyear company will be paid in prior preference stock at par. The company under refinancing plans is to meet all obligations by September 30, 1921. The company's bank borrowing exceeds $1,000,000; notes due in the United States amount to $1,219,920; rubber liabilities aggregate $684,000, and fabric liabilities, $4,800,000.

The Harry M. Hope Engineering Co., 185 Devonshire street, Boston, has established offices in the Dominion Express Building, Montreal, Quebec, to handle its Canadian business. The Canadian manager is George W. Saunders, formerly connected with S. Pearson & Sons, London.

STATEMENT OF THE INDIA RUBBER WORLD

Statement of the ownership, management, etc., required by the Act of Congress of August 24, 1912, of THE INDIA RUBBER WORLD, published monthly at New York, N. Y., for April 1, 1921.

State of New York, } ss.:
County of New York, }

Before me, a notary public in and for the State and county aforesaid, personally appeared E. M. Hoag, who, having been duly sworn according to law, deposes and says that she is the business manager of THE INDIA RUBBER WORLD, and that the following is, to the best of her knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, The India Rubber Publishing Co., 25 West Forty-fifth street, New York City.

Editor, Henry C. Pearson, 25 West Forty-fifth street, New York City.

Managing Editor, Henry C. Pearson, 25 West Forty-fifth street, New York City.

Business Manager, E. M. Hoag, 25 West Forty-fifth street, New York City.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.)

The India Rubber Publishing Co., 25 West Forty-fifth street, New York City.

Henry C. Pearson, 25 West Forty-fifth street, New York City.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given, also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by her.

E. M. HOAG, Business Manager.

Sworn to and subscribed before me this 31st day of March, 1921.

(Seal) FREDK. SPRENGER,

Notary Public, Westchester County.

New York County Clerk No. 188. Register's No. 2210. Certificate filed in New York County. My commission expires March 30, 1922.

ANOTHER GOOD ROADS ESSAY CONTEST

In the presence of members of the Highway and Highway Transport Education Committee and Harvey S. Firestone, President Warren G. Harding complied with a request of the committee and on the White House lawn recently presented Miss Katherine F. Butterfield of Weiser, Idaho, with a certificate that entitled her to a university scholarship. Of more than 200,000 high school contestants for the best 500-word essay written on the problem of good roads in the Ship-by-Truck—Good Roads essay contest, Miss Butterfield was chosen the winner.

At the ceremonies the announcement was made that the Highway Transport Committee will sponsor a second competition for the Harvey S. Firestone prize, a four-year scholarship, including expenses, to the high school student writing the best essay on a subject pertaining to good roads.

The rules of the contest, which last year were conducted by the Ship-by-Truck Bureau, which Mr. Firestone founded, will be virtually the same as in 1920. All high school students are eligible to compete, essays must be not more than 500 words in length and must be in the hands of the local committees not later than May 31. While no other major prizes have been announced, local and state prizes are expected.

A PIONEER IN BALATA AND RUBBER

BALATA MEN in the Guianas and in New York were once well acquainted with W. A. Joubert, who cruised for and discovered many valuable reefs in British and Dutch Guiana. So well known was he in the lines mentioned and in Mexican rubber that a sketch of his war activities is very interesting.

W. A. JOUBERT

Mr. Joubert knows Mexico and its rubber possibilities intimately. His plans for establishing a large and profitable business there had just matured when they were dealt a rude blow in 1913 by Mexico's internecine difficulties, and, forced to relinquish everything, he returned home almost penniless. Under contract, he spent 1914 and 1915 lecturing on "The Mexican Situation," addressing many distinguished gatherings, and wrote magazine articles on the subject, that were widely noted. On the outbreak of the World War, finding himself without resources, he bravely took a factory job as a "helper" and, as he says, "revelled a year in jeans and grease" with war-time wages. He combated enemy propaganda, notably in "Neighbor Hans," which, after a long magazine run, was used as a war document by the Morgan Liberty Loan Committee. Mr. Joubert also figured as a public speaker for the loans.

From Liberty Loan work he was transferred to the National Service Section of the United States Shipping Board, making many telling speeches for the Allied cause. In one case he prevailed upon the employes of eight munition works to abandon a projected strike and to stay loyally at their tasks. Next he was assigned to the United States Aircraft Production Bureau but finding the work uncongenial he sought a Y. M. C. A. post in France. The signing of the armistice, however, put an abrupt end to all his war activities. Since then he has been in the employ of a prominent New York investment house, in which position he has "made good" where many had failed; and with his wife and daughter now lives at Newburgh, New York.

Mr. Joubert has a son, Gordon, who, while in the Canadian service, was shell-shocked at Ypres, and is in business in Saskatchewan. Another son, Clement, who was in the United States aviation service, is managing a sugar plantation in Cuba.

MINNEAPOLIS RETAINS AND FURTHER SUBSTANTIATES ITS RIGHT to the title "Billion Dollar Market" in figures compiled by the wholesale and jobbers' section of that city's Civic and Commerce Association. Trade in belting and rubber goods totalled $7,500,000 in 1919 and increased to $9,687,500 in 1920. This is exclusive of rubber footwear which is included in the city's $9,000,000 trade in boots, shoes and rubbers.

Activities of The Rubber Association of America

MEETINGS

The Technical Committee of the Tire Manufacturers' Division held a meeting in the Association rooms on April 14, to consider in detail the tentative specification of the Bureau of Standards for pneumatic tires. A number of technical representatives of tire manufacturers, not represented on the Technical Committee, also participated in the conference, the work of which was completed at a meeting in Cleveland on April 26 and 27.

An engineering sub-committee of the Mechanical Rubber Goods Manufacturers' Division met at the Association rooms on April 14, to consider the subject of the standardizing of rubber belt and pulley sizes. The subject was thoroughly discussed in a general way and an outline prepared for treating the various phases in detail. Members of the sub-committee are studying the problems preparatory to another meeting of the committee.

The customary monthly meeting of the Executive Committee, Tire Manufacturers' Division, was held in the Association rooms on April 20. The disposition of a number of routine matters required the attention of the committee until late in the afternoon.

The development of the plans for the compilation of monthly statistics covering mechanical rubber goods was the principal subject of discussion at the usual monthly meeting of the executive committee of the Mechanical Rubber Goods Manufacturers' Division, held at the Yale Club on April 26.

The Traffic Committee held its April meeting in the Association rooms on April 18, and devoted the entire day to routine matters. Several members of the committee left that evening for Baltimore, to inspect the harbor and terminal facilities in that city, for handling shipments of rubber goods via the Panama Canal to the Pacific Coast.

The Board of Directors met at the Union League Club at 1 o'clock on April 29, in accordance with the schedule arranged for regular meetings.

PUBLICITY COMMITTEE OF EXECUTIVES APPOINTED

The Association will undertake educational work (publicity) on behalf of the rubber industry; a committee will be constituted of representatives to be designated by the following named firm members from the personnel of their several executive staffs: Firestone Tire & Rubber Co., Pennsylvania Rubber Co., Hewitt Rubber Co., Hood Rubber Co., The B. F. Goodrich Co., United & Globe Rubber Co., Hodgman Rubber Co., Kelly-Springfield Tire Co., The General Tire & Rubber Co., L. Littlejohn & Co.

FOREIGN TRADE BUREAU

In accordance with resolutions adopted by the Executive Committee of the Foreign Trade Division, a Foreign Trade Bureau has been added to the Association, under the management of P. L. Palmerton, who will devote his present attention to the following: Information bureau, information bulletins, rubber exporters' handbook, straight-side tire promotion, translation of rubber goods terms, employment bureau, collection of credit data, listing of desirable forwarders, and others.

It is intended to enlarge this program with other services as they may be requested or as the facilities of the bureau may permit.

The present membership of the Foreign Trade Division includes all members who are devoting much attention to export trade. However, the division extends an invitation to other firm members to become enrolled in the division. The manager of the Foreign Trade Bureau will, upon request, be glad to handle the details of enrollment of firms and recognition of representatives.

The meetings of the Executive Committee of the Foreign Trade Division are regarded as "open," and a welcome will be extended to a representative of any member of the division. Also, the division will appreciate the privilege of including in its docket, subjects of export interest that any member wishes to suggest. The executive committee has selected the third Friday of each month as its regular meeting date.

COST ACCOUNTING FOR RUBBER GOODS MANUFACTURERS

A study of the cost accounting problems of rubber goods manufacturers with the object eventually of outlining cost accounting methods for various branches of the industry will be undertaken by a cost accounting committee of experienced accounting executives from the staffs of the following named companies: The B. F. Goodrich Co., Firestone Tire & Rubber Co., United States Rubber Co., Hood Rubber Co., Ajax Rubber Co., Inc., The Fisk Rubber Co., Boston Woven Hose & Rubber Co., The Miller Rubber Co., Star Rubber Co., Kelly-Springfield Tire Co. (and one to be designated by the Rubber Manufacturers' Association of New Jersey—Trenton Association).

STATISTICS COMPILED FROM QUESTIONNAIRES NOS. 103 AND 104, COVERING THE YEAR 1920[1]

	Reported by Manufacturers Who Also Reclaim	Reported by Reclaimers Solely	Total	Approximate Amount Scrap Used per Pound of Reclaimed Produced
Reclaimed rubber produced from raw and cured scrap .... *pounds*	77,920,594	102,059.654	179.980,248	1 lb. 5 oz.
Scrap rubber (including raw and cured scrap) consumed in production of reclaimed rubber... *pounds*	100,659,857	134,786,740	235,446,597	

Number of Pounds of Crude Rubber Consumed in the Manufacture of Rubber Products and Total Sales Value of Shipments of Manufactured Rubber Products

Product	Number of Pounds Crude Rubber Consumed	Total Sales Value of Shipments of Manufactured Rubber Products
Tires and tire sundries		
Automobile and motor truck casings.....	204,852,163	$315.367,820
Automobile and motor truck tubes......	51,025,392	42,148.440
Solid tires..........................	26,482,247	18,441,402
Other tires and tire sundries...........	10,075,927	17,004,388
[2]Total—Tires and tire sundries.......	292.435 729	392,962,050
Other rubber products		
Mechanical goods......................	28,592,490	82.240.087
Boots and shoes.......................	32,610.547	61,707,773
Other products........................	16,250,905	61,809.742
[2]Total—Other rubber products........	77,453,942	$205,757,602
Grand total—All products............	369,889,671	$598.719,652

[1]The number of manufacturers reporting statistics for the first half of 1920 was 142; for the second half, 143. The number of reclaimers reporting for the first half was 7; for the second half, 8. The average total daily number of employes reported for the first half of 1920 was 199.750, and for the second half, 189,662.

[2]It should be noted that the above totals of "Tires and tire sundries" and "Other rubber products" include some figures which are not shown under the various items, which is due to the fact that some of the reports received were not itemized; for the same reason, under "Tires and tire sundries," in a few instances, the data submitted by individual members covering "Automobile and motor truck tubes" have been assigned to "Automobile and motor truck casings," wherever it has appeared desirable to do so, with respect to both the number of pounds of crude rubber consumed and the total sales value of shipments of manufactured rubber products.

Attention is directed to the fact that the totals shown above are the result of a compilation of statistics furnished by individual rubber manufacturers and reclaimers in the United States, and do not include figures of manufacturing firms located in Canada, as did the "Statistics Compiled from Questionnaires Nos. 101 and 102," covering the year 1919.

INTERESTING LETTERS FROM OUR READERS

LONDON COUNTY COUNCIL HOUSING BONDS

To the Editor:

Dear sir: The enclosed circular of the London County Council housing bonds describes the one method that has been successful in Europe in providing funds for housing purposes.

Why can we not adopt something that has proved satisfactory elsewhere instead of wasting time endeavoring to discover something that is all-American? Must we have another Liberty motor episode, trying to learn how to make all-American airplanes and motors when we could have much more quickly adopted the kind Europe was making successfully during the war, and which it was proved would work?

Americanism is one thing. Chauvinism is another.

New York, N. Y. R. J. Caldwell.

The securities referred to by Mr. Caldwell, which have been termed one of the most meritorious issues made in years, are the London County Council 6 per cent bonds to provide funds for the urgent housing needs of the metropolitan boroughs. They are sold for cash, or in four instalments, in denominations of £5 or in multiples thereof, to be repaid at par in five, ten, and fifteen years as desired by the buyer. Interest is payable semi-annually, and both interest and principal are secured by the property and revenues of the London County Council and the rates of this council outside the city. The council allows a brokerage of ¼ of one per cent and pays stamp duties on all transfers. The bonds are free of income tax at source of issue up to £100.—The Editor.

PROPER AND IMPROPER VULCANIZATION OF INNER TUBES

To the Editor:

Dear Sir:—The true measure of the proper elasticity in an inner tube is the stretch to break and the recovery from a stretch 60 to 70 per cent of breaking strain. Tensile, upon which so much stress is foolishly laid, is a secondary consideration. It is always possible to secure greatly increased temporary tensile strength either by increasing the vulcanization beyond the limits imposed for long life, or by using an excessive amount of what are loosely termed accelerators. Now let us see what happens when temporary tensile strength is thus artificially increased for a sales argument only, because it is not a service argument.

Given a compound containing 90 to 95 per cent rubber by volume, with 3 per cent sulphur, and not more than 0.50 per cent of hexamethylene tetramine as an accelerator, if properly vulcanized, a tube of this quality should stretch from 2 inches to 12 inches, and be so held for ten minutes, then allowed to recover for ten minutes. The stretch remaining over the original 2 inches should be about 10 per cent or 2.2 inches. Tensile strength should be about 2,000 pounds to 2.200 pounds per square inch. Now to increase this tensile by vulcanizing to 2,600 or 3,000 pounds, what happens? The stretch may not be affected immediately and perhaps not even for six months, but as sure as the Lord made little apples, such a tube will crumble and die soon after six months, and very likely earlier. When the recovery from stretch shows only 2½ to 5 per cent, there is something rotten in Denmark. The tube is doomed to a young, untimely death. If excessive tensile is secured by using as high as 1½ to 2 per cent of the accelerator mentioned, the result is even worse. Such tubes probably will not last three months.

Over-vulcanizing or the use of an amount of so-called accelerators, which are really catalysers and like poison, to be used in very small doses, give very pretty attractive first effects, which are really about as wholesome as the hectic flush of one in the last stages of tuberculosis. Such tubes are translucent, smooth, free from all bloom or sulphur deposit, very, very attractive indeed, but good only for the show window, or the salesman's grip; absolutely no good at all for long service. Take an extreme case, the tensile strength of such a compound as given may be increased to 4,000 pounds if the vulcanizing is continued until hard rubber is secured. It can easily be seen that while this material is all right for pipe stems, etc., it is scarcely the thing for an elastic tube, and here endeth the tensile lesson.

Jersey City, New Jersey. Superintendent.

THE EDITOR'S BOOK TABLE

"The Planting Engineer." By C. Reid, Colombo. Times of Ceylon Co., Limited, Colombo, Ceylon. Cloth, 371 pages.

This book which is intended for the planter of rubber, tea and coconuts, deals exhaustively with practical engineering as applied in the manufacturing processes employed on the estates in the Far East. The book comprises 27 chapters and appendix grouped under the following sections: Rubber, power, electric light and power, tea, transport and coconuts.

A full description of all machinery connected with the products named is given with instructions for working and general upkeep. General information is afforded on electric lighting, water supplies, transport by road and aerial tramway, followed by an appendix of useful facts, figures and tables. A full index is provided and the book is liberally illustrated. The instructions are simple, direct and as non-technical as possible. The book will be found a valuable aid to every estate engineer.

"Priestley in America," 1794-1804. By Edgar F. Smith, University of Pennsylvania. Cloth, 173 pages, 7½ by 5 inches.

This book should be of great interest to readers, as elsewhere in this issue appears a sketch of Joseph Priestley, the man who named india rubber. The book deals with the adventures and activities of Dr. Priestley during the years spent in America after being forced to leave France and England because of his radical sympathies. The book contains no illustrations, not even a frontispiece of Priestley, but is attractively printed and contains copies of many letters exchanged between the doctor and his numerous American friends.

NEW TRADE PUBLICATIONS

A brochure, "The Golden Year of Goodrich, 1870-1920, Fiftieth Anniversary," has just been published by The B. F. Goodrich Co., Akron, Ohio. It commemorates the fiftieth anniversary of the founding of the company, dealing not only with the history of the origin and growth of the company, but the part that rubber plays in the industrial development of the world and individual life. The context is written by Wilbur D. Nesbit, and colored symbolic illustrations representing Earth, Air, Fire and Water are reproduced from paintings by W. T. Benda. Throughout are numerous croquis of places, incidents, and machinery, while the last few pages are devoted to a list of the officials, branches of the company in the United States, foreign branches and foreign distributers.

Technical and Scientific Book Section, from the 1920 Edition of the Chemical Engineering Catalog. Chemical Catalog Co., New York.

This alphabetical list of authors' names includes practically all the current works on chemistry and chemical technology and is preceded by a subject index. Valuable for ready reference.

"The Rubber Industry," the first of the affiliated bulletins for firm and affiliated members of The Rubber Association of America, made its appearance early last month. It is a six-page leaflet which will be distributed at intervals of about two weeks, and will cover such subjects as are likely to be of interest to Association members in connection with the rubber industry, as for instance, legislation, taxation, traffic and transportation (rail and highway), industrial relations, foreign commerce, raw materials, statistics, Association activities, meetings, etc., and miscellaneous information.

"HALOWAX IN THE RUBBER INDUSTRY."—IN AN EIGHTEEN-PAGE pamphlet bearing the above title, the Condensite Company of America, Bloomfield, New Jersey, describes the physical properties of Halowax and the application of different grades in rubber manufacturing, illustrated by typical mixings.

THE AMERICAN SOCIETY FOR TESTING MATERIALS, PHILADELPHIA, Pennsylvania, has issued Bulletin No. 1, April 1, 1921, consisting of four pages dealing with the activities of the A. S. T. M., and notes and publications of interest to members.

JUDICIAL DECISIONS

MCLEOD TIRE CORPORATION VS. THE B. F. GOODRICH CO. District Court, Southern District of New York. February 28, 1920. No. 554.

The court will allow liberal inspection and compel answers to interrogatories in patent cases. In a tire patent case, inspection of working drawings or blue-prints from the records of defendant, showing molds, cores and other working parts used in the commercial production of defendant's tires, would not be denied because of defendant's objection that these represented the details of a secret process of manufacture employed by defendant. The secrecy of the process would be safeguarded by the order so far as possible.

In the above suit in equity the court granted in part the motion of the plaintiff to be allowed inspection of drawings, etc.—*Federal Reporter*, Volume 268, page 205.

WILLYS-OVERLAND CO. VS. AKRON-OVERLAND TIRE CO., INC., District Court, District of Delaware. In equity. August 2, 1920. No. 386.

In a suit in equity by the Willys-Overland Co. against the Akron-Overland Tire Co., Inc., a preliminary injunction was sought restraining the defendant from using the word "Overland" as the whole or any part of its corporate name, from listing its capital stock upon the New York Curb Market or any other association or exchange where listed stocks and securities are dealt in, under any name containing the word "Overland," and from designating its tires, or other automobile accessory made or sold by it, by the word "Overland," or by any combination of words containing that name.

Morris, District Judge, rendered the opinion that from the evidence the defendant was using "Overland" in its corporate title unfairly and to the detriment of the plaintiff; that the use by a defendant in its name of a word calculated to lead the public to believe its goods are the goods of the plaintiff, may be enjoined; that a preliminary injunction should be granted: and that a decree in conformity therewith might be submitted.—*Federal Reporter*, Volume 268, pages 151–155.

IN RE SCHWEINERT ET AL. Court of Appeals of District of Columbia. Submitted November 8, 1920. Decided January 3, 1921. No. 1323.

In the matter of the application of Maximilian Charles Schweinert and another for the patent of a tire valve, the defendants appealed from the refusal of the Commissioner of Patents to grant such a patent. The Court agreed with the Commissioner that the applicant had made no patentable advance over the prior art. The decision was therefore affirmed.—*Federal Reporter*, Volume 269, page 1020.

TREASURY DECISIONS

No. 44145.—Protest 935857 of Davies Turner & Co., New York.

RUBBER ATTACHMENTS FOR SOLES AND HEELS; WEARING APPAREL.—These articles are classified as articles of wearing apparel composed of cotton and india rubber at 30 per cent ad valorem under paragraph 256, tariff act of 1913, and are claimed dutiable as manufactures in chief value of india rubber at 10 per cent under paragraph 368.

Opinion by WELLER, G. A.: Proportionate values of component materials not shown, but found evident rubber is of chief value; therefore, claim that they are dutiable as manufactures in chief value of india rubber under paragraph 368 was sustained. These attachments are excluded from paragraph 256 on authority of Steinhardt vs. United States (8 Ct. Custom Appeals, 372; T. D. 37629).—*Treasury Decisions*, Volume 39, No. 14, page 10.

ADJUDICATED PATENTS

PALMER ET AL VS. JOHN K. STEWART & SONS, INC. United States District Court, New York.

The Palmer patent, No. 878,995, claim 1, for apparatus for inverting tubular fabrics, held infringed.—*Federal Reporter*, Volume 269, page 148.

THE OBITUARY RECORD

WELL-KNOWN RUBBER FOOTWEAR MANUFACTURER

TRACY SAMUEL LEWIS, president of the Beacon Falls Rubber Shoe Co., Beacon Falls, Connecticut, died suddenly on April 3, at his home in in Brooklyn, New York, in his forty-eighth year.

Mr. Lewis was born in Naugatuck, Connecticut, in 1873, and was educated at Greenwich Academy, Greenwich, Connecticut, and the Sheffield Scientific School, Yale University, graduating in 1894. Four years later he became secretary and treasurer of the Beacon Falls Rubber Shoe Co., of which his father, the late George A. Lewis, was president. On his father's death in 1914, Mr. Lewis became president of the company, which has continued to prosper under his management.

TRACY S. LEWIS

Several other firms closely allied with the rubber industry claimed part of his time. He was president and treasurer of the Connecticut Mills Co., tire fabric manufacturers, Danielson, Connecticut; treasurer of the Canadian Connecticut Cotton Mills, Limited, tire fabric manufacturers, Sherbrooke, Quebec, Canada; president of the Medford Woolen Manufacturing Co., Medford, Massachusetts; president of the Nobska Spinning Co., Taunton, Massachusetts; president and treasurer of the Continental Clay Co., Langley, South Carolina; and a director of the Naugatuck National Bank, Naugatuck, Connecticut, and of the Connecticut Cottons Co., Boston, Massachusetts. He was a member of The Rubber Association of America, Inc., and in 1917, one of its directors.

His widow, Grace Meacham Lewis, survives him, and his untimely death is mourned by many friends and trade acquaintances. Funeral services were held at the residence of his father, the late George A. Lewis, Naugatuck, Connecticut, and interment was also at Naugatuck.

A PIONEER IN THE MANUFACTURE OF RUBBER STAMPS

Charles Everson, one of the earliest to develop the rubber stamp in the commercial world, died April 14 at his home in Orange, New Jersey.

He established the Everson & Reed Co., manufacturer of rubber stamps, in 1875, which in 1914 acquired the Carragan & Tilson plant manufacturing metal badges, stencils and dies, thus joining the two oldest organizations. He served as first president of the New York Stamp Club when it was organized and later as president of the International Stamp Manufacturers' Association.

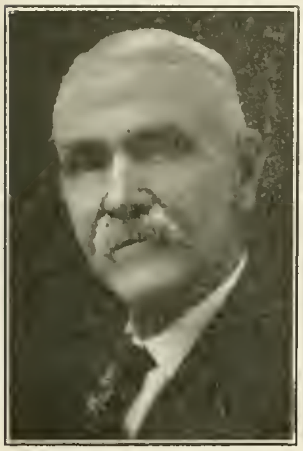
Mr. Everson was president and treasurer of Everson & Reed Co., 88 Chambers Street, New York, until his death. He was

particularly active in Grand Army work, as patriotic instructor and Senior Vice-Commander of Lafayette Post No. 140, New York, which conducted the Grand Army ritual service at his funeral.

The Everson & Reed Co. will continue to serve the trade under the direction of Mrs. Morris.

ACTIVE IN RUBBER MACHINERY MANUFACTURE

James Willett Chamberlain, whose death in Akron, Ohio, March 18, was noted in the April issue of The India Rubber World, was born in Redfield, New York, in 1843. Following his education in the village schools of that place, his first duty was to his country in the Civil War. Enlisting from Summit County, Ohio, in Company C, 115th Regiment, Ohio Volunteer Infantry, he served until the close of the war, being promoted to sergeant for brave and meritorious conduct.


James W. Chamberlain

Later in 1865 he began to serve his apprenticeship as a machinist at Webster Camp and Lane Machine Shop until his promotion to superintendent, a position which he held for many years, followed by several years as superintendent of the clutch department of the Williams Foundry & Machine Co., Akron, Ohio. At the time of his death he was identified with the Akron Equipment Co., Akron, Ohio. He was also connected with the Welman-Seaver-Morgan Co., Cleveland, Ohio; was a director of the Acme Steel Co. as well as a director of The India Tire & Rubber Co. and the Atlantic Foundry Co., both of Akron, Ohio. He was besides interested in several other firms.

Mr. Chamberlain was a member of the G. A. R. and received a pension until the World War, at which time he returned to the Government the full amount paid him and requested that his pension be canceled. This instance typifies the splendid spirit of integrity which won many friends for one of Akron's oldest and best-known rubber machinery men.

FORMER NEW JERSEY RUBBER MAN

Warren A. Greene, former general manager of the Lambertville Rubber Co., died on April 11 at his home in Lambertville, New Jersey, aged 89 years. Death was due to the infirmities of old age. He was president of the Amwell National Bank, Lambertville, and had been affiliated with the rubber company as general manager for about fifty years, having relinquished active duties a few years ago, owing to failing health. The interment was made at Providence, Rhode Island. He is survived by a son and daughter.

PROMINENT IN CIVIC AND FRATERNAL ORGANIZATIONS

Colonel Walter Rodney Williams, for twenty years connected with the Woonsocket Rubber Co., the footwear division of the United States Rubber Co., and in recent years employment manager at the Alice mill, died April 15 at his home in Woonsocket, in his sixtieth year.

Colonel Williams was born in Boston, Massachusetts, in 1862, and attended the public schools of Woonsocket, and was for some years employed in the Woonsocket office of the Adams Express Co. He then became a member of the office force of the Woonsocket Rubber Co., and was gradually promoted until he became employment manager, which position he held at the time of his death. For years he was secretary of the Woonsocket Business Men's Association, corporation clerk of the Woonsocket Chamber of Commerce, one of the first commanders of Gordon Camp Sons of Veterans and, later, the commander of Rhode Island Division with rank of colonel. He was a member of the Blackstone River Lodge of Masons, Woonsocket Commandery, Knights Templars, and Palestine Temple of the Mystic Shrine, and Roger Williams Council, Royal Arcanum. He is survived by his widow and three daughters.

RUBBER TRADE INQUIRIES

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

(861) Information is requested concerning the use of "reclaiming salts" in reclaiming.

(862) Inquiry is made for the address of the manufacturer of "J. B. L." cascades.

(863) A request has been received for the address of the manufacturer of machines for inflating rubber balls.

(864) A reader desires the addresses of manufacturers of machinery for repairing rubber footwear.

(865) A manufacturer of gold-ball molds abroad desires the addresses of American golf-ball manufacturers; also, of manufacturers of both balls and molds.

(866) A rubber manufacturer requests the addresses of makers of 36-inch breaker fabric and 36-inch tire-building fabric.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS

Addresses may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or from the following district or cooperative offices. Requests for each address should be on a separate sheet, and state number.

District Offices.	Cooperative Offices.
New York: 734 Customhouse.	Cleveland: Chamber of Commerce.
Boston: 1801 Customhouse.	Cincinnati: Chamber of Commerce; General Freight Agent, Southern Railway, 96 Ingalls Building.
Chicago: 504 Federal Building.	Dayton, Ohio: Dayton Chamber of Commerce.
St. Louis: 402 Third National Bank Building.	Los Angeles: Chamber of Commerce.
New Orleans: 1020 Hibernia Bank Building.	Philadelphia: Chamber of Commerce.
San Francisco: 307 Customhouse.	Portland, Oregon: Chamber of Commerce.
Seattle: 848 Henry Building.	

(34,585) An American citizen who has spent many years in Argentina engaged in the import trade, now in the United States, desires to secure an agency in Argentina and Uruguay for the sale of automobile accessories.

(34,602) A commercial agency in Belgium desires to secure an agency for the sale of bicycle accessories.

(34,613) A firm of manufacturers' representatives in India desires to secure an agency for the sale of rubber goods throughout India.

(34,638) An agency for the sale of motor cars and accessories is desired by a mercantile company in Australia.

(34,646) A firm of engineers in Sumatra desires to secure the agency for the sale of lightweight caterpillar tractors suitable for use on rubber estates.

(34,663) An official of a port in Mexico desires to secure catalogs with a view to purchasing for lifeboat crews rubber suits and rubber boots. Catalogs should be accompanied by photographs.

(34,664) An established importer with offices, showrooms and stock rooms in Australia desires to secure agencies from manufacturers for the sale of automobile accessories. Catalogs and prices requested.

(34,680) An importing firm in Austria desires to purchase large quantities of crude rubber immediately.

(34,728) A mercantile firm in India desires to receive catalogs and prices on automobiles, motorcycles and accessories.

(34,731) A mercantile firm in Bulgaria desires to purchase and secure an agency for the sale of whirling-spray syringes.

(34,748) A firm of merchants in Canada desires to purchase stair treads.

(34,752) An agency is desired by a mercantile company in India for the sale of motor and bicycle accessories.

Before the close of the year 1919, less than 500 automobiles had been imported into Pernambuco, Brazil, while in December, 1920, there were only 860 licensed automobiles in that city. Since then, however, about 1,000 cars have been imported, and tires for approximately 1,500 cars are required. Most tires imported are of American manufacture. A list of Pernambuco importers of rubber tires may be obtained from the Department of Commerce, Washington, D. C., by referring to file L. A. 12013.

FRENCH DISAPPROVE STRAIGHT-SIDE TIRES

The following article discussing straight-side tires appeared in *La Vie Automobile*, written by one of our French contemporaries. All of the pneumatic tires employed in France for a long time have been of the soft bead or clincher type, mounted on a rim having on each side a clincher in which the round portion of the bead engages. Placing a clincher tire on a rim is made a very easy matter by the use of suitable levers. Straight-side tires entail the use of a relatively complicated rim, which increases the weight of the wheel at the rim and, consequently, its inertia.

The farther away from the axis the weight of the wheel is located the longer will be the lever arm which moves the weight in its rotation, and the greater the effort required to get it up to speed. Inversely, the greater the amount of energy stored up in the wheel once it has been brought up to speed, the more violent must be the braking action, and the disadvantages of a road wheel acting as a flywheel are well known; it is these disadvantages which have led to the almost complete abandonment of the numerous designs of demountable rim, which apparently are more attractive than the demountable wheel.

It is easy to measure the power required to start a wheel when fitted with a clincher and straight-side tire respectively. Experiments were conducted with two wheels identical up to the tires, in which the difference in weight at the circumference amounted to 23.43 pounds.

The tire loaded with a weight of 1,100 pounds is carried at the end of a lever arm, resting on the surface of a drum which turns at a peripheral speed of 30 m.p.h., and driven by an electric motor. The power absorbed by the motor is measured by a voltmeter and an ammeter. The tire is first raised so that it does not touch the drum on which it bears. On the voltmeter and ammeter are read off the power consumptions corresponding to starting and normal running. Chronometer readings are taken of the time elapsing before the starting point and the normal speed are attained. The results of the experiment show:

1. On starting the straight-side wheel takes 426 watts more than the clincher wheel. This is more than ½-h.p. and is enormous (1 h.p. = 746 watts).

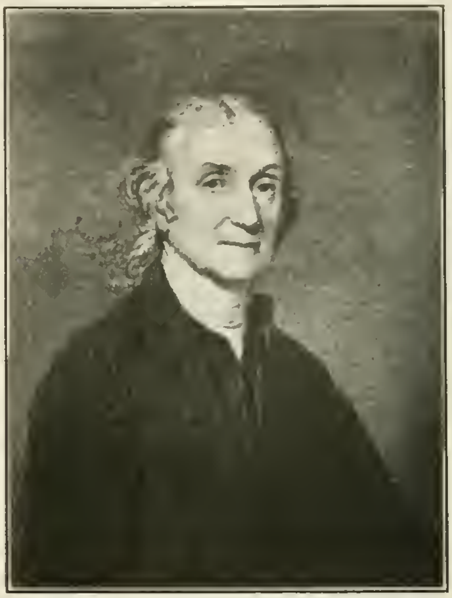
2. The normal speed is attained by the clincher tire at the end of 3 minutes 9 seconds, and by the straight-side tire at the end of 6 minutes.

3. At normal speed the straight-side tire takes 100 watts (1/7-h.p.) more than the clincher.

The phenomena observed at the moment of starting are reproduced, in an inverse sense, when the brakes are applied. The figures cited above refer to one wheel; the car has four of them; therefore, these figures must be multiplied by four in order to get an idea of what is going on on a vehicle. The phenomena above described take place not only on starting and braking but at every acceleration and deceleration, with reduced force.

THE MAN WHO NAMED INDIA RUBBER

To give anything a name that sticks through the centuries is somewhat of a feat. One has only to try it to discover just how difficult it is. India rubber had a variety of names until Dr. Priestley, using a bit of the Indian gum for erasing, called it india rubber. And just here some, many, will say, — "Who was Priestley?"



Joseph Priestley, LL.D., F.R.S.

Joseph Priestley, LL.D., F.R.S., a chemist, was born in Fieldhead near Leeds, Yorkshire, England, in 1733, his father being a fairly prosperous woolen cloth dresser. Although frail in health, he became a profound scientific and theological student and learned nearly a dozen languages. While conducting a private school and later, while a Unitarian minister, he delved deeply into chemistry, optics, electricity, etc., constructing his own apparatus. His opposition to the established church in sermons and tracts, and his sympathy with the French revolutionists, aroused much ill feeling; and in 1791 his home in Birmingham, with his manuscripts and apparatus, was destroyed by a mob. Birmingham now honors him with a marble statue in front of its town hall. He fled to London but there he was shunned even by his fellow members of the Royal Society, and he resigned. Appointment as literary companion of Lord Shelburne relieved his poverty and enabled him to resume his scientific researches.

In 1794 he went to live with his sons in Northumberland, Pennsylvania, and died there in 1804. On arriving in America, Priestley was greeted by the Governor of New York, was dined by President Washington, and had frequent conferences with Benjamin Franklin, whom he had known well abroad.

Priestley, perhaps best known as the discoverer of oxygen, which he termed "vital air," also produced carbonic acid gas, which he termed "fixed air," commercially, thus laying the foundation for soda water manufacture. The discovery by him, too, of nitrous oxide gas was the basis of modern anæsthesia. His experiments and scientific observations, as well as his principles of grammar, law, theology, etc., are set forth in twenty-five volumes. His frank, engaging memoirs are, however, more generally known and best appreciated.

HALOWAX OIL

Halowax oil is used in the treatment of fabric to improve the "frictioning" or bonding of rubber to it. There is no added solvent liquid in this oil, which must be removed before vulcanization. The boiling point of the oil is so high that it is not volatilized under the vulcanization temperature and therefore remains in combination in the finished work. The action of the oil is to soften the rubber, so that it penetrates the fiber structure with great ease, and provides a bonding medium between the cloth and rubber. Halowax oil can also be used for facilitating the mixing of fillers, especially those of fibrous nature, into rubber compounds.

The Rubber Trade in Great Britain

By Our Regular Correspondent

The turn in the tide of depression is not yet apparent, and it is difficult to find anything of a really satisfactory nature to report. Most of the rubber factories are working only three days a week, and it would seem that the rubber workers will have to fall in line with their fellows in other industries and accept a reduction in wages if a betterment in trade conditions is to be brought about. Foreign competition, the manufacturers say, has now become a serious matter. In addition to the American tires which are being "dumped" here, French, Belgian and Italian goods are also coming in at prices below the minimum the most up-to-date home works can hope to reach.

WAGES AND EMPLOYMENT

In the waterproof garment industry—that is, the various works which make up proofed cloth—notices have been posted of a reduction of 17½ per cent in wages to take effect on the first pay day after March 28. This has not been agreed to by the workers' unions so far because the reduction in wage is not accompanied by a guarantee of more work. In other sections of the rubber trade seven days' notice has been given of 10 to 12 per cent reduction in some districts. In the Manchester district, except in one case of a 5 per cent reduction, the workers' unions intend to resist the proposed cut in wages, this decision having been reached at a mass meeting held just before Easter. It now remains to be seen what the employes will do.

It must not be overlooked that the position of affairs is the reverse of what existed when wage advances were willingly or grudgingly conceded. Any stoppage of work then meant loss of profit; at the present time, if anything, it would mean cessation of loss. Many employers who are finding work with difficulty for two or three days a week would be by no means averse to a complete stoppage for a time, as this would assist in clearing out the accumulated stocks on hand.

DYEING TEXTILES FOR THE PROOFING TRADE

I have read with interest the report in The India Rubber World of the meeting of proofers and dyers held in New York on January 5. The matters principally referred to would seem to have reference only to the rubber proofer or mackintosh manufacturer and not to the rainproof trade, though in the report of the meeting, rubberizers and rainproof material manufacturers are referred to as being equally affected or interested. In Great Britain the two trades are entirely distinct, and I can call to mind only two rubber proofing firms of importance which have a rainproofing plant on their premises. The points under discussion in New York as to the avoidance of certain dyeing materials were under consideration in England 20 to 30 years ago, Bradford dyers and Manchester waterproofers having long worked on lines which barred the use of copper and manganese salts. The limit of 2 per cent of ether extract has also long been in use. The case of chromium is interesting; it has often been indicted, but the evidence for the prosecution has always seemed to me to be weak, and I am glad to see that a committee was appointed at the New York meeting to make tests to determine the effect of chromium compound upon rubberizing. I note that the effect of iron is to be studied. I do not know how far the cold cure of proofed fabrics is being utilized in America, but it has been generally recognized in England that the dyer's responsibilities are much heavier in the case of the cold than of the hot cure. In the former case the free acid produced may convert metallic oxides into salts, whence in the hot cure they remain unaffected. With regard to iron, for instance, it is supposed that while ferric oxide is harmless, ferric chloride is dangerous. Chromium has, of course, been very largely used during the late war, as the yellow of the khaki was due entirely to chromium salts and not at all to organic coloring matters. As the dyeing is effected in an acid bath, it is essential that the cloth should be put through an alkaline bath to remove the last traces of acid. There has been reason to suppose that the complete removal of acid has not always been effected in cloth intended for rubberizing, and this matter, with its possible consequences, might, I suggest, be added to the agenda of the New York investigators.

THE UNBURSTABLE BALL

At first sight a child's playing ball, which is estimated to remain in good condition for about a dozen years, does not seem a very paying proposition. This, however, is not the view of the two English concerns which have mastered the problem of making the cellular rubber bouncing ball. The current demand for these balls, which are produced and sold at an extremely satisfactory profit, has outrun the maker's capacity of production. It seems a matter for legitimate surmise as to what effect these balls will have upon the ordinary hollow playing ball industry. There used to be a hollow ball convention as to prices between the German and British makers, but I believe that came to an end with the war. As far as the English output is concerned, the only firm which counts is the New Eccles Rubber Works, Limited, of Manchester, the original owners of Cox's machine.

FINANCIAL NOTES

The Dunlop Rubber Co., Limited, issue of £3,000,000 8 per cent first mortgage debenture stock at 98 per cent was not largely subscribed to by the public, the underwriters having had 73½ per cent left on their hands.

The Empire Waterproof Co., of Houndsditch, London, of which Barnett Abrahams was sole proprietor, has failed with liabilities of £9,701 due to unsecured creditors, the largest claim being that of the Express Rubber Co., Limited, of London, for £5,503.

The Leyland & Birmingham Rubber Co., Limited, has decided not to pay the usual 5 per cent interim dividend, owing to the present abnormal financial conditions and the extremely unsettled state of all markets.

The Chemical Engineering Corporation, Limited, interested in artificial leather and tires, with a factory at Southhall, Middlesex, has failed for about £40,000, with practically no assets. The corporation was concerned with the flotation of the Standard Tyre & Rubber Manufacturers, Limited, now located in the Alperton factory, Wembley, near London. This company is not directly concerned with the failure, though it figures as a large creditor.

The United Malaysian Rubber Co., Limited, is to be wound up, but the first meetings of creditors and contributories will not be held until June 16 in London.

The British Insulated & Helsby Cables, Limited, is paying 15 per cent for 1920, the same as in 1919, the profits amounting to £340,713, as against £328,688 for 1919. The factories at Helsby and Prescot are stated to have been worked at full capacity. This report, taken in conjunction with that of the Telegraph Construction & Maintenance Co. and the Henley Telegraph Co., indicate that the slump which affected the rubber trade in the second half of last year was not shared by the electrical cable firms.

The Victor Tyre Co., Limited, with which Sir W. Y. Jones has been closely connected, has gone into liquidation, with liabilities of £62,396. The works are at New Malden, Surrey.

The Research Association of British Rubber and Tire Manufacturers is among the associations of manufacturers formed in England to conduct industrial and scientific research in the fields of their industries, and have been given governmental assistance.

THE RUBBER CLUB SCHEME

This has now assumed definite form, though by no means on the lines which many of its original supporters had anticipated. To the average Briton the term club has a somewhat closely defined meaning quite apart from a business association, which the new club now appears to be. In this way its activities and procedure are much on the lines of the Rubber Association of America, which includes in its functions much of what is already provided for in our Rubber Manufacturers' Association. The Rubber Club of Great Britain will not conflict with the established Manufacturers' Association, its energies being directed into different and more varied channels. The bulletin which it is proposed to publish, and which will be sent free to all members, will be conducted on novel lines, and will not cover ground already dealt with by the established trade journals. Mention is made of the fact that the need of central commodious club premises can be met later when justified by financial or other considerations. The present position is that a bulletin has been sent to the rubber trade in its varied branches and interest, inviting applications for membership on the following lines, and no doubt the proposed constitution and organization will depend upon the response.

Full members: Rubber manufacturers, whether corporations, firms or persons, and corporations, firms or persons providing raw materials and machinery used in the rubber and allied industries; annual subscription, £21.0.0.

Merchant members: Merchant corporations and firms interested in the rubber and allied industries; annual subscription, £10.10.0.

Associates: Individuals connected with or interested in the rubber and allied industries; annual subscription, £2.12.6.

I do not notice any reference to the inclusion or otherwise of non-British subjects. As one of the specified objects of the club is to watch foreign competition and keep its members advised thereon, a somewhat delicate situation might be created if representatives of foreign firms or non-naturalized foreigners were members thereof. But no doubt this, together with other matters relating to membership, will come before the new committee to be chosen from those who have been circularized and accepted membership.

THE LONDON RUBBER EXHIBITION

The Governments of Indo-China, Gambia, Java and Sumatra also have decided to take part in the Fifth International Exhibition of Rubber and other Tropical Products to be held in London, June 3-9, 1921.

A. Garnier, director of the Agence Economique in Paris of the Government of Indo-China, is to visit London personally and represent his government at the Congress and the Exhibition. Auguste Chevalier, director of the Institut Scientifique de Saigon, will accompany Mr. Garnier and also read a paper on "Progress of Hevea Cultivation in Indo-China."

The participation of the Government of Gambia in the Exhibition adds to the already outstanding importance of the West African Section.

Dr. O. de Vries, director of the Central Rubber Station, Buitenzorg, Java, is arranging for Java's participation in the exhibition. Dr. de Vries will read a paper at the Congress on "The Influence of Field Conditions and the Treatment of the Trees on Latex and Rubber."

An exhibit will be made by the General Experimental Station of the A. V. R. O. S., Medan-Deli, Sumatra. The director of the station, Dr. A. A. L. Rutgers, will contribute papers to the Congress, entitled "The Selection of Rubber" and "The Cultivation of Oil Palms."

The Hunter Dry Kiln Co., Indianapolis, Indiana, will introduce their method of drying and processing rubber to foreign trade by operating a unit at the Fifth National Rubber Exhibition in London. Francis Shaw & Co., Limited, Manchester, who handle the Hunter System in British possessions, excluding Canada, will supervise the exhibit. Harry Hunter, inventor and president of the Hunter Dry Kiln Co. will attend the exhibition and explain the details of the system.

COMPETITION No. 1

Owing to reduction of output, some companies are not marketing scrap grades and, in these circumstances, the Committee have decided that a consignment may consist of *two* grades instead of three grades (75 per cent No. 1 sheet and/or crêpe and 25 per cent No. 2 grade, or compo crêpe, other than scrap) provided the entry is accompanied by a certificate to the effect that scrap grades are not being manufactured and that the consignment fairly represents the present grades turned out by the estate.

NEW COMPETITION (No. 1A)

For Rubber Produced in Malaya and Ceylon, Sold Locally in Singapore and Colombo

The conditions will be identical with those of Competition No. 1 (as amended) except that samples forwarded to the Awards Committee must be accompanied by a certificate similar to that required for wharf-samples drawn in London, such certificate to be signed on behalf of responsible godown approved by local Chamber of Commerce.

Awards will be given for each country according to the number of entries received and will consist of the Association's gold, silver or bronze medals and prizes.

Entries, samples and certificates will be accepted up to and including May 25, 1921.

THE BRITISH RUBBER INDUSTRY SINCE THE ARMISTICE

Figures relating to the British rubber industry during 1919 and 1920 have just come to hand and are particularly interesting as showing the continued progress of this industry since the armistice.

During the two years under review, imports of crude rubber increased by about 20,000,000 pounds. In 1919 the total quantity was 228,237,700 pounds, value £24,211,886; and in 1920, 248,368,100 pounds value £24,556,126. Whereas the Straits Settlement sent the largest quantity in 1919, when the figures were 67,351,100 pounds, value £7,187,882, exports showed a decrease in 1920 to 66,516,400 pounds, value £6,499,413, and first place went to the Federated Malay States which had increased the total exports to Great Britain from 62,862,200 pounds, value £6,628,845 in 1919, to 67,151,200 pounds, value £6,860,824 in 1920. British India also advanced with 12,286,800 pounds, value £1,308,035 in 1920, against 11,301,200 pounds, value £1,240,460 the year before. Ceylon and dependencies showed the greatest rate of increase among the leading rubber-producing countries, totals being 47,991,900 pounds, value £4,657,041 in 1920 as compared with 33,498,100 pounds, value £3,605,033 in 1919.

Exports from other Dutch possessions in the Indian Seas dropped from 12,283,200 pounds, value £1,286,691 in 1919 to 8,608,600 pounds, value £870,634 in the following year. However, this decrease from Dutch sources was made up for by the shipments from Dutch East Indies (except other Dutch possessions in Indian Seas) which rose from 13,372,200 pounds, value £1,381,220 in 1919 to 17,769,400 pounds, value £1,667,780 in 1920. Figures for Brazil indicated a gain in quantity, those for 1920 reading 18,354,-

400 pounds, value £1,793,766, as compared with 18,121,400 pounds, value £1,997,385 the year before. It will be noted that though the quantity increased by 233,000 pounds in 1920, the value decreased by £203,619.

Reexports of crude rubber were 132,653,900 pounds, value £13,-971,875 in 1919, against 120,753,900 pounds, value £13,854,944, showing a small decrease.

All domestic exports showed substantial advance. The rate of increase was highest in the case of submarine cables, exports of which rose from £622,633 in 1919 to £1,776,940 in 1920—and insulated wire, the value of which jumped from £827,732 to £1,752,-916. More than half the value of exports of manufactured goods was accounted for by tires and tubes, the total in 1920 being £6,500,761 as compared with £4,257,651 the year before.

Here it might be worth while to call attention to the fact that imports of tires and tubes during 1920 were not far behind the exports for the same year, having amounted to £5,577,078. This total was over two and a half times as large as that for 1919, which came to £2,148,989.

Another interesting bit of comparison may be made with regard to the item boots and shoes. The value of domestic exports rose from £240,849 in 1919 to £397,763, whereas the value of imports increased from £294,338 to £714,685 in 1920. It is regrettable that the statistics do not give the imports and exports of manufactured articles by countries.

Exports of waterproof clothing nearly doubled in value, the 1919 figures having been £1,728,828, while the 1920 figures read £2,930,240. Other rubber manufactures showed a similar growth, the totals being £2,831,183 and £4,689,739, respectively. Waste and reclaimed rubber reached a value of £397,763 during 1920, as compared with £240,849 the year before. Rubber substitutes were not separately mentioned before 1920, when the total amounts exported valued £123,346.

EUROPEAN RUBBER NOTES

By Our Regular Correspondent

HOLLAND'S RUBBER TRADE IN 1920

Conditions in the rubber trade in Holland during 1920 were similar to those reported from most countries; large imports and exports, good prices during the first few months followed by diminishing demand and falling prices. Although the volume of trade was greater than in 1919, the general tone of the market was depressed.

The chief set-back was the failure of the expected large orders from America to materialize, which resulted in a general collapse in the Holland market that became so serious in the closing months of the year that several important firms had to suspend payments.

During 1920, total imports of crude rubber amounted to 26,074 metric tons (metric ton equals 2,204 pounds), of which 849 tons were wild rubber, 25,134 tons plantation rubber and 91 tons old rubber. The figures for 1919 were 1,274 tons of wild rubber, 13,614 tons of plantation rubber and 397 tons of old rubber—total 15,285 tons.

Exports amounted to 14,532 metric tons in 1920 and consisted of 1,176 tons of wild rubber, 13,296 tons of plantation and 60 tons of old rubber. In 1919 the total was 9,598 tons and consisted of 187 tons wild, 9,355 plantation, 56 tons of old rubber.

All of the exports of wild rubber went to Germany and Austria. Germany also took 7,021 tons of plantation rubber in 1920 as against 3,869 tons the previous year. The United States took 5,229 tons in 1920 as compared with 5,058 tons the year before. The Congo supplied 35 per cent of the imports of wild rubber and Brazil about 40 per cent. The Netherlands East Indies furnished 11,422 tons of plantation rubber during 1920, the rest of the imports arriving from various parts of the world by way of Great Britain.

Rubber authorities in Holland are rather sceptical about the efficacy of the rubber output restriction as a means of keeping up prices, believing that the only hope of better prices is in improved demand, especially from the United States. At present the demand from Germany is poor and the outlook not very promising.

Holland's imports from the United States included oil and rubber tissue, value $215,329 in 1920 and $357,546 in 1919; automobile tires, $1,490,170 in 1920 as against $1,620,024 in 1919; other rubber goods, 207,651 in 1920 and $154,818 the previous year. The value of Holland's exports of crude and manufactured rubber to the United States in 1920 was $3,347,456 as against $3,135,950 in 1919.

Although the trade outlook toward the end of 1920 was very discouraging yet it is noteworthy that, due to the business done in the early part of 1920, the year showed a record trade between Holland and the United States.

FRANCE

Assistant Trade Commissioner Donald L. Breed, Prague, reports that, according to the terms of the commercial treaty between Czecho-Slovakia and France, the former country agrees to import 3,500 metric tons of French rubber goods. It is stated that this quantity is sufficient to cover the needs of Czecho-Slovakia for six years.

At a recent meeting of the Société du Caoutchouc-Mousse it was decided to increase the capital from 2,500,000 to 3,000,000 francs. It was announced that the factories at Aurec, Loire, are developing and that other manufactures were to be added. At present the company makes chiefly hollow play balls and recently the process has been improved and made more economical.

The Société "Caoutchouc Industriel du Sud," 2 bis, rue Ribotti, Nice, has raised its capital to one million francs.

M. Gruenais, rubber manufacturer at Arcueil-Cachan, has established a second factory at Autony.

GERMANY

The news of the decisions regarding the Entente plans of taxing German exports to England, France and Belgium, has caused considerable agitation. The so-called "sanctions" are termed acts of violence and various business associations urge cooperation against this attempt to "destroy German industry, exports and economy." The Zentral Verband der Deutschen Kautschuk-Industrie (Central Union of the German rubber industry) Berlin, has published a call to the rubber industry to take action against the sanctions, by not purchasing from England any crude rubber or other material of English or French origin. It is urged that only rubber be bought that is proved to be of Dutch origin or that was ordered or stored by German dealers before the sanctions came into force.

Furthermore, German representatives of British firms dealing in rubber and other raw material, are to be informed that offers for their British clients cannot for the time being be considered.

The Union of the Hamburg Import Trade resolved at a recent meeting that German merchants are in honor bound to abstain from buying directly or indirectly from enemy countries that have approved the sanctions.

The *Hansa-Bund* warns against dealing with English, French or Belgium firms and advises that all import and export business be done with neutral states and with Italy. This country did not accept the sanctions.

Among further weapons to be used against the sanctions may be mentioned:

Freeing of a number of articles from the export ban.

Abolition of price control of most goods and of quantity control in many departments.

Extreme stringency in the provisions regarding imports, particularly with regard to prohibitions of import of superfluous foreign goods.

GERMAN EXPORTS AND IMPORTS

Recent official statistics show that German imports of soft rubber goods amounted to 14,965 quintals in 1919 and to 17,200 quintals (quintal equals 220.46 pounds), during the first eight months of 1920; imports of hard rubber and manufactures of hard rubber during 1919 were 142 centals and for the first seven months of 1920, 100 quintals.

Exports of soft rubber goods were 3,068 quintals during 1919 and 16,200 quintals for the first eight months of 1920. As for hard rubber and manufactures thereof, the amounts were 222 quintals in 1919 and 692 during the first seven months of 1920. Against these figures, the total exports of soft rubber goods during the first eight months of 1913 were 126,200 quintals and imports 30,300 quintals.

It is interesting to note the gradual increase of imports and exports of soft rubber goods after the war. In January, 1919, the imports were but 2 quintals and up to June the total was but 99 quintals, the amount for the last half of 1919 having been 14,866 quintals. Exports started with 3 quintals in January, 1919 and increased gradually month by month until they jumped from 391 quintals in November, 1919 to 1,692 quintals the following month.

NEW FIRMS

Richard Cars, Gahlenberg, near Stuttgart, wholesale dealers in rubber goods, manufacture of wringing machines, Gummiwarenfabrik Hagufa, G. m. b. H., Harburg a. E., manufacture and sale of rubber goods.

Gummi Handelsgesellschaft "Liga" Putzo & Co., Munich, sale of rubber goods.

"Treügolnick" Deutsche Import and Export Gesellschaft m. b. H., Berlin. Headquarters of this firm have been moved from Hamburg to Berlin. The concern will buy and sell the products of the Russian-American India Rubber Co.

"Treügolnick," Petrograd. It is capitalized at 500,000 marks. The management is in the hands of Franz Albert Robert Zernickow, Berlin; John Friederich Jordan, Hamburg; Georg Stumpf, Berlin-Wilmersdorf.

Gummiwerke Stoeckicht G. m. b. H., Sterbfritz (Bez. Kassel), manufacture of rubber goods, trade in crude rubber, semi-manufactured and manufactured goods.

Presser & Compagnie, Berlin-Tempelhof, manufacture and sale of metal and rubber goods.

Gummi- und Turnschu-Verkaufs, G. m. b. H., Breslau, trade in rubber shoes, shoes for gymnastics, tennis, beach; rubber soles and heels and similar articles.

Firma Gummi-Aufbereitungs-Gesellschaft m. b. H., Frankfort-on-the-Main, separating and milling of soft and hard rubber; preparation of rivets, protectors, treads, and general preparation of rubber and semi-manufactures.

Firma Vulcasta, G. m. b. H., Berlin, exploitation of the inventions of Gustav Schäfer concerning vulcanization methods in repairing of tires and tubes.

Gummiwarenfabrik Imperator Jander & Lemcke, Berlin-Tempelhof; manufacture of rubber goods

NEWS NOTES

The Saarbrücker Asbest- und Gummi-Industrie Nöll & Resch, Saarbrücken, has been dissolved.

The annual report of the Norddeutsche Kabelwerke, Aktiengesellschaft, Neukölln, shows that this company had net profits of 1,422,088.63 marks during the past business year. A dividend of 16 per cent was declared on the old issues of shares and 10 per cent on the new issues.

The Continental-Caoutchouc und Gutta-Percha Compagnie, Hanover, has opened a warehouse for the sale of raincoats at 76 Kaiser Wilhelmstrasse, Hamburg.

The Norddeutsche Gummi- und Guttapercha-warenfabrik, formerly Fonrobert & Reimann, Berlin, reports that it will be unable to pay a dividend for the past business year. Adverse rates of exchange, higher wages and an increase in the cost of coals, are the reasons. The year before it was able to declare a dividend of 8 per cent.

The Phil. Penin, Gummiwarenfabrik, A.-G., Leipzig-Plagwitz, will raise its capital by 1,200,000 marks.

AUSTRIA

Statistics published by the Austrian Government for the fiscal year ended June 30, 1920, show that the foreign commerce of Austria for this period amounted in weight of commodities to 5,479,230 metric tons. Of this total, imports amounted to 4,502,-170 metric tons, and exports to 977,060 metric tons. About 40 per cent, or over 4,500,000 metric tons came from Germany, while 20 per cent of the exports, or 190,320 metric tons were sent to Germany.

Austria imported a total of 590 metric tons of rubber goods of which 60 metric tons, value 45,000,000 Austrian crowns (average price for American dollar during November, 1920, was 317 crowns) came from Germany. Exports of rubber goods to all countries amounted to 730 tons, of which 60 tons, value 50,000,000 Austrian crowns went to Germany.

A preliminary report for the calendar year 1919 covering the boot and shoe industry in 161 Canadian plants has been prepared by the Dominion Bureau of Statistics. There were 183,193 dozen pairs of rubber heels and 103,052 dozen pairs of rubber and composition soles produced, the cost values of which, delivered at the factory, were respectively, $235,276 and $395,625.

FOREIGN TARIFFS

PERU

On March 16, 1921, the payment of the Peruvian export duty on rubber gum was suspended in the Department of Madre de Dios until June 30, 1921. The export duty on rubber is levied at the rate of 8 per cent ad valorem, with the exception of that from Putamayo, where it is only one-half of that amount.

FRENCH AFRICA

A decree of January 12, 1921, fixes the export duties on rubber at 10 per cent ad valorem.

BRITISH INDIA

The revised tariff valuations for import duties for 1921 as covered by Notification No. 8973 issued by the Department of Commerce of the Government of India includes the following: Rubber tires for motors and motorcycles, and rubber tubes for tires, and other manufactures of rubber, not otherwise specified, are dutiable at 7½ per cent ad valorem.

AUSTRIA

An Austrian decree dated December 28, 1920, makes important changes in import and export permits. Import license is required for wares of india rubber of all kinds, not including waste, paste, pieces of used ware, threads and sheets. Export license is required for india rubber waste, old used pieces of india rubber wares.

VENEZUELA

On February 10, 1921, the Venezuelan Ministry of Finance passed three resolutions amending the tariff law which went into effect April 1.

The first resolution abolishes the tariff item, evidently to eliminate duplication: No. 901. Wire, insulated or not, for electrical installations (see Tariff No. 825), duty—5.00 bolivars per kilo.

The second resolution makes the following changes in classification: No. 268. Tubes or conduits, of rubber, not otherwise specified. (Formerly: Tubes or conduits, of rubber, more than 15 millimeters in diameter, 0.75-bolivar per kilo.) No. 269. Tubes or conduits, of rubber, less than 15 millimeters in exterior diameter. (Formerly: Tubes or conduits, of rubber, less than 15

millimeters in diameter, 2.50 bolivars per kilo); having a duty, respectively, of 2.50 and 1.25 bolivars per kilo.

The third resolution provides for new classifications and duties on canvas hose, rubber hose covered with cloth or bound with wire at 75-bolivar per kilo.

CHILE

In the April issue readers were advised that it was proposed that tires should be exempted from an increase in custom tariff rates. The law of February 23, 1921, exempts rubber tires for automobiles, both solid and pneumatic, from increase in import duty.

METHOD OF ESTIMATING DUTY ON PENS IN CHILE

The point is removed from one fountain pen when a shipment is received in Antofagasta, Chile, weighed separately and the weight of the entire shipment is calculated from that one point. On repeat shipments where the weight of the pen point is on file, this is not necessary, and reduces the liability to damage incurred by the removal of points. If the point were not removed the whole pen would be weighed and duty assessed on the entire pen at the rate leviable on the gold point. When separated, the stocks are dutiable at the rate for manufacturers of rubber, 2.50 pesos per kilo, or about 41 cents per pound, while the points are dutiable at the rate of 0.10 peso per gram, or $16.56 per pound.

STATUS OF THE BERGOUGNAN COMPANIES

The "slack-off" in the motor trade has had its effect on the French tire manufacturers, no less than their British and American competitors, and all have had to fit themselves to circumstances. A considerable reduction of output has been arranged by the Bergougnan Co., of Clermont-Ferrand, which will continue until business resumes the normal. Varying activity is reported from the firm's subsidiary branches. The Italian branch, whose factory was seized by the workmen and run for a time on "Soviet" principles, passed through a period of chaos and two months' subsequent idleness. It is now back in the hands of the company, but the loss sustained is estimated at 20,000,000 francs.

The Belgian company, which was formed in the early part of 1920, has not yet commenced production. However, it is expected to start working within the next few months. The capital, which is eventually to be 20 millions of francs (half of which provided by the Empain group of chemical companies), has had only four millions subscribed up to the present.

The American branch at Trenton, New Jersey, is operating on a very much restricted scale and is considerably inconvenienced by the general crisis in trade, the lower sale prices and the high rate of American exchange.

A resumption of export sales activity by the Moscow branch is anticipated shortly. The factory has not suffered during the troubles, but entirely free trading relations have not yet been established.

In regard to the parent company, its accounts as of September 30, 1920, show total assets of 54,000,000 francs, with liabilities 39,000,000 francs. The general meeting of December 11, 1920, decided to pay a dividend of 60 francs per share, which amounted to nearly 11,000,000 francs.—*The India Rubber Journal*, London.

BURMA'S RUBBER TRADE

The rubber export trade of Burma is constantly growing. Although the total quantity exported in 1919-20, 4,924,000 pounds, increased 18 per cent over the shipments of the previous year, 4,149,000 pounds, the value declined. The bulk of this product went to the United Kingdom in 1919-20. Burma's trade with the United States included raw rubber to the value of $46,623 and $13,660 in the fiscal years 1918 and 1919, respectively. Imports of rubber goods from the United States were $18,538 in 1918; $11,292 in 1919 and $25,398 in 1920.

THE RUBBER TRADE IN THE FAR EAST

By Our Regular Correspondent

MALAYA

The question of further reduction of output to 50 per cent is occupying planters' minds at present. While many hope the plan will go through, not a few think that nothing will come of it. Many small holdings have been forced to shut down and others have had to restrict output by one-half without waiting for legislation. Recent statistics show that receipts of native-grown rubber at Singapore have fallen by 60 per cent. So far only one European-owned estate has stopped tapping altogether, although reports indicate that others feel the need of such measures.

Opinion concerning the 50 per cent reduction is divided. Many who oppose it do so from the idea that such restriction would double the cost of production. In a letter to the *Straits Times*, W. M. Sime explains that with half crop the cost of production is really only 10 cents, Straits currency, a pound higher than with full crop.

Other opponents, mainly the strong companies, believe that nature should take its course and that the problem should be solved by the survival of the fittest. This is a very heartless view, and if put into effect it would by no means solve the problem. To be sure, the shutting down of many small estates would bring about a temporary reduction of output sufficient to send prices up. However, it is to be expected that the wealthier companies would seize the opportunity of acquiring additional rubber areas at very low prices, and would push the exploitation of their estates when rubber prices went up, and within a short time over-production and low prices would again prevail.

There is, therefore, the view that the supply of rubber must be controlled. Recently there appeared in the *Financier* an analytical survey of the problem and practical suggestions by one signing himself "Kidah." The following are some of the suggestions:

Reduction of costs by grouping together estates in the same district whenever possible.

Amalgamation of companies according to such groups.

Establishment of central warehouses in the chief distributing centers in Malaya, Ceylon and the Netherlands East Indies.

Complete control of distribution from these centers.

Decrees of British and Dutch colonial governments prohibiting the opening up of new lands for the time being.

The output would be dealt with as follows:

Immediate restriction of output by 50 per cent; companies or owners having only 50 per cent of their land in full bearing to restrict by 25 per cent.

When the price of rubber went above 2*s.* per pound, output to be restricted by 33 1/3 per cent. At 2*s.* 6*d.*, reduction to be 25 per cent until rubber touched 3*s.* 6*d.*, when full production or 90 per cent of full production should be resumed. As soon as the price dropped below 3*s.*, the 25 per cent restriction should be adopted again.

NEW INDUSTRIES

The discouraging conditions in the rubber industry have at last aroused Malaya to the danger of centering on only one or two crops, and the local government is endeavoring to encourage the cultivation of other crops, as sugar. It has also been suggested that attention be given to food crops, oil palm, ground nuts, rozelle fiber, etc.

The rubber slump has also opened the eyes of many to the fact that Malaya may have potential rivals in the other rubber-producing countries. Thus a correspondent of the *Malayan Tin & Rubber Journal*, wishes to know if serious efforts are being made in the Philippines to cultivate rubber. The writer is of opinion that should the Philippines be suitable for rubber cultivation Americans would not hesitate to spend the necessary money to open up the country and within a few years the islands would prove a serious menace to Malaya.

PERSONAL MENTION

F. Zech, rubber buyer for Fred Stern & Co., New York, N. Y., and Stern & Knowles, London, England, was tendered a dinner in Singapore late in February by friends, almost all of them connected with the rubber business, prior to leaving on a trip to Europe and the United States. A novel souvenir was provided for Mr. Zech in a sheet of pale crêpe bearing the signatures in copying ink of all those present.

CEYLON

Interesting data were given in the annual report presented at a recent meeting of the Ceylon Chamber of Commerce at Colombo.

Ceylon's industries, with the exception of coconut oil and copra, suffered from the general trade depression prevailing everywhere. The Government's offer to set aside 10 million rupees to aid tea and rubber estates was withdrawn. Estates were also hard hit by the high price of rice and it has been calculated that tea and rubber estates alone suffered a loss of 24 million rupees from this cause.

The total exports of rubber amounted to 87,296,356 pounds, and had voluntary restriction not been undertaken toward the end of the year, exports would have reached about 95 million pounds. Comparative figures for the years 1920 and 1919, with the countries of destination, follow:

	1919 Pounds	1920 Pounds
To United Kingdom	32,973,661	44,717,774
America	66,404,500	38,814,178
Europe	473,303	2,499,619
Australia	270,567	891,464
Japan	267,427	326,345
Other countries	3,373	46,976
Totals	100,392,831	87,296,356

America led in 1919 with 65 per cent of the exports, but dropped to second place, with 44 per cent in 1920. England, which in 1919 had taken 33 per cent of the total exports, stood first in 1920, her share being 51 per cent. Shipments to Europe showed an increase of 2,026,316 pounds principally to Germany, France and Italy.

Particulars relating to rubber offered at the local auctions during the last five years, follow:

	Pounds	Average Price Per Pound, Rupees
1916	24,675,206	1.79
1917	23,039,670	1.49
1918	20,869,795	....
1919	37,927,220	1.00
1920	36,078,693	0.70

For producers, 1920 was a very disappointing year. During January prices were steady with pale crêpe and No. 1 ribbed sheet selling at rupees 1.10 a pound; clean brown scrap crêpe at 95 cents, and curly scrap at 70 cents. However, prices declined until at the end of the year pale crêpe stood at 48 rupee cents (rupee—about 32 cents, United States currency, at normal rate of exchange); ribbed sheet 38 cents, clean brown scrap crêpes 30 cents and curly scrap 23 cents. These prices give an average well under the cost of production to most producers.

Recent inquiries show that while European-controlled estates in Ceylon are widely supporting the scheme for reducing output by 25 per cent, a large number of Ceylonese who own small rubber estates have failed to come into line. There are a number of these small acreages planted to rubber, the total area being no less than 40,000 acres. So far, little interest has been taken in the Malayan plan for compulsory restriction by 50 per cent. However, it is possible, that owing to the attitude of the Ceylonese, interest in this scheme will grow, particularly if it is adopted in Malaya.

LOCAL USES FOR RUBBER

An editorial in *The Weekly Times of Ceylon* mentions the various uses to which rubber has been put locally. Several estates are making and selling scrap rubber soles for boots and shoes. One planter is experimenting with scrap rubber on his cart roads. Locally made rubber studs to prevent windows from rattling are not unknown. A well-known proprietor has used his scrap rubber extensively on stairs, windows and doors of his bungalow.

CEYLON AND THE LONDON EXHIBITION

Ceylon's representation at the forthcoming exhibition will be divided into the following classes: 1. Crêpe; 2. Unsmoked sheet; 3, Smoked sheet; 4. Block; 5. Scrap Crêpe No. 1; 6. Clean curly scrap; 7. Any smoke cure.

NETHERLANDS EAST INDIES

While the stronger rubber concerns in the Netherlands East Indies have been able to carry through, there are many weak estates that are in difficulties. It is expected that in consequence there will be opportunities for securing good lands at reduced rates. This seems to be particularly true of Sumatra, East and West Coast, where many concessions are in the hands of those lacking either the capital or the desire to cultivate them.

Local planters are not enthusiastic over output restriction, and the big concerns particularly are keeping out of the movement. J. N. Burger, manager of various Dutch rubber-planting concerns, considers that efforts should rather be centered on reducing the cost than the output of rubber. In his opinion the present low market price is sufficient inducement to clear the accumulated stocks of rubber.

Sumatra has adopted a wait-and-see policy with regard to restriction. The movement in Malaya is being carefully observed and action here will be influenced by results obtained there. The expressed opinion is that output reduction can better be judged in Europe than in the lands of production, since there are other factors, outside of the East, that contribute in great part to the present crisis.

The rumors of English efforts to get local producers to join a syndicate that would centralize the sale of rubber and fix minimum prices, are not without a basis of fact. The opinion in certain quarters is that a majority of the planters would be willing to cooperate; however, it seems probable, that certain influential producers would be opposed to the movement.

NEW HEVEA DISEASE

In the *Archief voor de Rubbercultuur,* P. E. Keuchenius describes a new disease of *Hevea brasiliensis,* found in Malaya and the East Coast of Sumatra, though not in Java. The bark of infected trees is quite dry, can easily be removed and shows concentric bursts. In older cases, the bark gradually drops off and the concentric circles appear as typical rosettes. When the cork layer is scraped off, a sepia discoloration is found; this area is very full of sap and is sometimes attacked by borers. It is said that the disease is not dangerous as it never attacks the cambium. While the cause is not definitely known, it is certainly a disease of infection, originating in superficial wounds, and seems to be due to mould.

FRENCH INDO-CHINA

An official report states that under a decree of November 9, 1920, issued by the Governor-General of Indo-China, a subsidy of 450,000 piastres is granted to the rubber planters of French Indo-China in regard to their exports for the year ended March 31, 1921.

The decree contains a clause to the effect that if a customs duty is placed in France upon the importation of foreign rubber, the subsidy will be reduced proportionally by the amount of that duty. Furthermore, if the value of rubber per kilo on the London market exceeds the exchange value of the piastre by two francs, the payment of the subsidy will be suspended entirely. One quarter of the present subsidy will be borne by the Government of Cochin-China, where most of the rubber plantations are located, and the remainder by the Government of Indo-China.

There is a real need for government aid, for the combined effects of falling prices, abnormally high rate of the piastre and the high cost of labor make exploitation impossible. Although most planters need help, there are a certain number fortunate enough to be favorably located and able to turn out satisfactory dividends.

Recent Patents Relating to Rubber

THE UNITED STATES

GRANTED MARCH 1, 1921

No. 1,369,766 Rubber shaving-cup with soap-containing orifice. L. A. Amis, Muskogee, Okla.
1,369,767 Soft rubber lather-cup with massage projections on bottom. L. A. Amis, Muskogee, Okla.
1,369,771 Rubber heel. H. L. Beal, Brookline, Mass.
1,369,851 Hose clamp. A. P. Swaidmark, assignor to Universal Industrial Corporation, both of Hackensack, N. J.
1,369,868 Golf ball and similar article. G. C. Worthington, Elyria, Ohio.
1,369,931 Storage battery. H. McCreary, Youngstown, Ohio.
1,369,992 Billiard table having bed cloth comprising, in a single structure, a rubberized cotton warp back, and a wool top interwoven with said back, completely inclosing said warp. J. Turner, Dorchester, Mass.
1,370,045 Dirigible balloon. R. A. D. Preston, assignor to The Goodyear Tire & Rubber Co. both of Akron, Ohio.
1,370,065 Rubber protector for the soles and heels of footwear. H. T. Stephens, London, Eng.
1,370,066 Garter. S. W. Stern, Brooklyn, N. Y.
1,370,128 Inflating coupling. H. P. Kraft, Ridgewood, N. J., assignor to A. Schrader's Son, Inc., both in Brooklyn, N. Y.
1,370,168 Windshield cleaner. J. J. Tracy, Cleveland, Ohio.
1,370,170 Stopper plug. L. Ullman, New York, N. Y.
1,370,178 Valve for toy balloons. H. Albert, assignor to Art Toy & Stamping Works, Inc.—both of New York, N. Y.
1,370,280 Tire. O. Buse, Brooklyn, N. Y.
1,370,289 Hose coupling. R. D. Crippen, San Diego, assignor of one-half to G. B. Sheldon, La Mesa, both in Calif.
1,370,316 Diver's suit. H. Houdini, Brooklyn, N. Y.
1,370,395 Combined lock-sleeve and dust cap for valve stems. W. M. Anderson, Minneapolis, Minn.
1,370,437 Apparatus for testing battery jars. A. E. Gustafson, Centerville, S. D.
1,370,442 Cushion tire. H. M. Henry, Pottstown, Pa.

GRANTED MARCH 8, 1921

1,370,525 Paper box or carton for tire valves. E. Eisenkraft, assignor to A. Schrader's Son, Inc., both in Brooklyn, N. Y.
1,370,568 Abdominal supporter. M. E. Wagner, Atchison, Kans.
1,370,603 Combination valve cap and tire deflator. W. P. McComb, Conroe, Tex.
1,370,678 Tire pressure gage. W. A. Allen, Yonkers, N. Y., assignor to A. Schrader's Son, Inc., Brooklyn, N. Y.
1,370,684 Windshield cleaner. J. Demand, New York, N. Y.
1,370,709 Inking roller with surface of soft rubber. F. Smith, Philadelphia, Pa.
1,370,714 Auto tire. J. Strzyczkowski, New York, N. Y.
1,370,727 Rug holder. W. O. Bloom, West Boylston, Mass.
1,370,730 Pedal cover. T. C. Carver, Milwaukee, Wis.
1,370,797 Shoe sole stiffening device. H. C. Egerton, Passaic, N. J.
1,370,798 Reinforced gripping rubber shoe sole. H. C. Egerton, Ridgewood, N. J.
1,370,799 Arch supporting insole. H. C. Egerton, Ridgewood, N. J.
1,370,909 Windshield cleaner. J. Pederson, Bridgeport, Conn.
1,370,910 Windshield cleaner. J. Pederson, Bridgeport, Conn.
1,370,977 Tire lock applicable to the inflating valve. H. G. Levy, San Francisco, Calif.
1,370,988 Pressure indicator for pneumatic tires. W. M. Myers, St. Joseph, Mo.
1,371,040 Shoe heel. L. McMillan, Wilmington, N. C.
1,371,089 Combined tire inflator and gage. L. N. Herring, Marshall, Minn.
1,371,097 Pneumatic tire protector. L. I. Jones, Bowling Green, Ohio.
1,371,186 Vehicle tire. J. Parrino, assignor of one-half to G. Di Girolamo—both of Buffalo, N. Y.
1,371,194 Amusement device employing balloons. D. Bird, New York, N. Y.
1,371,203 Inflatable gas bags for airplane safety device. J. R. Drumman and T. Mieczejeksi, Rosemont, W. Va.

GRANTED MARCH 15, 1921

1,371,236 Gas mask. W. C. Geer, N. S. Noble and E. S. Teed—all of Akron, Ohio, assignors to The B. F. Goodrich Co., New York, N. Y.
1,371,274 Hose clamp. J. L. Thompson, Centerville, Iowa.
1,371,339 Detachable shoe heel pad. L. Arntz and B. Walters, both of Des Moines, Iowa.
1,371,363 Windshield wiper. A. F. Gillet, assignor to Jubilee Manufacturing Co.—both of Omaha, Nebr.
1,371,398 Spring heel with rubber lift overlapped by spring plate. B. F. Schirmer, New York, N. Y.
1,371,472 Sponge rubber cushion tire. T. W. Costello, San Francisco, Calif.
1,371,574 Tire lifter. E. D. Redfield, Hartford, Conn.
1,371,672 Pneumatic tire. A. F. Fairchild, Delavan, Wis.
1,371,676 Demountable rim for tires. W. H. Fox, Minneapolis, Minn.
1,371,708 Swimming glove. M. Schreiner, New York, N. Y.
1,371,763 Nasal Douche. J. H. Heron, Denver, Colo.
1,371,804 Manufacture of artificial fur comprising a fabric base, a coating of somewhat elastic vulcanizable material on the face side having a large number of hairs stuck into it endwise, said coating being vulcanized to hold the ends of the hairs. H. T. Nowell, New Rochelle, N. Y.
1,371,807 Tire tube. T. A. Philpott, Columbus, Mont.
1,371,919 Vermin-proof combined mattress and spring composed of superposed inflatable sections of vulcanized comparatively hard robber fabric and soft rubber, respectively, vulcanized together. E. P. Mahony, New York, N. Y.

GRANTED MARCH 22, 1921

1,372,004 Pacifier. C. C. Borchers, Chicago, Ill.
1,372,021 Process for the production of artificial patent leather and product thereof. H. J. Haon, Newburgh, N. Y., assignor by mesne assignments, to E. I. du Pont de Nemours & Co., Wilmington, Del.
1,372,089 Nose shaper and surgical supporter. A. D. Rostow, Summit, N. J.
1,372,101 Urine container and supporter. T. T. Snow, Sioux Falls, S. D.
1,372,115 Closure device with ball valve. T. H. Bennis, Brooklyn, N. Y.
1,372,116 Tire. H. Besser, Alpena, Mich.
1,372,213 Drinking fountain attachment for bibbs or faucets. F. P. Williams, assignor of one-fourth to A. Beauvais—both of Detroit, Mich.
1,372,230 Demountable rim for tires. R. L. Jenkins, assignor to G. L. Christian, Jr. both of Richmond, Va.
1,372,260 Auxiliary balloon for flying machine and inflating tank therefor. G. W. Wilkin, Grangeville, Idaho.
1,372,284 Tire inner liner. F. C. Doss, Atlanta, Ga.
1,372,322 Bottle cap. R. Stock, Sandusky, Ohio.
1,372,412 Cripple's washing device with suction cup. W. L. Finkhousen, Van Wert, Ohio.
1,372,417 Pneumatic tire. F. V. Gardner, Cincinnati, Ohio.
1,372,428 Endless belt with endless rubber core, a strip of rubber-impregnated fabric having diagonally cut and overlapping ends and being rolled around the core, and a rubber outer cover. A. M. Hardy, Bowmanville, assignor to The Goodyear Tire & Rubber Co. of Canada, Limited, Toronto—both in Ontario, Canada.
1,372,505 Sanitary mattress attachment. C. Hanson, Wittenberg, Wis.
1,372,517 Adjustable rubber pad, ferrule, or tip for walking sticks, crutches, etc. F. King, Carmarthen, Wales.
1,372,528 A collapsible boat composed of inflatable fabric members. F. Marcovsky, Duquesne, Pa.
1,372,587 Tire filler. H. A. Andresen, Chicago, Ill.
1,372,608 Fountain pen with transparent tube showing through lengthwise groove to indicate ink content. R. de Echevarria, Santa Cruz, Philippine Islands.
1,372,641 Spring wheel with pneumatic tire. M. N. Clay, Morgan City, La.

THE DOMINION OF CANADA

GRANTED MARCH 1, 1921

208,914 Elastic Tire. Fridtjov Anderson, Kristiania, Norway.
208,929 Windshield cleaner. V. H. Chritin, Toledo, Ontario.
208,930 Two-part rubber heel. W. H. Clark, Toronto, Ontario.
208,951 Cushion Wheel. P. H. Dorsey, Algiers, Louisiana, U. S. A.
208,962 Windshield cleaning apparatus. W. M. Folbertb, Cleveland, Ohio. U. S. A.
208,975 Windshield cleaner. F. S. Gold, Toronto, Ontario.
208,989 Blow-out patch. W. V. Hayes, New York, U. S. A.
209,024 Pencil eraser. H. Moore, Brooklyn, New York, U. S. A.
209,060 Washing device. P. Sporer, Chicago, Ill., U. S. A.

GRANTED MARCH 8, 1921

209,322 Laminated sheet of rubber and chemically treated, parchmentized vegetable fibre. The Diamond State Fibre Co., Bridgeport, assignee of A. M. E. Strijffert, Norristown—both in Pennsylvania, U. S. A.

GRANTED MARCH 15, 1921

209,418 Vaginal douche. C. W. De Long, Live Oak, Florida, U. S. A.
209,435 Boot and shoe lift. T. A. Gambino, Providence, Rhode Island, U. S. A.
309,440 Rupture appliance, with rubber pad. A. L. Hatzan, Niagara Falls, Ontario.
209,537 Rubberized fabric steam line shields for cables. The Goodyear Tire & Rubber Co., assignee of R. Hazlett Upson—both of Akron, Ohio, U. S. A.

GRANTED MARCH 22, 1921

209,612 Nursing bottle attachment to prevent collapse of nipple. L. D. Clark, Waterville, Maine, U. S. A.
209,615 Combined dental syringe and mirror. J. E. Craig, Gary, Ind., U. S. A.
209,686 Elastic stocking. S. Mohink, Pawtucket, Rhode Island, U. S. A.
209,725 Gutta percha or gutta percha compound insulating medium for cables with self-inductive lead. K. W. Wagner, Berlin Lankwitz, Germany.
209,792 Obstetrical bandage with inflatable pad in center. T. W. H. Young and T. H. Kendrey, assignee of a half interest—both of Peterborough, Ontario.

THE UNITED KINGDOM

PUBLISHED FEBRUARY 16, 1921

155,325 Pneumatic tire. A. T. Milne-Smith, Laurel Cottage, Fox Hill, Upper Norwood, London.
155,348 Resilient work-support with inflatable casing for leather-working machines. A. S. Jones, Pendower, Wrexham, Denbighshire, and Turner Tanning Machinery Co., Peabody, Mass., U. S. A.
155,362 Sectional inner tube with individual valves for sections. S. Mack, 29 Elie House Road, Mutwal, Colombo, Ceylon.
155,393 Latex spout. P. J. Magoris, 16 King street, Portman Square, and F. V. Wart, 3 Torrens street, City Road, both in London.
155,421 Bottle stopper with rubber washer. C. Buchan, 3 Lygon Road, Edinburgh.
155,465 Reinforced pneumatic tire. G. R. Granzow, Thompson, Iowa, U. S. A.
155,479 Inflatable artificial bait. M. White, 15 Dundonald Road, Glasgow.
155,505 Tire interliner containing semi-liquid puncture-closing composition. H. Wade, 111 Hatton Garden, London.
155,512 Sock-suspenders. J. K. Seymour, 116 Lake avenue, Elyria, Ohio, U. S. A.

Chemical Patents will be found on page 581. Machinery Patents on pages 584-585

PUBLISHED FEBRUARY 23, 1921

155,716 Window buffer. J. Holloway, 4 Wesley Road, High Road, Leyton, London.
155,734 Sock-suspenders. J. Lindauer, 42 Faubourg du Temple, Paris.
155,737 Cushion tire. D. Maggiora, Villa le Fontanelle, Firenze, Careggi, Italy.

PUBLISHED MARCH 2, 1921

155,974 Toy airplane actuated by elastic band. R. N. Bullock, Pendean, Forest avenue, Forest Hall, Northumberland.
156,001 A rubber core to replace the air-tube in an ordinary tire cover. S. G. Wood, 64 Milton Park, Highgate, London.
156,043 Tire attachments to rims. E. E. W. Butt, 410 Mansion House Chambers, Queen Victoria street, London.
156,074 Catamenial appliance. E. Kuhn, 48 Viktoriastrasse, Schlachtensee, near Berlin. (Not yet accepted.)
156,102 Respiratory appliance. R. van der Heide, 43 Wielandstrasse, Charlottenburg, Berlin. (Not yet accepted.)
156,205 Solid or cushion tire reinforced with strips of frictioned fabric. The Goodyear Tire & Rubber Co., 1144 East Market street, assignee of J. E. Hale, 862 West Exchange street—both of Akron, Ohio, U. S. A. (Not yet accepted.)
156,239 Spring wheel with pneumatic, rubber ring, or similar cushions. Dobbins Wheel Co., 717 First National Bank Building, Denver, Colorado, assignee of T. C. Dobbins, Huntington Park, Calif.—both in U. S. A. (Not yet accepted.)
156,240 Spring wheel with rubber tire. Dobbins Wheel Co., 717 First National Bank Building, Denver, Colo., assignee of T. C. Dobbins, Huntington Park, Calif.—both in U. S. A. (Not yet accepted.)
156,256 Garment suspenders. J. Pabst, 46 Gessneralle, Zurich, Switzerland. (Not yet accepted.)
156,314 Cushion tires. T. P. Jones, 11 Paul Nel street, Hillbrow, Johannesburg, South Africa.
156,453 Corsets with elastic bands. R. M. Hahn, 6 Great Castle street, London.
156,461 Finger, stamp or envelope moisteners. G. W. Jones, 1443 King street, West Toronto, Canada.
156,465 Connected upper and lower garters to be worn above and below the knee, respectively. C. Baring, Park Place, Englefield Green, Surrey.
156,568 Construction of pneumatic tire cover to permit attaching to rim by cement. A. Schipke, 18 Lauenburgerstrasse, Wilmersdorf, Berlin. (Not yet accepted.)
156,584 Construction of heels for attaching removable rubber lifts. H. F. W. Stedler, Hohenbostel, Deister, Hanover, Germany. (Not yet accepted.)

PUBLISHED MARCH 16, 1921

156,650 Cushion tire. H. Debor, 55 Zielstattstrasse, Munich, Germany. (Not yet accepted.)
156,770 Hose coupling. J. M. Oden, 253 Tillary street, Brooklyn, N. Y., U. S. A. (Not yet accepted.)
156,786 Boxes for holding tire valve caps. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)
156,787 Wheel tires. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)
156,788 Diving dress stiffened with pneumatic tubes. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of M. C. Schweinert, 42 Riverside Drive—both in New York, U. S. A. (Not yet accepted.)
156,789 Tire valves. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of M. C. Schweinert, 42 Riverside Drive—both in New York, U. S. A. (Not yet accepted.)
156,790 Wrench for tire valves. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)
156,791 Tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)
156,792 Dust cap for tire valves. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of M. C. Schweinert, 42 Riverside Drive—both in New York, U. S. A. (Not yet accepted.)
156,793 Attachment of valve stem to tire tubes. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)
156,794 Dust cap for tire valves, etc. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of E. van A. Myers, 77 Evergreen Place, East Orange, N. J.—both in U. S. A. (Not yet accepted.)
156,795 Tire valves. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)
156,847 Tire with sponge rubber interliner. S. Midzushima, 30, 9-Chome, Kobiki-Cho, Kyobashi-Ku, Tokio.
156,886 Detachable rubber heel. A. Powell, 26 Rushton Road, Cobridge, Stoke-on-Trent.
156,967 Wedge-shaped vulcanite golf appliance held between the teeth and connected to player's clothing by tapes or elastic for teaching a player to avoid head movement when making a stroke. S. Hickman, 12 Bernard Gardens, Wimbledon, London.
156,989 Solid tire with tubular steel hoop embedded therein near base. T. H. Rushton, 31 Southbrook Road, Lee, London.

GERMANY

PATENTS ISSUED, WITH DATES OF ISSUE

335,631 (June 13, 1920.) Pneumatic tire attachment. Saturn-Luftreifen-Gesellschaft Eichler & Co., Hanover.
335,632 (November 22, 1916.) Cushion tire. Emil Schätzle and Caroline Seraphine Schätzle, née Froideveaux, Waldenburg, Switzerland. Representative: Emil Schätzle, Weil b. Lörrach, Baden.
335,857 (September 11, 1919). Resilient tire. Dr. Alfred Amsler, Rheinbuhl, Shaffhausen, Schweiz; represented by Dr. L. Gottsche, Berlin, W. 8.
335,896 (June 12, 1919.) Resilient tire: Dr. Hermann Punig, Neuplstr. 26-27, Munster i. W.
335,897 (August 29, 1919). Resilient tire. Paul Kutter, Magdeburgerstr. 5, Brandenburg a. H.

TRADE MARKS

THE UNITED STATES

SERIAL NUMBERS PUBLISHED MARCH 10, 1921*

No. 96,277 Representation of a rubber nipple having a red band at edge—rubber nipples. Revere Rubber Co., Providence.
123,837 Air Lock—air valves for tires, pneumatic cushions, life-preservers, etc. The Griffith Manufacturing Co., Boston.
127,083 Representation of a globe surmounted by a spread eagle and encircled by a ribbon scroll the globe and scroll bearing the words Eagle Brand Rubber Toys—toy balloons. The Eagle Rubber Co., Ashland, Ohio.
129,381 Goodrich—druggists' and surgical sundries. The B. F. Goodrich Co., New York.
131,951 Representation of label showing children at play with balloons and the word Faultless—toy balloons. The Faultless Rubber Co., Ashland, Ohio.
135,127 Evenflo—stylographic pencils and fountain pens. I. J. Bissell, Grand Rapids, Mich.
137,465 Akron—belting, hose and packing. The B. F. Goodrich Co., New York.
137,474 Goodrich—rubber or rubber composition. The B. F. Goodrich Co., New York.
138,447 Evrda—fountain pens, etc. S. J. Meyerpeter, Chicago.
139,714 Diadem—rubber belting and hose, rubber and composition packing and gaskets. E. Z. Jefferson, Pittsburgh, Pa.
139,907 Toothex Tooth Exercise Gum—chewing gum. Pirodent Corporation, Detroit.

SERIAL NUMBERS PUBLISHED MARCH 18, 1921*

120,403 Betty Bates enclosed in a conventionalized oval—rubber and leather boots and shoes, rubber boots, etc. A. J. Bates & Co., Inc., New York.
126,468 Goodrich—waterproof clothing and footwear. The B. F. Goodrich Co., New York.
131,503 Noxall—waterproof baby pants. Rubberized Sheeting & Specialty Co., Inc., New York.
138,055 Lister-Spearmint—chewing gum. Listerated Gum Corporation, New York.

SERIAL NUMBERS PUBLISHED MARCH 24, 1921*

121,279 "Red Spot" above a red spot—brake linings and clutch facings. J. R. Kelso, Trenton, N. J.
129,382 Goodrich—valves, ball valves, dredging sleeves, emergency bands for pneumatic tires, floats, gas pipe, rings, hard and soft rubber connections for fluid conductors, belting, hose, machinery packing, non-adhesive tire repair materials, pump and regulator diaphragms, tire reliners, screen diaphragms for paper pulp vats, sheet diaphragms, pneumatic, solid or cushion tires, vacuum brake, diaphragms, etc., all made wholly of rubber or rubber combined with asbestos or fabric. The B. F. Goodrich Co., New York.
135,826 Seibel. Facsimile signature—pneumatic tires. Seibel Air-Spring Co., Inc., Phoenix, Ariz. (See The India Rubber World, February 1, 1920, page 345.)
137,473 Goodrich—thread made of rubber. The B. F. Goodrich Co., New York.
138,975 Drive-On! Sheet-rubber patches. E. T. Barker, Oakland, Calif.
139,474 Red W enclosed between representation of two posts connected at top and bottom by chains—raincoats. W. H. Redwine, Pittsburgh, Pa.
139,583 Las-Stik Tube Patch, The Original Patch With a S-t-r-e-t-c-h—fabric and rubber repair patches. Las-Stik Patch Manufacturing Co., Hamilton, Ohio.
140,158 Brite Mawnin—jar rings. Amboy Products Co., Inc., Chicago. (See description elsewhere in this issue.)

SERIAL NUMBERS PUBLISHED MARCH 29, 1921*

126,499 Representation of a stick of licorice and a Brownie-type figure—chewing gum. Wm. Wrigley, Jr., Co., Chicago.
132,661 Sure-On—detachable treads or shoes of rubber and fibrous materials for use on pneumatic tires. Sure-On Tire Saver Co., Chicago.
132,903 Representation of a seal bearing the words Willard Thread Rubber, Insulation and the letter W—storage batteries and parts thereof. Willard Storage Battery Co., Cleveland, O.
139,110 The word Cox combined with a sphinx and a pyramid above a rectangle—rubber tapes, webbing, hard rubber and vulcanized fiber, etc., all used for electrical insulating purposes. Albert J. Cox Co., Chicago.
140,177 The word Spiralweave superimposed above a keystone and two insulated wires—insulated wires and cables. Hazard Manufacturing Co., Wilkes-Barre, Pa.
141,780 'Order from Horder'—rubber stamps. Horder's, Incorporated, Chicago.

*Notice of opposition must be filed with the Commissioner of Patents, Washington, D. C., within thirty days after this date.

TWO KINDS OF TRADE MARKS NOW BEING REGISTERED

Under the rules of the United States Patent Office, trade marks registered under the Act of February 20, 1905, are, in general, fanciful and arbitrary marks, while those registered under the Act of March 19, 1920, Section 1 (b), are non-technical, that is, marks consisting of descriptive or geographical matter or mere surnames. To be registered under the latter act, trade marks must have been used for not less than one year. Marks registered under this act are being published for the first time when registered, any opposition taking the form of an application for cancellation. The following list includes those of interest to the rubber trade published since the establishment of this procedure:

GRANTED MARCH 1, 1921

Under Act of February 20, 1905

139,998 Jenckes—textile fabrics in the piece for tire manufacture. Jenckes Spinning Co., Pawtucket, R. I.

Under Act of March 19, 1920, Section 1 (b)

140,024 INRGARD TIRE REINFORCEMENT, accompanied by representations of section of tire, interliner and inner tube overlapping each other beneath a section of interliner—tire reinforcements made of fabric and cement. The American Automobile Accessories Co., Cincinnati, O.

140,055 SCHMIDT'S ARCH HEEL and representation of heel—rubber, leather, and composition heels. M. C. Schmidt, Tacoma, Wash.

140,065 BOOTEE—lumbermen's fabric and rubber boots. United States Rubber Co., New Brunswick, N. J., and New York, N. Y.

RENEWALS

19,078 The monogram VZ—belting, hose and packing for machinery. Revere Rubber Co., Boston, Mass., assignor to Revere Rubber Co., a Rhode Island corporation.

GRANTED MARCH 8, 1921

Under Act of February 20, 1905

140,092 ONE-IN-ALL "IN THE RAIN"—waterproof coats and slickers, J. T. Caradine, St. Louis, Mo.

140,128 VULCO-CURED TUBE—inner tubes. The Gates Rubber Co., Denver, Colo.

140,191 SATURN—rubber and fabric belting. The Gutta Percha & Rubber Manufacturing Co., New York.

140,200 Section of belting showing copper thread—belting. The Rossendale-Reddaway Belting & Hose Co., Newark, N. J.

140,223 STAR—pneumatic and solid tires. The Star Rubber Co., Akron, O.

Under Act of March 19, 1920, Section 1 (b)

140,267 RUBBER HARDWARE—tire valves, dust caps, etc. The Dill Manufacturing Co., Cleveland, O.

140,294 PANAMA—garters. President Suspender Co., Shirley, Mass.

GRANTED MARCH 15, 1921

Under Act of February 20, 1905

140,311 Conventional design—belting, hose, packing, and belt lacings. C. O. Alexander, Philadelphia, Pa.

140,326 BENNIE SPRINGFIELD—pneumatic tires. Alexander Bennie & Co., Nashville, Tenn.

140,363 DRESCO—belting, hose, packing, and tires. Delaware Electric & Supply Co., Wilmington, Del.

140,364 SUPERTITE—Fountain pens, etc. De Witt-La France Co., Cambridge, Mass.

140,374 RUBBER ACE MASTER OF AIR—sponge rubber tire fillers. Elgin Rubber Ace Co., Elgin, Ill.

140,375 RUBBER ACE—sponge rubber tire fillers. Elgin Rubber Ace Co., Elgin, Ill.

140,376 MASTER OF AIR—sponge rubber tire fillers. Elgin Rubber Ace Co., Elgin, Ill.

140,382 FEDERAL—belting, hose, packing, tires, reliners, patches, washers, rings and balls. The Federal Rubber Co., Cudahy, Wis.

140,444 SYRA-CORD—tire casings or shoes and inner tubes. Syracuse Rubber Co., Inc., Syracuse, N. Y.

140,449 TIRETEX—woven fabrics in the piece for making tires. Thistle Cotton Mills, Inc., Ilchester, Md.

140,450 Representation of a tiger holding a tire encircling the words TIGER CLAW—tire patches. Tigers Claw Manufacturing Co., Detroit, Mich.

140,480 A Marathon runner—inner tubes. The Marathon Tire & Rubber Co., Cuyahoga Falls, O.

140,508 EVEREADY—ruberhose, and rubber and fiber hose, etc. Oxweld Acetylene Co., Newark, N. J.

140,531 RAINBOW—elastic webbing. The Russel Manufacturing Co., Middletown, Conn.

140,532 ELK—elastic webbing. The Russell Manufacturing Co., Middletown, Conn.

140,533 GIBRALTAR—elastic webbings. The Russell Manufacturing Co., Middletown, Conn.

140,534 SHAMROCK—elastic webbings. The Russell Manufacturing Co., Middletown, Conn.

140,535 ALLIGATOR—elastic webbings. The Russell Manufacturing Co., Middletown, Conn.

140,536 CHALLENGE—elastic webbings. The Russell Manufacturing Co., Middletown, Conn.

Under Act of March 19, 1920, Section 1 (b)

140,538 A white disk surrounded by a red band, and the words GOODYEAR CORD AKRON—rubber or rubber and fabric tires. The Goodyear Tire & Rubber Co., Akron, O.

GRANTED MARCH 22, 1921

Under Act of February 20, 1905

140,582 The letter C containing the letter X—tires and tubes. The Converse Rubber Shoe Co., Malden, Mass.

140,617 "SHIRLASTIC"—sanitary belts. I. B. Kleinert Rubber Co., New York.

140,618 KNICKERBOCKER—massage shower-bath sprays. Knickerbocker Manufacturing Co., Chicago, Ill.

140,677 SANSCO—infants stork pants and bibs. N. Scoville, St. Louis, Mo.

140,688 KIDALLS—overalls. United States Rubber Co., New Brunswick, N. J., and New York, N. Y.

Under Act of March 19, 1920, Section 1 (b)

140,714 MILLER—rubber sponges and sponge rubber. The Miller Rubber Co., Akron, O.

THE DOMINION OF CANADA

REGISTERED

28,028 UNIVERSAL—electric storage batteries, parts, and accessories. Universal Battery Co., Chicago, Ill., U. S. A.

28,078 Representation of a pen-nib bearing the words PEN-CORD—tires and tubes. W. A. F. Oakley, Hamilton, Ont.

28,131 SIMMS and the words SET IN RUBBER in an oval over the word SIMMS—brushes. T. S. Simms & Co., Limited, Saint John, N. B.

28,134 A maple leaf surcharged with the words C. V. E., LONDON, and underneath, the words TRADE MARK—motor accessories and auto-shop equipment. Canada Vulcanizer and Equipment Co., Limited, London, Ont.

THE UNITED KINGDOM

PUBLISHED JANUARY 5, 1921

403,629 Representation of a tire enclosing figure of a man standing beneath a tree—tire dressings, cement, and puncture-healing composition. George Spencer Moulton & Co., Limited, and Wood-Milne, Limited, 2 Central Buildings, Westminster, London, S. W. 1.

407,944 Representation of a pile of three tires with different treads, accompanied by the words HIGH FRESS RETREADS, DRICURE PROCESS—tires. The United Rubber Co., 141-143, Commercial Road, Peckham, London, S. E. 15.

PUBLISHED JANUARY 12, 1921

407,857 LIXUM—manufactured rubber and gutta percha goods not included in classes other than No. 40. The Greengate & Irwell Rubber Co., Limited, Greengate Rubber Works, Greengate, Salford, Lancashire.

407,858 LIXUM—hose and packing. The Greengate & Irwell Rubber Co., Limited, Greengate Rubber Works, Greengate, Salford, Lancashire.

408,439 Conventionalized representation of the sun's rays around a circle enclosing the word ABACUS arranged in a central acrostic, accompanied by the words, THERE IS SOME THING NEW UNDER THE SUN—fountain pens, etc. E. J. Hammond, 10 Chertsey Road, Leytonstone, London, E. 11.

409,163 PUNKHO—medium for closing tire punctures. F. S. Brereton, Felton Lodge, Boxmoor, Hertfordshire.

B409,422 RAYNOFF—waterproof clothing, etc. J. Mandleberg & Co., Limited, Albion Waterproofing Works, Cobden street, Pendleton, Manchester.

PUBLISHED JANUARY 19, 1921

407,148 Representation of a lightning flash and the word 'ECLAIR'—electrical insulating materials. John W. Shaw, Limited, 90 Broughton Lane, Strangeways, Manchester.

407,822 Representation of three round heels arranged in trifoil formation, with the monogram SRCO superimposed upon them—rubber heels and soles. Barnet Etkind, trading as The Sussex Rubber Co., 32 Houndsditch, London, E. 1.

408,251 ROTEX—rubber tobacco pouches. A. Oppenheimer & Co., 38 Finsbury Square, London, E. C. 2.

408,580 OAK—all rubber goods included in Class No. 40. Oak Tire & Rubber Co., Limited, 19 Dundas street, East, Toronto, Ont., Can.; address for service in the United Kingdom, care of H. Fairbrother, 30-32 Ludgate Hill, London, E. C. 4.

PUBLISHED JANUARY 26, 1921

401,184 Conventionalized Maltese cross wider than high, not to be used in red—chewing gum. William Wrigley Junior Co., 5 North Wabash avenue, Chicago, Ill., U. S. A.; address in the United Kingdom, care of Marks & Clerk, 57-58 Lincoln's Inn Fields, London, W. C. 2.

402,440 Representation of profile bust on disk, accompanied by the words CARDINAL WOLSEY—manufactured rubber and gutta percha goods not included in classes other than No. 40. Walker, Sons & Tyler, Limited, 31 King street, Leicester.

405,626 PHELVAN BRAND and a representation of the statue of a man strangling a snake, standing on a plinth bearing the name GOLIATH—tires and tiring material. The Manufacturers' Eastern Agency, 32 Apollo street, Bombay, India; address for service in the United Kingdom, care of G. F. Redfern & Co., 15 South street, Finsbury, London, E. C. 2.

408,086 ROTEX—hose and packing. A. Oppenheimer & Co., 38 Finsbury Square, London, E. C. 2.

409,366 ACE—hose and packing, asbestos goods in Class No. 50, etc. The Beldam Packing & Rubber Co., Limited, 29 Gracechurch street, London, E. C. 3.

409,937 A conventionalized monogram formed of the letter R reversed joined to W and R, with the word HYDE between—rubber and other goods included in Class No. 40. Redfern's Rubber Works, Limited, Dawson and Spring Bank streets, Hyde, Cheshire, and 75 Newman street, London, W. 1.

410,035 TOPAZ—sponge substitutes of rubber and spongy rubber goods not included in classes other than No. 40. Featheredge Rubber Co., 408 West Grand avenue, Chicago, Ill., U. S. A.; address for service in the United Kingdom, care of Francis Heron Rogers, Bridge House, 181 Queen Victoria street, London, E. C. 4.

410,196 LUKKIOUKKI—inflatable rubber toys. J. G. Franklin & Sons, Limited, 17 Colvestone Crescent, Dalston, London, E. 8. (See description in THE INDIA RUBBER WORLD, April 1, 1921, page 504.)

PUBLISHED FEBRUARY 2, 1921

B405,010 GRAPHO—fountain pens, ink and pencil erasers, rubber bands, etc. Grapho, Limited, 13 Lovell's Court, London, E. C. 4.

407,712 Representation of a label bearing the words LE REPNEU and a group of gnomes repairing tires and supporting one which has been repaired and branded LE REPNEU, accompanied by further text in French—tires and tubes, etc. Frederick William Farr, trading as The Hercules Tyre Co., Reclaim Works, 16 Henry street, Northampton.

408,146 SPRINGBOK—sock suspenders. John Patterson, Jr., The Scotch House, Wellington street, Aldershot, Hampshire.

408,196 SEMCO—inner tubes for automobile and motorcycle pneumatic tires. Semple Rubber Co., 112 Murray street, Trenton, New Jersey, U. S. A.; address for service in the United Kingdom, care of Herbert Haddan & Co., 31-32 Bedford street, Strand, London, W. C. 2.

PUBLISHED FEBRUARY 9, 1921

402,160 BOX-ALL—rubber heels, tips, and soles. Elijah Day & Sons, Limited, 462 Claremont Road, Rusholme, Manchester.

408,866 SALAMANDER beneath the representation of a salamander bearing a pen or pencil in its mouth—fountain and stylographic pens, etc. George Hyman Hudson, trading as G. H. Hudson & Co., 65-66 Basinghall street, London, E. C. 2.

409,094 NADATH—rubber heels. Arthur Powell, 26 Rushton Road, Cobridge, Stoke-on-Trent, Staffordshire.

409,298 Harmen tires, casings, and innner tubes. H. J. Menzies, Linden House, Langholme Road, East Boldon, Newcastle-on-Tyne.

410,350 Walpad—rubber belts and belting. F. Reddaway & Co., Limited, Victoria Mills, Cheltenham street, Pendleton, Manchester, Lancashire.

Published February 16, 1921

405,078 A triangle containing the monogram AR between the letters C and O—waterproof garments. Alfred Smith, trading as The Amazon Rubber Co., 31 Sackville street, Manchester.

405,581 Pussy Foot-Pad and the representation of a cat's foot-print within a circle—rubber soles and heels. Andrew Spiller, 31 Gunnersbury Lane, Acton, London, W. 3.

409,416 Victaulic—rubber packing. The Victory Pipe Joint Co., Limited, 64 Victoria street, Westminster, London, S. W. 1.

409,823 Federuber manufactured rubber and gutta percha goods not included in classes other than No. 40. George Spencer Moulton & Co., Limited, and Wood-Milne, Limited, 2 Central Buildings, Westminster, London, S. W. 1.

Published February 23, 1921

405,456 Ralco—balata machine belting. William Thomas Lambourne, trading as The W. T. Lambourne Co., 5 Henrietta street, Covent Garden, London, W. C. 2.

B409,626 Featheredge and the words Trade Mark—rubber sponges. Featheredge Rubber Co., 408 West Grand avenue, Chicago, Ill., U. S. A.; address for service in the United Kingdom, care of H. Gardner & Son, 173-175 Fleet street, London, E. C. 4.

New Zealand

Published February 10, 1921

16,515 Representation of seal of company, bearing, among other things, the name of the company and the words Picher Pure White Lead—lead pigments, carbonate, sulphate, monoxide, oxidized white lead, etc., for use in the rubber and other industries. The Eagle-Picher Lead Co., 1020 Broadway, Cincinnati, Ohio, U. S. A.

16,579 Oldfield formed by representation of a tire as O and the letters ldfield, so drawn as to look as if they were traveling along a road—pneumatic and solid tires, inner tubes, and accessories. The Oldfield Tire Co., 2045 Euclid avenue, Cleveland, Ohio, U. S. A.

Designs

The United States

No. 57,184 Tire. Patented March 1, 1921. Term 14 years. W. D. Carnal, Akron, assignor to The Tuscora Rubber Co., New Philadelphia—both in Ohio.

57,185 Tire. Patented March 1, 1921. Term 14 years. James Christy, Cleveland, assignor to The Portage Rubber Co., Barberton—both in Ohio.

57,207 Tire. Patented March 8, 1921. Term 14 years. W. Carnal, Akron, assignor to The Knox Tire & Rubber Co., Mount Vernon—both in Ohio.

57,208 Tire. Patented March 8, 1921. Term 14 years. W. Carnal, Akron, assignor to The Knox Tire & Rubber Co., Mount Vernon—both in Ohio.

57,209 Tire. Patented March 8, 1921. Term 14 years. W. Carnal, Akron, assignor to The Knox Tire & Rubber Co., Mount Vernon—both in Ohio.

57,210 Tire. Patented March 8, 1921. Term 14 years. W. D. Carnal, Akron, assignor to The Tuscora Rubber Co., New Philadelphia—both in Ohio.

57,211 Tire. Patented March 8, 1921. Term 14 years. W. D. Carnal, Akron, assignor to The Tuscora Rubber Co., New Philadelphia—both in Ohio.

57,224 Tire casing. Patented March 8, 1921. Term 7 years. T. G. Graham, assignor to Sears, Roebuck & Co.—both in Chicago, Ill.

57,225 Rubber Heel. Patented March 8, 1921. Term 14 years. G. W. Grubb, New Philadelphia, Ohio.

57,257 Tire casing. Patented March 8, 1921. Term 14 years. Ludvig T. Petersen, assignor to The Republic Rubber Corporation—both of Youngstown, Ohio.

57,258 Tire casing. Patented March 8, 1921. Term 14 years. Ludvig T. Petersen, assignor to The Republic Rubber Corporation—both of Youngstown, Ohio.

57,259 Tire casing. Patented March 8, 1921. Term 14 years. Ludvig T. Petersen, assignor to The Republic Rubber Corporation—both of Youngstown, Ohio.

57,260 Tire casing. Patented March 8, 1921. Term 14 years. Ludvig T. Petersen, assignor to The Republic Rubber Corporation—both of Youngstown, Ohio.

57,261 Tire casing. Patented March 8, 1921. Term 14 years. Ludvig T. Petersen, assignor to The Republic Rubber Corporation—both of Youngstown, Ohio.

57,265 Non-skid tire. Patented March 8, 1921. Term 3½ years. W. H. R. Thaler, assignor to New Castle Rubber Co.—both of New Castle, Pa.

57,271 Air hose stand. Patented March 8, 1921. Term 14 years. G. F. Royer, Wilkes Barre, Pa.

57,290 Tire. Patented March 8, 1921. Term 14 years. M. L. Wiener, Akron, assignor to The Oldfield Tire Co., Cleveland—both in Ohio.

57,295 Tire. Patented March 15, 1921. Term 14 years. Addison A. Arter, Omaha, Nebr.

57,297 Tire tread. Patented March 15, 1921. Term 3½ years. Herbert T. Auerbach, Buffalo, New York.

57,303 Tire. Patented March 15, 1921. Term 14 years. D. L. Becker, Oakland, Calif.

57,307 Tire. Patented March 15, 1921. Term 14 years. J. J. Black, assignor to The Master Tire & Rubber Co.—both of Dayton, O.

57,310 Advertising clock having tire as frame, and bearing the words Time to Retire beneath bust of figure yawning with arms up raised. Patented March 15, 1921. Term 14 years. F. R Bessert, Chicago, Ill.

57,332 Tire tread. Patented March 15, 1921. Term 14 years. L. A. Giedys, Akron, Ohio.

57,336 Tire casing. Patented March 15, 1921. Term 14 years. A. H. Harris, Barberton, assignor to The Cleveland Rubber Corporation Co., Cleveland—both in Ohio.

57,339 Rubber heel. Patented March 15, 1921. Term 14 years. E. J. Hooper, Stoughton, Mass., assignor to Foster Rubber Co. Kennebunk, Me.

57,340 Tire casing. Patented March 15, 1921. Term 14 years. F. C. Hudson, assignor to Archer Tire & Rubber Co.—both of Minneapolis, Minn.

57,348 Advertising sign with reproduction of automobile wheel and tire at one end. Patented March 15, 1921. Term 7 years. R. R. Johnstone, Wauwatosa, Wis.

57,350 Tire tread. Patented March 15, 1921. Term 7 years. L. M. Kennedy, Fulton, Ill.

57,363 Cushion tire. Patented March 15, 1921. Term 14 years. H. M. Lambert, Portland, Oreg.

57,376 Tire. Patented March 15, 1921. Term 7 years. J. H. Patten, Seattle, Wash.

57,377 Tire Tread. Patented March 15, 1921. Term 14 years. W. H. Paull, Birmingham, assignor to The Dunlop Rubber Co., Limited, London—both in England.

57,386 Tire. Patented March 15, 1921. Term 7 years. N. Serlin, Chicago, Ill.

57,408 Tire casing. Patented March 15, 1921. Term 14 years. O. L. Weaver, assignor to The Star Rubber Co.—both of Akron, Ohio.

The Dominion of Canada

4,998 Rubber heel for soft shoe soles. Patented March 1, 1921. The Hurlbut Co., Limited, Preston, Ont.

Germany

Design Patents Issued, with Dates of Issue

767,240 (June 6, 1920). Tobacco pouch of seamless rubber. Paragummiwerk m. b. H., Köln-Dentz.

767,612 (January 26, 1921). Waterproof rain hat. Continental-Caoutchouc und Gutta-Percha Compagnie, Hannover.

767,755 (October 18, 1920). Rubber band for rubber coating on footwear. Karl Bayer, Herrenkellergasse 1, Ulm a. D.

767,813 (January 29, 1921). Atomizer. Alfred Wassmuth. G. m. b. H., Köln-Delbrück.

767,816 (January 31, 1921). Slip-on rubber heel. Gustav Hoelze, Luisenallee 92, Konigsberg i. Pr.

767,922 (January 29, 1921). Dry inhaling apparatus. Wilhelm Bregler, Pragstrasse 94, Stuttgart-Cannstatt.

767,924 (January 29, 1921). Atomizer. Max Heinz Gurth, Belle Alliance Strasse 47, Berlin.

768,003 (January 31, 1921). Rubber tread for bicycles, motorcycles and automobiles. Vereinigte Gothiana-Werke A.-G., Gotha.

768,318 (February 4, 1921). Mouth-piece. New York Hamburger Gummi-Waaren Compagnie, Hamburg.

768,421 (February 2, 1921). Athletic belt. August Gross, Kurfüstendamm 47, Berlin.

768,635 (February 5, 1921). Stuffing-box packing. Joh. Behrens, Bornstrasse 57, Bremen.

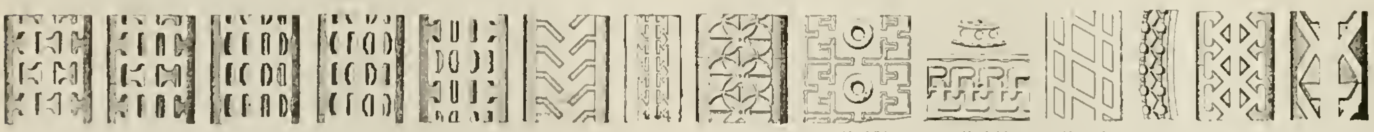
768,942 (January 12, 1921). Rubber heel, with non-slipping device. Ella Meyar, Marienstr. 9., Harburg a. E.

769,030 (February 7, 1921). Kidney-shaped rubber sucker for dental gum-plates. Paul Weyel & Täschner, Duren, Rhld.

769,077 (January 26, 1921). Hygienic protector for ladies. Oskar Petrich, Bulmannstr. 23, Nürnberg.

769,259 (November 9, 1920). Aluminum plate with circular hollow for renewable rubber heels. Bernhard Ridder, Römerstr. 97, Koblenz.

769,266 (December 7, 1920). Renewable sole protector of elastic rubber. Anton Kolodziej, Füsilierstr. 6, Hannover.



57,257 57,258 57,259 57,260 57,261 57,265 57,307 57,303 57,350 57,353 57,277 57,86 57,224 57,400

57,185 57,290 57,336 57,184 57,285 57,376 57,408 59,207 57,208 57,340 57,210 57,211 57,332 57,297

Review of the Crude Rubber Market

NEW YORK

In the New York market there has been some activity due to purchases mostly by small western manufacturers and some trading among dealers for various future positions in all grades. Prices responded with an upward tendency on the news of elimination of the threat of a general strike in England and favorable domestic rail decision. Settlement of the refinancing of the Goodyear company, and news that this company is on a production basis of 18,000 tires per day had a marked influence to firm rubber prices.

Prompt and May-June shipments were offered at 17½ cents on ribs while first latex crêpe still remains at a premium of 1½ to 2 cents on all positions. Parás have also firmed up about ½ cent on the general better feeling. Ambers, browns and roll are offered in fair quantities, spot rolled brown advancing from 10½ to 11¾–12 cents. Firmer prices may be expected with increased factory demand.

It is reported from a Dutch source that in the Netherlands East Indies there are almost no estates still able to produce with a profit at present prices. An improvement in the rubber price is not to be anticipated as the estimated world's stock of 300,000 tons at the end of February, 1921, being the world's output of about one year, will counteract the effect of restricted output in a marked degree.

Imports during March were 14,416 tons of all grades, compared with 31,650 tons last year. Plantation arrivals for March were 12,241 tons, compared with 28,533 tons a year ago. Total imports for the first three months of 1921 were 37,234 tons, compared with 85,995 tons for the same period in 1920.

Spot and future quotations on standard plantation and Brazilian grades were as follows:

PLANTATIONS. April 2. Spot first latex crêpe 18½ cents; April–June, 18½ cents; July–September, 21 cents; July–December, 22 cents.

April 25. Spot first latex crêpe, 19½ cents; May-June, 19½ to 20 cents; July–September, 20½ to 21 cents; July–December, 22 to 22½ cents.

April 2. Spot ribbed smoked sheets, 16¼ to 16½ cents; April-June, 17 cents; July–September, 18½ cents; July–December, 20 to 20½ cents.

April 25. Spot ribbed smoked sheets, 17 to 17½ cents, May–June, 17½ to 18 cents; July-September, 18½ to 19½ cents; July–December, 20 to 20½ cents.

April 2. No. 1 amber crêpe, 15½ cents.

April 25. No. 1 amber crêpe, 15½ to 16 cents.

April 2. No. 1 rolled brown crêpe, 11 cents.

April 25. No. 1 rolled brown crêpe, 12 to 12½ cents.

SOUTH AMERICAN PARÁS AND CAUCHO. April 2. Upriver fine, 17 cents; islands fine, 17 cents; upriver coarse, 10 cents; islands coarse, 12 cents; Cametá, 10 cents; caucho ball, 13½ cents.

April 25. Upriver fine, 17½ to 18 cents; islands fine 17¾ to 18 cents; upriver coarse, 9 to 9½ cents; islands coarse, 12 to 12½ cents; Cametá, 12 to 12½ cents; caucho ball, 11 to 12½ cents.

NEW YORK QUOTATIONS

Following are the New York spot quotations, for one year ago, one month ago, and April 25, the current date:

	May 1 1920	April 1 1921	April 25 1921
PLANTATION HEVEA			
First latex crêpe	$0.42½ @.43	$0.18½ @.19	$0.19 @.19½
Off latex crêpe	@	.17 @.18	.18 @.18½
Amber crêpe No. 1	.44 @.45	.15½ @.16	.15½ @
Amber crêpe No. 2	.43 @	.14½ @.15	.14½ @
Amber crêpe No. 3	.42 @	.13½ @.14	.13½ @
Amber crêpe No. 4	$0.41 @	$0.12½ @.13	$0.12½ @
Brown crêpe, thick and thin	.42 @	.13½ @.14	.15½ @
Brown crêpe, specky	.39 @	.11 @.12	.13½ @
Brown crêpe, rolled	.34 @	.12 @	.12 @.12½
Smoked sheet, ribbed	.42½ @.43	.16½ @	.17 @.17½
Smoked sheet, plain	.40 @	.15 @.16	.15½ @
Unsmoked sheet	@	.15 @	.15½ @
Colombo scrap No. 1	.35 @	.11 @	.11½ @
Colombo scrap No. 2	.42 @	.09 @	.09½ @
EAST INDIAN			
Assam crêpe	@	@	@
Assam onions	@	@	@
Penang block scrap	@	@	@
PONTIANAK			
Banjermassin	.13 @	.07 @	.07 @
Palembang	@	.09 @	.09 @
Pressed block	.25 @	.11¾ @	.12 @
Sarawak	@	.06 @	.06 @
SOUTH AMERICAN			
PARAS			
Upriver, fine	.42 @	.17 @.17½	.17½ @.18
Upriver, medium	.39 @	.14 @	.13½ @
Upriver, coarse	.31 @	.10 @	.09½ @
Upriver, weak, fine	.36 @	.11 @.12	@
Islands, fine	*.41½ @	.17 @	.18 @
Islands, medium	*.38 @	.13 @	.13½ @
Islands, coarse	.22 @	.12 @	.12½ @
Cametá	.22 @	.10½ @	.12½ @
Acre Bolivian, fine	.42½ @	.18 @	.18 @
Madeira, fine	.44 @	.19½ @.20	.19½ @
Peruvian, fine	.40 @	.16 @	.16½ @
Tapajos, fine	.40 @	.16 @.16½	.15½ @
CAUCHO			
Upper caucho ball	.32½ @	.14 @	.12½ @
Lower caucho ball	.29 @	.10½ @	.11 @
MANICOBAS			
Ceará negro heads	*.33 @	.10 @	.10 @
Ceará scrap	*.30 @	.05 @	.06 @
Maniçoba, 30% guarantee	*.30 @.33	.09½ @.10	.11 @
Mangabeira thin sheet	.31 @	.12 @	.12 @
CENTRALS			
Corinto scrap	.29 @.30	.11 @.12	.09 @.10
Central scrap	@	.11 @.12	.09 @.10
Central scrap and strip	.27 @.28	.08 @.10	.07 @.08
Central wet sheet	.19 @	.05 @.07	.04 @.05
Esmeralda sausage	.29 @.30	.11 @ 12	.09 @.10
Guayule, 20% guarantee	.28 @	@	@
Guayule, washed and dried	.38 @	*.26 @	.26 @
AFRICANS			
Benguela, extra No. 1, 28%	.25 @	@	@
Benguela, No. 2, 32½%	.21 @	@	@
Conakry niggers	.34 @	@	@
Congo prime, black upper	.37 @	@	@
Congo, prime, red upper	.33 @	@	@
Kassai, black	@	@	@
red	.35 @	@	@
Massai sheets and strings	.34 @	@	@
Niger flake, prime	.18 @	@	.14 @
Rio Nunez ball	.36 @	@	@
Rio Nunez sheets, strings	.34 @	@	@
GUTTA PERCHA			
Gutta Siak	.30 @.31	.15½ @	.15 @.16
Red Macassar	2.70 @	2.25 @	2.00 @2.75
BALATA			
Block, Ciudad, Bolivar	.67 @.68	.56 @	.54 @.55
Colombia	.53 @.54	.47 @.48	.45 @.46
Panama	.48 @.50	.46 @.47	.45 @.46
Surinam sheet	.84 @	.68 @.69	.70 @.71
amber	.86 @	.80 @.82	.80 @

NEW YORK AVERAGE SPOT RUBBER PRICES

APRIL, 1921

	4	5	6	7	8	9	11	12	13	14	15	16
Plantations—												
Sheet:												
Ribbed Smoked	16	16¼	16¼	16¼	16¼	16⅜	16⅝	16½	16½	16⅝	17	17¼
Crêpe:												
First latex	18¼	18½	18⅜	18¼	18⅜	18¼	18¾	18½	18½	19	19¼	19¼
Off latex	15⅞	16¼	15¾	16¼	16	16	16½	16	16	16¾	16¾	17½
No. 1 blanket	14¾	14¾	14¾	14¾	14½	14¾	14⅞	14¾	14¾	14¾	14⅞	15
No. 2 blanket	13¾	13¾	13¾	13¾	13½	13¾	13⅞	13¾	13¾	13¾	13⅞	14
No. 3 blanket	12¾	12¾	12¾	12¾	12½	12¾	12⅞	12¾	12¾	12¾	12⅞	13
Thin clean brown	13⅝	14	13½	13½	13⅝	13⅝	14⅜	14½	14¾	14	14¾	14½
Specky brown	11¼	12	11⅛	10	10⅝	11½	11⅛	12	12	11½	12¼	11¼
Rolled brown	11¼	11½	10¾	10¾	10¾	10¾	11⅛	10⅞	10¾	11	11⅜	11½

*Nominal.

COMPARATIVE LOW AND HIGH NEW YORK SPOT RUBBER PRICES

April

	1921*	1920	1919
PLANTATIONS			
First latex crêpe...	$0.18¼ @ $0.19½	$0.42½ @ $0.46½	$0.47 @ $0.50½
Smoked sheet ribbed	.16 @ .17¼	.42½ @ .45	.46½ @ .49½
PARAS			
Upriver, fine	.16½ @ .18	.40½ @ .42	.56 @
Upriver, coarse....	.09 @ .10½	.30 @ .32	.34 @
Islands, fine.......	.17 @ .18	.41 @ .42	.47½ @
Islands, coarse.....	.09½ @ .12	.21½ @	.21½ @
Cameta	.08 @ .11	.22½ @	.22½ @

*Figured to April 25, 1921.

ANTWERP RUBBER MARKET

GRISAR & CO., Antwerp, report under date of April 7, 1921:

Inactivity continues to be the predominating note in the rubber market. After having touched the low rate of 10½*d.* prices recovered slightly and the market closed with the following quotations, in favor of buyers: First latex crêpe, spot, 10¾*d;* April-June, 11*d;* July-September, 1*s,* 0¼*d;* July-December, 1*s.* 0¾*d;* October-December 1*s.* 1¼*d.* Fine Para, 11*d.*

Statistics for the week were as follows: Arrivals, 2,112 tons; sales, 889 tons; stock: 64,782 tons against 21,614 tons in 1920.

In Antwerp the stocks on hand were about 1,829 tons. The futures market remains quiet, without any change in rates. Quotations were: April, 5.80; May, 5.85; June, 5.95; July, 6.10; August-October, 6.20; November, 6.30; December-March, 6.40.

HAMBURG RUBBER MARKET

EFFEKTIV-ROHGUMMIMAKLER-VEREIN, Hamburg, report, March 26, 1921:

As a result of unchanged, steady reports from London a comparatively regular business developed here. This was made possible only by the yielding tendency of sellers.

Sales took place in fine Pará, first latex crêpe, thick and thin crêpe, smoked sheets, and medium grades. Prices ranged from:

	Marks
First latex crêpe	27.50 @ 29.50
Ribbed smoked sheets	23 @ 25
Ribbed smoked sheets, lower grade	19 @ 22.50
Brown crêpe, clean	19 @ 23
Brown crêpe, somewhat barky	16 @ 20
Dark crêpe	15.50 @ 18
Hard fine Pará	27 @ 29
Caucho ball	20 @ 23
Congos	17 @ 21
Block balata	60 @ 85
No. 1 balata sheet	100 @ 110
Jelutong	13 @ 17

AMSTERDAM RUBBER MARKET

JOOSTEN & JANSSEN, Amsterdam, report, under date of April 1, 1921:

Expect some turnover in sheets September delivery at 60 cents, and a few small spot parcels, nothing was done since the Easter holidays. The tone was dull and prices finally gave way somewhat, demand being very poor, closing about as follows:

Hevea Crêpe, Fl. 60. Sheets, Fl. 52 on the spot.
Hevea Crêpe, Fl. 62. Sheets, Fl. 53 April-June.
Hevea Crêpe, Fl. 66. Sheets, Fl. 58 July-September.
Hevea Crêpe, Fl. 69. Sheets, Fl. 63 October-December.

RECLAIMED RUBBER

The reclaimed rubber situation is sharing in the gradual improvement of the rubber manufacturing industry generally. The large reclaimers are resuming operation at about one-third capacity. It is rumored that one of the largest users of automobile topping has adopted artificial leather in place of rubber-coated topping. This raises the question of how to utilize the large tonnage of shoe reclaim thus released and what reaction this will have on prices for reclaim and scrap.

NEW YORK QUOTATIONS

April 25, 1921

Prices subject to change without notice

STANDARD RECLAIMS	
Floating	*$0.15 @ $0.18
Friction	* .15 @ .18
Mechanical	* .09 @ .11
Shoe	* .12½ @ .13½
Tires, auto	* .12 @ .13½
truck	* .09 @ .11
White	* .15 @ .18

*Nominal.

SINGAPORE RUBBER MARKET

GUTHRIE & CO., Limited, Singapore, report under date of March 10, 1921:

Since last reporting, the rubber market has shown a steadier tendency and a fair volume of business has been transacted between dealers. Chinese buyers have been practically out of the market, and orders from Japan have ceased for the time being.

For the auction held yesterday and today, the quantity cataloged for sale was 929 tons. Demand was fairly good, but bidding was slow and values somewhat erratic, due to buyers tentatively feeling their way.

Standard ribbed smoked sheet sold freely at 30½ to 31½ cents. Standard pale crêpe was in strong demand and sold up to 39 cents, an advance of 2 cents on the week. There is a shortage of this grade at present, and a heavy premium is obtainable. Off quality crêpe was a good market, but off sheet declined slightly, and moldy lots were sorely penalized. Lower grade crêpes were somewhat firmer. The quantity sold was 555 tons. The following is the course of values:

	In Singapore per pound[1]	Sterling Equivalent per pound in London
Sheet, fine ribbed smoked	30½ @ 31½	—/10⅞ @ —/11⅛
Sheet, good ribbed smoked	20 @ 30	—/ 7⅞ @ —/10¾
Crêpe, fine pale	39 @ ..	1/ 1¾ @ —/..
Crêpe, good pale	21½ @ 38	—/ 8⅞ @ 1/ 1½
Crêpe, fine brown	19 @ 26	—/ 8⅛ @ —/10⅛
Crêpe, good brown	12½ @ 18½	—/ 6¼ @ —/ 8
Crêpe, dark	12 @ 16	—/ 6⅛ @ —/ 7¼
Crêpe, bark	10 @ 12½	—/ 5⅛ @ —/ 6¾

[1] Quoted in Straits Settlements currency, $1 equals $0.567 United States currency.

NEW YORK AVERAGE SPOT RUBBER PRICES

JANUARY, 1921

	3	4	5	6	7	8	10	11	12	13	14	15	17	18	19	20	21	22	24	25	26	27	28	29	31
ibbed smoked sheets	16½	16¾	18½	18	17¾	17⅞	18¼	20¼	20	20¾	20¾	20¾	20¾	20⅞	20¾	20¼	19¾	19¾	19⅜	19½	19⅛	18¾	18¼	18¼	17⅞
irst latex crêpe	16¾	17½	19	18½	18½	18½	19¼	21	20¾	21¾	21½	21½	21⅜	21½	21¾	21¼	20¼	20¼	19⅞	19¾	19¾	19¼	19¼	19¼	19¼
ff latex crêpe	15	15¼	17½	16½	16½	16⅝	17¾	19⅜	18⅜	19¾	19	19	19⅛	18¼	19¼	18⅝	18¼	18¼	17⅞	18	18	17¼	17¼	17¼	17½
lean thin brown crêpe	13¾	14	16	16	14¾	14¾	15⅞	16½	15⅞	17½	16⅛	16⅛	16⅝	16½	17⅛	16½	15¾	15¾	15⅝	15⅝	15½	16¼	15¼	15¼	14¾
pecky brown crêpe	9¾	10½	12½	12	11¾	11½	12⅝	14	13¼	15¼	13⅝	13⅝	14	13¼	14½	13⅝	13⅝	13½	13⅛	12⅞	13¼	13⅞	13⅜	13½	13¼
o. 1 blanket crêpe	13¾	14¼	14¾	16	15½	15¼	16⅞	17	17½	17¼	17⅛	17⅜	17⅝	17¾	17¾	17½	16¾	16¾	16½	16¼	16⅜	16	16	16	15¾
o. 2 blanket crêpe	12¾	13¼	14	15	14½	14¼	15⅞	16	16½	16¼	16⅛	16⅜	16⅝	16¼	16¾	16½	15¾	15¾	15½	15¼	15⅜	15	15	15	14¾
o. 3 blanket crêpe	11¾	12½	13	14	13½	13¼	14⅞	15	15½	15¼	15⅛	15⅜	15⅝	15¾	15¾	15½	14¾	14¾	14½	14¼	14⅜	14	14	14	13¾
olled brown crêpe	10	10½	10½	12	11½	11	12⅛	11½	13	13	13⅛	13⅛	12⅞	12½	13⅛	13¼	12½	12½	12⅝	12¼	12½	12⅛	12	11¾	11½

FEBRUARY, 1921

	1	2	3	4	5	7	8	9	10	11	14	15	16	17	18	19	21	23	24	25	26	28
ibbed smoked sheets	17⅜	17⅜	17¼	17⅛	17¼	17¾	18⅝	18½	18⅜	18½	18¼	18½	18½	18⅜	18¼	18¼	18¼	18¼	18⅛	17⅝	17¼	16¾
irst latex crêpe	18⅞	18¾	18¾	18⅞	19¼	19¼	19⅝	18⅞	20⅛	19½	19½	19¾	20	19¾	19½	19½	19¼	19¾	19½	19¼	19	18½
ff latex crêpe	17¼	17⅛	16¾	17⅞	17¾	17½	17¾	17½	17¾	17⅝	17⅝	17¾	17⅝	17½	16½	16½	16½	17¾	17	17¼	17	16½
lean thin brown crêpe	14⅝	14½	14¾	14⅛	14½	14½	14¾	15	14¾	14⅝	14½	15	14⅝	14½	14½	14½	14½	14½	14½	14½	14½	14
pecky brown crêpe	12⅝	12⅞	12¾	12	12½	12½	12½	12⅝	12⅜	12⅛	12¼	12¾	12½	12½	12½	12½	12½	11¾	12½	12½	12½	11¾
o. 1 blanket crêpe	15	15⅛	14½	15⅛	15¼	15¼	15¾	16	16¼	15⅞	15⅝	16	16⅛	16	16	16	16¼	16¼	15⅞	16	15¾	15½
o. 2 blanket crêpe	14	14⅛	13½	14¼	14¼	14¼	14¾	15	15¼	14⅞	14⅝	15	15⅛	15	15	15	15¼	15¼	14⅞	15	14¾	14½
o. 3 blanket crêpe	13	13⅛	12½	13¼	13¼	13¼	13¾	14	14¼	13⅞	13⅝	14	14⅛	14	14	14	14¼	14¼	13⅞	14	13¾	13½
olled brown crêpe	11½	12	11½	11½	11½	11½	12¼	11½	11¾	11½	12	12	11½	11½	12½	12½	12½	12¼	12	11¾	11¾	11½

MARCH, 1921

	1	2	3	4	5	7	8	9	10	11	12	14	15	16	17	18	19	21	22	23	24	25	26*	28	29	30	31
ibbed smoked sheets	16½	16⅝	16⅞	17¾	17¾	17⅝	17½	17¼	16¾	16¾	16⅞	16¾	17⅛	16⅞	16⅞	17¼	17¼	17⅝	17½	17⅛	16¾	16¾	....	16⅞	17	16⅝	16⅝
irst latex crêpe	18⅛	18¼	18½	19½	19¼	19⅝	19½	18¾	18¾	18¾	18¾	19	18⅝	18¾	18¾	18¾	18¾	19¼	18¾	18¾	18¾	18¾	....	18¾	18¾	18¾	18¾
ff latex crêpe	15⅞	16⅝	17⅛	17⅜	17¼	17½	17	17¼	17⅛	17¼	17¼	17	17¼	17¼	16¾	17¼	17¼	16⅞	17	16¾	17¼	17¼	....	16¾	16¾	16¾	16¾
lean thin brown crêpe	14	14½	14½	14⅞	14¾	14½	14⅝	14	14	14	14¼	14¼	14⅞	14⅜	14⅜	14¼	14¼	14½	14⅜	14	13½	13½	....	13½	13¾	13½	13¾
pecky brown crêpe	11⅜	11¾	12	12	12½	12¼	12⅜	11½	11⅝	11¾	12⅛	12¼	11½	12¼	12¼	12¼	12½	11¾	12⅛	12	11½	11½	....	11⅝	11¾	10¾	11
o. 1 blanket crêpe	15¾	15¾	15½	16	16¼	15⅞	15⅝	15¾	16	15½	15¾	15½	15½	15¾	15½	15⅝	15⅝	15¾	15¾	15⅜	15¾	15¾	....	15¼	15½	15¼	15¼
o. 2 blanket crêpe	14¾	14¾	14½	15	15¼	14⅞	14⅝	14¾	15	14½	14¾	14½	14½	14¾	14½	14⅝	14⅝	14¾	14¾	14⅜	14¾	14¾	....	14¼	14½	14¼	14¼
o. 3 blanket crêpe	13¾	13¾	13½	14	14¼	13⅞	13⅝	13¾	14	13½	13¾	13½	13½	13¾	13½	13⅝	13⅝	13¾	13¾	13⅜	13¾	13¾	....	13¼	13½	13¼	13¼
olled brown crêpe	11¾	11½	12	12⅛	11⅞	12⅛	12	11¼	11½	11¾	11⅞	12	11½	12	11⅝	11¾	11¾	12¼	12⅜	12	11¾	11¾	....	12⅛	11½	11½	11¼

*Trade closed.

STRAITS SETTLEMENTS RUBBER EXPORTS

It is announced by official report from Singapore that 5,813 tons of rubber were exported from Straits Settlements ports in the month of February, as compared with 5,809 tons in January and 17,379 tons in the corresponding month last year. Transhipments amounted to 1,958 tons. Totals to end of February: 1921, 11,622 tons; 1920, 30,504 tons; 1919, 30,065 tons. Appended are the comparative statistics:

	1919	1920	1921
January .... tons	14,404	13,125	5,809
February	15,661	17,379	5,813
Totals............. tons	30,065	30,504	11,622

These figures include transhipments of rubber from various places in the neighborhood of the Straits Settlements, such as Borneo, Java, Sumatra and the non-Federated Malay States as well as rubber actually exported from the Colony, but do not include rubber exports from the Federated Malay States.

FEDERATED MALAY STATES RUBBER EXPORTS

An official report from Kuala Lumpur states that the export of plantation rubber from the Federated Malay States in the month of February amounted to 6,091 tons as against 7,085 tons in January and 9,781 tons in the corresponding month last year. The total export to the end of February was 13,176 tons, against 20,900 tons in 1920 and 17,972 tons in 1919. Appended are the comparative statistics:

	1919	1920	1921
January .... tons	7,163	11,119	7,085
February	10,809	9,781	6,091
Totals............. tons	17,972	20,900	13,176

CEYLON RUBBER IMPORTS AND EXPORTS

IMPORTS

	January 1 to January 31	
Crude rubber:	1920	1921
From Straits Settlements................ pounds	385,100	198,989
India	131,590	98,214
Burma and other countries..............	6,300	....
Totals	522,990	297,203

EXPORTS

	1920	1921
Crude rubber:		
To United Kingdom .... pounds	3,811,739	3,811,487
Belgium	18,360	78,492
France	11,200	163,520
Germany	....	446,051
Holland	....	110,223
Denmark	....	11,200
Italy	....	67,200
Victoria	....	49,730
New South Wales.............................	20,191	15,760
United States	1,492,886	3,475,888
Canada and Newfoundland................	257,600	254,025
India	....	3,040
Japan	52	20,160
Totals	5,612,028	8,506,776

PLANTATION RUBBER EXPORTS FROM MALAYA

(These figures include the production of the Federated Malay States, but not of Ceylon.)

	January 1 to December 31, 1920			January 1 to March 3, 1921	
	Singapore	Malacca	Penang	Port Swettenham	Totals
To United Kingdom.... pounds	65,767,971	3,569,973	24,735,492	3,381,772	97,455,208
The Continent..	15,193,455	880,666	506,266	11,200	16,591,587
Japan	13,475,062	....	2,277	....	13,477,339
Ceylon	10,299	....	487,733	106,968	605,000
United States and Canada...	278,609,400	57,814	19,281,456	....	297,948,670
Australia	1,235,410	....	....	....	1,235,410
China (Hong-Kong)	....	....	....	....	....
Other countries.	427,390	....	9,333	....	436,723
Totals.....	374,718,987	4,508,453	45,022,557	3,499,940	427,749,937
For the year 1920.	374,718,987	4,508,453	45,022,557	26,306,225	450,556,222
For the year 1919.	352,338,000	17,849,500	25,779,500	30,850,166	426,817,166
For the year 1918.	225,100,000	837,600	12,479,200	....	238,416,800
For the year 1917.	177,901,200	15,113,200	23,402,000	....	216,416,400
For the year 1916.	135,535,954	7,167,346	30,643,565	360,840	177,007,705
For the year 1915.	86,067,657	7,898,984	28,580,663	821,445	123,368,749
For the year 1914.	43,534,177	5,218,379	21,912,567	2,052,620	72,717,743

Compiled by Barlow & Co., Singapore.

RUBBER EXPORTS FROM PENANG

	January 1 to January 31	
	1920	1921
To Great Britain........................... piculs[1]	25,363	14,151
Europe	490	173
United States	22,030	235
Totals........................... piculs[1]	47,883	14,559

[1]One picul equals 133⅓ pounds.

PLANTATION RUBBER EXPORTS FROM JAVA*

	December		Twelve Months Ended December 31	
	1919	1920	1919	1920
To Netherlands .... kilos	325,000	418,000	2,971,000	5,011,000
Great Britain	190,000	739,000	7,223,000	8,802,000
Germany	....	37,000	....	146,000
France	....	10,000	215,000	53,000
Belgium	....	44,000	....	161,000
Italy	....	....	....	42,000
Other European destinations	25,000	....	25,000	....
United States...........	2,225,000	522,000	18,766,000	12,058,000
Singapore	357,000	258,000	5,365,000	4,447,000
Japan	....	....	183,000	194,000
Australia	....	18,000	245,000	252,000
Other countries	....	....	169,000	....
Totals .... kilos	3,122,000	2,046,000	35,162,000	31,166,000
Ports of origin:				
Tandjong Priok .... kilos	2,145,000	853,000	18,412,000	14,583,000
Samarang	58,000	31,000	562,000	506,000
Soerabaya	914,000	1,099,000	15,075,000	14,926,000

*The returns for the month of November are verified.

CRUDE RUBBER ARRIVALS AT ATLANTIC AND PACIFIC PORTS AS STATED BY SHIPS' MANIFESTS

PARAS AND CAUCHO AT NEW YORK

	Fine	Medium	Coarse	Caucho	Totals Pounds
March 29. By the S. S. "Strabo," from Manáos.					
Poel & Kelly..........	......	......	......	......	158,448
March 29. By the S. S. "Strabo," from Pará.					
Poel & Kelly..........	......	......	......	......	20,127
Meyer & Brown, Inc........	54,880*	......	......	......	54,880
Paul Bertuch	22,236	......	......	......	22,236
H. A. Astlett & Co..........	95,000	8,000	2,500	60,000	165,500
March 30. By the S. S. "Polycarp," from Manáos.					
General Rubber Co..........	......	......	......	......	32,000
G. Amsinck & Co., Inc.......	......	......	......	......	28,000
Meyer & Brown, Inc........	63,840*	......	......	......	63,840
Various	......	......	......	......	180,234
March 30. By the S. S. "Polycarp," from Iquitos.					
Various	......	......	......	......	4,707
March 30. By the S. S. "Polycarp," from Pará.					
Poel & Kelly..........	......	......	......	......	10,484
Various	......	......	......	......	102,731
April 19. By the S. S. "Bronte," from Santos.					
Arkell & Douglas, Inc.......	......	......	......	......	†429
Poel & Kelly..........	......	......	......	......	†5
Paul Bertuch	......	34,573	1,105	......	35,678
A. M. Capen's Sons, Inc.....	......	......	......	......	†132
Various	......	......	......	......	†408
April 16. By the S. S. "Sallust," from Pará.					
Meyer & Brown, Inc........	59,360	......	......	......	59,360
Various	......	......	......	......	‡92

*Includes medium. †Cases. ‡Packages.

PLANTATIONS

(Figured 180 pounds to the bale or case)

	Shipment from:	Shipped to:	Pounds	Totals
March 18. By the S. S. "Laomedon," at New York.				
Goldman, Sachs & Co....	Singapore	New York	137,880	
Rubber Trading Co......	Singapore	New York	54,000	
Baring Bros.	Singapore	New York	34,560	
Hood Rubber Co........	Singapore	Watertown	126,000	
Kidder, Peabody & Co...	Singapore	New York	53,640	
East Asiatic Co., Inc....	Singapore	New York	111,060	
Paterson, Simmons & Co.	Singapore	New York	48,600	
Chas. T. Wilson Co., Inc.	Singapore	New York	103,184	
Irwin-Harrison & Crosfield, Inc.	Singapore	New York	55,800	
J. Aron & Co..........	Singapore	New York	21,600	
Aldens' Successors, Inc..	Singapore	New York	105,120	
Thornett & Fehr.........	Singapore	New York	125,280	
Edward Boustead & Co..	Singapore	New York	10,800	
Poel & Kelly...........	Singapore	New York	11,520	
Firestone Tire & Rubber Co.	Singapore	Akron	105,480	
Goschen & Cunliffe......	Singapore	New York	28,800	
Eastern Rubber Co......	Singapore	New York	42,660	
H. A. Astlett Co.........	Singapore	New York	170,000	
Hood Rubber Co........	Singapore	Watertown	190,302	
Various	Singapore	New York	2,020,894	
H. A. Astlett Co.........	Colombo	New York	140,000	
Hood Rubber Co........	Colombo	Watertown	220,640	
Various	Colombo	New York	468,180	
Hood Rubber Co........	London	Watertown	33,600	4,419,600

	Shipment from:	Shipped to:	Pounds	Totals
March 20. By the S. S. "Romeo," at New York.				
Hood Rubber Co.	Singapore	Watertown	195,660	
Poel & Kelly	Singapore	New York	297,900	
Harburger & Stack	Singapore	New York	50,400	
William H. Stiles & Co.	Singapore	New York	78,400	
L. Littlejohn & Co., Inc.	Singapore	New York	78,400	
Baring Bros.	Singapore	New York	1,980	
Goldman, Sachs & Co.	Singapore	New York	20,160	
Hood Rubber Co.	Singapore	Watertown	222,382	
Rogers-Pyatt Shellac Co.	Singapore	New York	140,040	
E. H. Leland & Co.	Singapore	New York	12,600	
F. R. Henderson & Co.	Singapore	New York	168,480	
Thornett & Fehr	Siogapore	New York	189.540	
Pennsylvania Rubber Co.	Singapore	Jeanette	107,280	
The Fisk Rubber Co.	Singapore	Chicopee Falls	27,249	
Various	Singapore	New York	351,089	
Aldens' Successors, Inc.	Penang	New York	10,080	
Various	Teluk Anson	New York	9,360	
F. R. Henderson & Co.	Port Dickson	New York	23,940	
Aldens' Successors, Inc.	P't Sw't'nh'm	New York	28,260	
Various	Belawan-Deli	New York	79.660	2,092,860
March 21. By the S. S. "West Kasson," at New York.				
L. Littlejohn & Co., Inc.	Colombo	New York	85,960	85,960
March 23. By the S. S. "Hathaway," at New York.				
Manhattan Rub. Mfg. Co.	T'jong-Priok	New York	45,000	
East Asiatic Co., Inc.	T'jong-Priok	New York	106,020	
Various	T'jong-Priok	New York	38,520	
Henderson, Forbes & Co.	Soerabaya	New York	18,360	
The Goodyear Tire & Rubber Co.	Colombo	Akron	203,040	
Henderson, Forbes & Co.	Singapore	New York	208,260	
East Asiatic Co., Inc.	Singapore	New York	16,560	
F. R. Henderson & Co.	Singapore	New York	51,840	
J. T. Johnstone & Co., Inc.	Singapore	New York	67,200	
Mitsui & Co., Ltd.	Singapore	New York	61,560	
Fred Waterhouse Co., Ltd.	Singapore	New York	38,340	
Fred Stern & Co.	Singapore	New York	11,200	
William H. Stiles & Co.	Singapore	New York	44,800	
L. Littlejohn & Co., Inc.	Singapore	New York	224,000	
Baring Bros.	Singapore	New York	40,320	
Hood Rubber Co.	Singapore	Watertown	124,728	
The Goodyear Tire & Rubber Co.	Singapore	Akron	717,840	
General Rubber Co.	Singapore	New York	403,560	
Poel & Kelly	Singapore	New York	452,880	
Firestone Tire & Rubber Co.	Singapore	Akron	102,960	
General Rubber Co.	Singapore	Montreal	180,480	
Various	Singapore	New York	458,312	3,615,780
March 24. By the S. S. "West Sequana," at Boston.				
Hood Rubber Co.	Colombo	Watertown	54,200	54,200
March 24. By the S. S. "West Sequana," at New York.				
Thornett & Fehr	Colombo	New York	10,080	
Various	Colombo	New York	46,060	56,140
March 26. By the S. S. "City of Sparta," at New York.				
L. Littlejohn & Co., Inc.	Colombo	New York	138,865	
Meyer & Brown, Inc.	Colombo	New York	89,600	
H. A. Astlett Co.	Colombo	New York	80,000	308,465
March 27. By the S. S. "Half Moon," at New York.				
Poel & Kelly	Singapore	New York	93,960	
The Fisk Rubber Co.	Singapore	Chicopee Falls	96,586	
East Asiatic Co., Inc.	Soerabaya	New York	151,740	342,286
March 27. By the S. S. "Tokaaka Maru," at New York.				
Dumarest Bros.	Colombo	New York	66,960	
General Rubber Co.	Colombo	New York	190,800	257,760
March 30. By the S. S. "Valacia," at New York.				
Goldman, Sachs & Co.	London	New York	691,380	
Various	London	New York	199,440	890,820
April 2. By the S. S. "Rotterdam," at New York.				
Chas. T. Wilson Co., Inc.	Rotterdam	New York	46,371	
L. Littlejohn & Co., Inc.	Rotterdam	New York	56,191	
Various	Rotterdam	New York	419,258	521,820
April 4. By the S. S. "Celtic Prince," at New York.				
Hood Rubber Co.	Singapore	Watertown	67,200	67,200
April 6. By the S. S. "Clan Mackinnon," at New York.				
W. T. Sargent & Sons	Cochin	New York	37,800	
Various	Cochin	New York	18,360	56,160
April 6. By the S. S. "Trekieve," at New York.				
Baring Bros.	Colombo	New York	201,600	
Meyer & Brown, Inc.	Colombo	New York	392,000	
L. Littlejohn & Co., Inc.	Colombo	New York	404,020	
J. T. Johnstone & Co., Inc.	Colombo	New York	35,800	
Various	Colombo	New York	145,160	1,178,580
April 6. By the S. S. "Trekieve," at Boston.				
Hood Rubber Co.	Colombo	Watertown	168,000	168,000
April 9. By the S. S. "Gaelic Prince," at New York.				
Aldens' Successors, Inc.	Singapore	New York	117,180	
Poel & Kelly	Singapore	New York	193,500	
Balfour, Williamson & Co.	Singapore	New York	61,920	
G. Amsinck & Co., Inc.	Singapore	New York	10,440	
East Asiatic Co., Inc.	Singapore	New York	219,780	
The Fisk Rubber Co.	Singapore	Chicopee Falls	161,006	
General Export & Commission Co.	Singapore	New York	12,780	
William H. Stiles & Co.	Singapore	New York	291,200	
L. Littlejohn & Co., Inc.	Singapore	New York	1,215,120	
H. A. Astlett & Co.	Singapore	New York	120,000	
Edward Boustead & Co.	Singapore	New York	3,600	
The Goodyear Tire & Rubber Co.	Singapore	Akron	425,520	

	Shipment from:	Shipped to:	Pounds	Totals
W. R. Grace & Co.	Singapore	New York	36,180	
J. T. Johnstone & Co., Inc.	Singapore	New York	235,200	
Meyer & Brown, Inc.	Singapore	New York	56,000	
General Rubber Co.	Singapore	New York	120,420	
Rubber Importers & Dealers Co.	Singapore	New York	40,320	
American Trading Co.	Singapore	New York	88,740	
Rogers-Pyatt Shellac Co.	Singapore	New York	68,400	
Hood Rubber Co.	Singapore	Watertown	134,537	
Chas. T. Wilson Co., Inc.	Singapore	New York	33,600	
Fred Stern & Co.	Singapore	New York	78,400	
Paterson, Simmons & Co.	Singapore	New York	187,020	
Various	Singapore	New York	1,341,897	
Thornett & Fehr	Penang	New York	10,080	
Edward Boustead & Co.	Penang	New York	57,600	5,320,440
April 10. By the S. S. "Amur Maru," at New York.				
Baird Rubber & Trading Co.	Singapore	New York	122,400	
Poel & Kelly	Singapore	New York	79,920	
Thornett & Fehr	Singapore	New York	127,080	
Fred Stern & Co.	Siogapore	New York	22,400	
L. Littlejohn & Co., Inc.	Singapore	New York	112,200	464,000
April 14. By the S. S. "Indianic," at New York.				
Pacific Trading Co.	Colombo	New York	85,680	
Chas. T. Wilson Co., Inc.	Colombo	New York	56,020	
L. Littlejohn & Co., Inc.	Colombo	New York	201,600	
Baird Rubber & Trading Co.	Colombo	New York	58,240	
Various	Colombo	New York	374,060	775,600
April 14. By the S. S. "Indianic," at Boston.				
Hood Rubber Co.	Colombo	Watertown	150,500	150,500
April 14. By the S. S. "City of Agra," at New York.				
L. Littlejohn & Co., Inc.	Singapore	New York	156,800	
F. R. Henderson & Co.	Singapore	New York	100,800	
Baird Rubber & Trading Co.	Singapore	New York	56,000	
Goldman Sachs & Co.	Singapore	New York	60,480	
McAllister Bros.	Singapore	New York	68,040	
Mitsubiski Goshi Kaisha	Singapore	New York	33,660	
Rubber Importers & Dealers Co., Inc.	Singapore	New York	142,920	
J. T. Johnstone & Co., Ltd.	Singapore	New York	89,820	
Fred Stern & Co.	Singapore	New York	67,200	
H. A. Astlett Co.	Singapore	New York	95,000	
Various	Singapore	New York	46,920	
Thornett & Fehr	Penang	New York	30,240	
Edward Boustead & Co.	Penang	New York	28,800	
F. R. Henderson & Co.	Penang	New York	30,240	
General Rubber Co.	Belawan-Deli	New York	48,240	
Thornett & Fehr	Belawan-Deli	New York	10,980	
Various	Belawan-Deli	New York	25,200	1,091,340
April 14. By the S. S. "Agamemnon," at New York.				
Fisk Rubber Co.	Singapore	Chicopee Falls	8,960	
F. R. Henderson & Co.	Singapore	New York	71,460	
L. Littlejohn & Co., Inc.	Singapore	New York	356,000	
E. G. Curry & Co., Inc.	Singapore	New York	50,400	
Chas. T. Wilson Co., Inc.	Singapore	New York	77,971	
Hood Rubber Co.	Singapore	Watertown	22,400	
Jaeger & Co.	Singapore	New York	41,760	
Rubber Importers & Dealers Co., Inc.	Singapore	New York	50,400	
Baring Bros.	Singapore	New York	60,480	
J. T. Johnstone & Co., Inc.	Singapore	New York	44,800	
Baird Rubber & Trading Co.	Singapore	New York	56,000	
Smith & Schippers	Singapore	New York	100,800	
Far East Importing Co.	Singapore	New York	180	
Fred B. Peterson	Singapore	New York	180	
H. A. Astlett Co.	Singapore	New York	55,000	
Chas. T. Wilson Co., Inc.	Belawan-Deli	New York	108,540	
F. R. Henderson & Co.	Belawan-Deli	New York	3,600	
Meyer & Brown, Inc.	Belawan-Deli	New York	23,760	
W. T. Sargent & Sons	Colombo	New York	34,740	
Pablo Calvet & Co.	Colombo	New York	50,400	
Baird Rubber & Trading Co.	Colombo	New York	33,600	
Meyer & Brown, Inc.	Colombo	New York	331,520	1,582,951
April 16. By the S. S. "Ryndam," at New York.				
L. Littlejohn & Co., Inc.	Java	New York	108,004	
Thornett & Fehr	Rotterdam	New York	12,240	
Chas. T. Wilson Co., Inc.	Rotterdam	New York	44,800	
Various	Rotterdam	New York	486,736	651,780
April 18. By the S. S. "West Caddoa," at New York.				
The Goodyear Tire & Rubber Co.	Colombo	Akron	49,860	49,860
April 19. By the S. S. "Trafford Hall," at New York.				
Hood Rubber Co.	Singapore	Watertown	123,590	123,590
April 20. By the S. S. "Esther Dollar," at New York.				
Meyer & Brown, Inc.	Singapore	New York	324,800	324,800
April 20. By the S. S. "Eastern Knight," at New York.				
Meyer & Brown, Inc.	Batavia	New York	56,000	56,000
April 22. By the S. S. "Bolton Castle," at New York.				
Hood Rubber Co.	Singapore	Watertown	168,060	
J. T. Johnstone & Co., Inc.	Singapore	New York	78,400	246,460

CENTRALS

	Shipment from:	Shipped to:	Pounds	Totals
March 29. By the S. S. "Pastores," at New York.				
Isaac Brandon & Bros.	Cristobal	New York	300	300
April 14. By the S. S. "Gen. G. W. Goethals," at New York.				
Pablo Calvet & Co.	Cristobal	New York	3,300	3,300
April 15. By the S. S. "Gen. H. F. Hodges," at New York.				
Baring Bros.	Cristobal	New York	4,200	4,200

AFRICANS

	from: Shipment	Shipped to:	Pounds	Totals
March 27. By the S. S. "Barrbacenia," at New York.				
Colonial Raw Products Co.	Lisbon	New York	20,717	
Various	Lisbon	New York	565,873	586,590
April 16. By the S. S. "France," at New York.				
Various	Havre	New York	125	125

PONTIANAK

	from: Shipment	Shipped to:	Pounds	Totals
March 18. By the S. S. "Laomedon," at New York.				
Various	Singapore	New York	27,000	27,000
March 20. By the S. S. "Romeo," at New York.				
Baring Bros.	Singapore	New York	300	300
March 23. By the S. S. "Hathaway," at New York.				
Fred Waterhouse Co., Ltd.	Singapore	New York	4,500	
Various	Singapore	New York	60,000	64,500
April 14. By the S. S. "City of Agra," at New York.				
Various	Singapore	New York	132,900	132,900

GUTTA SIAK

	from: Shipment	Shipped to:	Pounds	Totals
April 10. By the S. S. "Amur Maru," at New York.				
Various	Singapore	New York	120,000	120,000

BALATA

	from: Shipment	Shipped to:	Pounds	Totals
March 20. By the S. S. "Ebro," at New York.				
G. Amsinck & Co., Inc.	Valparaiso	New York	3,150	3,150
March 25. By the S. S. "Mayaro," at New York.				
South & Central America Commercial Co.	Trinidad	New York	18,450	18,450
March 26. By the S. S. "Tivives," at New York.				
P. R. Rincorres, Jr., Co.	Port Colombia	New York	3,000	3,000
April 6. By the S. S. "Allianca," at New York.				
Fidanque Brothers & Sons	Cristobal	New York	1,650	1,650
April 11. By the S. S. "Maraval," at New York.				
South & Central America Commercial Co.	Trinidad	New York	55,950	
Middleton & Co.	Cayenne	New York	3,890	
Boss & Co.	Trinidad	New York	14,250	
G. Amsinck & Co., Inc.	Trinidad	New York	14,100	
Ultramares Corporation	Trinidad	New York	30,150	118,340
April 15. By the S. S. "Caracas," at New York.				
Ultramares Corporation	Cristobal	New York	24,150	24,150
April 16. By the S. S. "Quilpue," at New York.				
American Trading Co.	Guayaquil	New York	1,500	1,500

CUSTOM HOUSE STATISTICS

NEW YORK

IMPORTS

	February 1920 Pounds	February 1920 Value	February 1921 Pounds	February 1921 Value
Unmanufactured—*free*:				
Balata:				
From Netherlands	87,320	$57,588	......	......
England	20,267	16,864	......	......
Panama	2,166	917	125	$25
Brazil	1,495	747	3,373	675
Colombia	36,168	13,459	3,039	949
Ecuador	2,336	935	......	......
British Guiana	30,359	24,604	......	......
Dutch Guiana	4,397	3,626	......	......
Venezuela	143,787	65,549	84,943	54,178
Trinidad	......	......	95,876	58,605
Totals	328,295	$184,289	187,356	$114,432
Jelutong (Pontianak):				
From England	274,145	$20,022	56,000	$8,860
Straits Settlements	1,018,171	136,392	110,468	13,383
Dutch East Indies	......	......	201,124	25,573
Totals	1,292,316	$156,414	367,592	$47,816
Gutta percha:				
From Netherlands	110	$170	......	......
Straits Settlements	250,641	52,085	......	......
Siam	1,464	374	......	......
Dutch East Indies	......	......	251,611	$42,406
Totals	252,215	$52,629	251,611	$42,406
Crude rubber:				
From Belgium	340,926	$96,699	......	......
France	827,307	243,229	......	......
Netherlands	2,586,622	1,123,583	360,640	$74,928
Portugal	220,462	44,000	......	......
England	15,383,717	7,312,311	66,981	11,303
Guatemala	2,518	503	484	121
Honduras	960	265	......	......
Nicaragua	2,750	1,173	......	......
Panama	1,084	395	375	75
Mexico	37,007	11,106	......	......
Trinidad	4,245	3,203	25	5
Bolivia	20,397	7,910	......	......
Brazil	3,807,367	1,117,767	1,147,121	210,290
Colombia	88,071	28,162	3,673	877
Ecuador	287,998	69,122	954	143
British Guiana	5,973	5,449	......	......
Peru	1,722,297	557,203	......	......
Uruguay	23,586	9,800	......	......
Venezuela	93,460	35,369	......	......
British India	301,293	139,066	......	......
Straits Settlements	21,732,218	9,393,584	13,788,173	4,891,002
British East Indies	7,128,151	2,921,947	2,786,670	457,243
Dutch East Indies	2,007,125	671,077	3,169,471	1,037,256
Philippine Islands	61,618	23,764	......	......
Costa Rica	......	......	750	188
Dutch Guiana	......	......	23,505	11,737
China	......	......	29,135	10,197
British India	......	......	166,791	51,073
Totals	56,687,152	$23,876,687	21,544,748	$6,756,438
Rubber scrap and reclaimed	643,220	57,508	215,310	11,826
Totals, unmanufactured	59,203,198	$24,327,527	22,566,617	$6,972,918
Manufactures of rubber and gutta percha	......	$27,949	......	$47,761
Rubber substitutes	11,200	2,017	796	250
Chicle ... *dutiable*	453,054	353,013	212,954	109,350

EXPORTS

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Belting	......	$109,893	......	$114,432
Hose	......	202,368	......	276,262
Packing	......	68,962	......	65,978
Rubber boots ... *pairs*	24,658	97,200	3,754	15,465
Rubber shoes ... *pairs*	887,062	743,205	157,862	188,917
Druggists' sundries	......	90,766	......	81,421
Automobile tires	......	3,199,706	......	951,299
Other tires	......	52,731	......	19,717
Inner tubes	......	142,146	......	93,467
Solid tires	......	141,519	......	84,921
Soles and heels	......	47,222	......	55,087
Other rubber manufactures	......	378,918	......	369,491
Totals, manufactured	......	$4,895,718	......	$2,316,457
Chewing gum	......	$277,561	......	$33,773
Insulated wire	......	500,687	......	1,046,512
Fountain pens ... *number*	17,358	13,895	35,222	55,265
Suspenders and garters	......	236,503	......	49,575
Totals	......	$1,028,646	......	$1,185,125
Unmanufactured—*free*:				
Rubber scrap and reclaimed	285,365	$37,200	582,364	$42,118

FOREIGN EXPORTS

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Balata	......	......	82,163	$29,391
Crude rubber	......	......	51,359	7,079
Rubber manufactures	......	$1,034	......	12,049
Rubber substitutes	14,540	10,553	......	......

MASSACHUSETTS

IMPORTS

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Unmanufactured—*free*:				
Crude rubber:				
From England	256,075	$119,242	......	......
British East Indies	......	......	125,000	$30,545
Totals, unmanufactured	256,075	$119,242	125,000	$30,545
Rubber manufactures ... *dutiable*	......	$15,951	......	$2,968

EXPORTS

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Manufactured:				
Automobile tires	......	$2,926	......	$289
Inner tubes	......	......	......	29
Solid tires	......	......	......	14
Belting	......	2,221	......	......
Hose	......	57	......	1,920
Packing	......	......	......	18
Rubber boots ... *pairs*	141	9,378	2,061	7,491
Rubber shoes ... *pairs*	119,196	105,391	9,475	8,697
Druggists' sundries	......	2,902	......	684
Soles and heels	......	10,450	......	1,491
Other rubber manufactures	......	13,443	......	17,014
Totals	......	$146,768	......	$37,647
Insulated wire	......	$9,307	......	$344
Suspenders and garters	......	8,981	......	2,054

PHILADELPHIA

IMPORTS

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Rubber scrap and reclaimed	......	......	55,066	$1,515
Rubber manufactures ... *dutiable*	......	$449	......	85

EXPORTS

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Automobile tires	......	$28,956	......	$36,950
Inner tubes	......	4,973	......	6,643
Solid tires	......	6,504	......	......
Belting	......	......	......	326
Hose	......	29,433	......	47,319
Packing	......	7,880	......	489
Druggists' sundries	......	351	......	398
Other rubber manufactures	......	2,792	......	668
Totals	......	$80,889	......	$92,793
Insulated wire	......	$13,782	......	......
Suspenders and garters	......	1,856	......	......
Rubber scrap and reclaimed	128,074	7,412	103,030	$6,586

NEW ORLEANS

IMPORTS

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Unmanufactured—*free*:				
Crude rubber:				
From Mexico	18,383	$12,618	......	......
Straits Settlements	391,995	201,606	......	......
Totals	410,378	$214,224	......	......
Chicle ... *dutiable*	......	......	20	$12

EXPORTS

	February			
	1920		1921	
	Pounds	Value	Pounds	Value
Manufactured:				
Automobile tires	......	$9,561	......	$8,364
Inner tubes	......	1,778	......	1,312
Solid tires	......	106	......	2,446
Other tires	......	870	......	76
Belting	......	410	......	14,460
Hose	......	1,649	......	3,453
Packing	......	726	......	291
Rubber boots ... *pairs*	......	......	3	19
Rubber shoes ... *pairs*	4,159	4,941	14,761	20,114
Soles and heels	......	213	......	148
Druggists' sundries	......	89	......	248
Other rubber manufactures	......	1,654	......	1,188
Totals	......	$21,997	......	$52,119
Insulated wire	......	$7,003	......	$4,706
Suspenders and garters	......	1,610	......	126
Chewing gum	......	2,810	......	1,318

SAN FRANCISCO

IMPORTS

Unmanufactured—*free:*				
Crude rubber:				
From Straits Settlements	4,990,619	$2,035,230	102,850	$18,509
Dutch East Indies	40,680	30,275	......	......
Hong Kong	112	56	......	......
Philippine Islands	180	90	......	......
Totals	5,031,591	$2,065,651	102,850	$18,509
Jelutong (Pontianak):				
From Straits Settlements	......	......	10,973	$1,444
Totals	......	......	10,973	$1,444
Rubber scrap and reclaimed	......	......	110	11
Totals, unmanufactured	5,031,591	$2,065,651	113,933	$19,964
Rubber manufactures. *dutiable*	......	$281	......	......
Chicle ... *dutiable*	30,305	37,578	......	......

EXPORTS

Manufactured:				
Automobile tires	......	$198,580	......	$12,051
Inner tubes	......	16,077	......	1,698
Solid tires	......	14,471	......	3,307
Other tires	......	1,475	......	15,247
Belting	......	8,699	......	20,712
Hose	......	8,578	......	14,212
Packing	......	16,178	......	18,152
Rubber boots ... *pairs*	5,025	16,976	168	531
Rubber shoes	2,004	2,055	1,266	1,413
Soles and heels	......	1,496	......	55
Druggists' sundries	......	2,744	......	1,579
Other rubber manufactures	......	15,063	......	4,049
Totals	......	$302,392	......	$93,006
Insulated wire	......	$13,908	......	$6,796
Fountain pens ... *number*	228	441	169	364
Suspenders and garters	......	2,429	......	1,430
Chewing gum	......	6,696	......	100
Rubber scrap and reclaimed	737,570	41,957	......	......

WASHINGTON

IMPORTS

Unmanufactured—*free:*				
Crude rubber:				
From Canada	9,820	$4,630	......	......
British India	558,381	267,848	......	......
Straits Settlements	3,627,602	1,659,988	......	......
Japan	69,450	34,500	......	......
Totals	4,265,253	$1,966,966	......	......
Rubber scrap and reclaimed	60,867	$2,034	......	......
Totals, unmanufactured	4,326,120	$1,969,000	......	......
Rubber manufactures. *dutiable*	......	$257	......	$20

EXPORTS

Manufactured:				
Automobile tires	......	$39,318	......	$206
Inner tubes	......	4,532	......	......
Solid tires	......	1,034	......	80
Other tires	......	13	......	......
Belting	......	1,083	......	888
Hose	......	436	......	894
Packing	......	294	......	379
Rubber boots ... *pairs*	569	2,505	79	320
Rubber shoes ... *pairs*	......	......	2,449	2,083
Soles and heels	......	755	......	......
Druggists' sundries	......	487	......	403
Other rubber manufactures	......	1,820	......	6,874
Totals	......	$52,277	......	$12,127
Insulated wire	......	$440	......	......
Fountain pens ... *number*	......	......	20	$21
Suspenders and garters	......	1,226	......	89
Rubber scrap and reclaimed	271,743	12,953	......	......

BUFFALO

IMPORTS

Rubber scrap and reclaimed	......	......	7,363	$381
Rubber manufactures. *dutiable*	......	......	......	1,500

EXPORTS

	February			
	1920		1921	
	Pounds	Value	Pounds	Value
Manufactured:				
Automobile tires	......	......	......	$58,565
Ioner tubes	......	......	......	7,322
Solid tires	......	......	......	302
Other tires	......	......	......	64
Belting	......	......	......	4,020
Hose	......	......	......	1,342
Packing	......	......	......	1,910
Rubber shoes ... *pairs*	......	......	19	53
Druggists' sundries	......	......	......	3,269
Other rubber manufactures	......	......	......	77,382
Totals	......	......	......	$154,229
Insulated wire	......	......	......	$14,788
Fountain pens ... *number*	......	......	380	350
Suspenders and garters	......	......	......	2,253
Chewing gum	......	......	......	4
Rubber scrap and reclaimed	......	......	39,349	4,092

FOREIGN EXPORTS

Crude rubber	......	......	556,498	$106,933
Rubber manufactures	......	......	......	2

CHICAGO

IMPORTS

Chicle ... *dutiable*	211,291	$148,049	743,235	$365,138
Rubber manufactures. *dutiable*	......	123	......	1,084

MICHIGAN

IMPORTS

Rubber scrap and reclaimed	13,639	$440	......	......
Rubber manufacturers. *dutiable*	......	7,939	......	$1,648

EXPORTS

Manufactured:				
Automobile tires	......	$87,899	......	$546
Inner tubes	......	16,071	......	12
Solid tires	......	336	......	72
Other tires	......	40	......	341
Belting	......	1,790	......	901
Hose	......	453	......	317
Packing	......	24	......	164
Rubber boots ... *pairs*	1,824	6,618	1,068	3,495
Rubber shoes ... *pairs*	300	753	......	......
Soles and heels	......	47	......	......
Druggists' sundries	......	2,013	......	1,054
Other rubber manufactures	......	16,521	......	9,201
Totals	......	$132,565	......	$16,103
Insulated wire	......	$3,442	......	$6,082
Fountain pens ... *number*	610	801	......	......
Suspenders and garters	......	8,959	......	927
Chewing gum	......	431	......	295
Rubber scrap and reclaimed	133,961	18,479	93,633	2,053

OHIO

IMPORTS

Unmanufactured—*free:*				
Crude rubber:				
From Straits Setlements	1,885,852	$962,083	......	......
Dutch East Indies	348,112	157,728	......	......
Totals	2,233,964	$1,119,811	......	......
Rubber manufactures. *dutiable*	......	$2,587	......	$112

MICHIGAN

IMPORTS

	January			
	1920		1921	
	Pounds	Value	Pounds	Value
Unmanufactured—*free:*				
Crude rubber:				
From England	56,205	$29,490	....	....
Totals	56,205	$29,490	....	....
Rubber scrap and reclaimed	4,804	$1,201	....	....
Rubber manufactures. *dutiable*	....	2,319	....	$488

EXPORTS

Manufactured:				
Automobile tires	....	$307	....	$23,356
Inner tubes	....	98	....	2,470
Solid tires	....	....	....	268
All other tires	....	25	....	50
Belting	....	3,873	....	1,162
Hose	....	149	....	630
Packing	....	619	....	220
Rubber boots ... *pairs*	1	3	....	....
Soles and heels	....	13	....	....
Druggists' sundries	....	149	....	358
Other rubber manufactures	....	10,327	....	2,304
Totals	....	$15,563	....	$30,818
Insulated wire	....	$7,150	....	$17,964
Fountain pens ... *number*	210	230	....	....
Suspenders and garters	....	2,632	....	1,625
Rubber scrap and reclaimed	16,557	2,510	2,670	156

UNITED STATES CRUDE RUBBER IMPORTS FOR 1921 (BY MONTHS)

1921	Plantations	Parás	Africans	Centrals	Guayule	Maniçoba and Matto Grosso	Balata	Miscellaneous	Waste	Totals 1921	Totals 1920
January . . . . tons	12,819	1,312	43	3	......	....	41	173	1,071	15,462	22,401
February	7,913	432	269	2	25	....	25	216	37	8,919	33,984
March	12,241	1,794	377	1	......	3	29	7	345	14,797	33,998
Totals, 3 months, 1921	32,973	3,538	689	6	25	3	95	396	1,453	39,178	......
Totals, 3 months, 1920	76,013	7,539	1,893	399	148	3	245	2,231	1,912	......	90,383

Compiled by The Rubber Association of America, Inc.

UNITED KINGDOM RUBBER STATISTICS

IMPORTS

	Year Ended December 31			
	1919		1920	
UNMANUFACTURED— Crude rubber: From—	Pounds	Value	Pounds	Value
Straits Settlements	67,351,100	£7,107,882	66,516,400	£6,499,413
Federated Malay States	62,862,200	6,628,845	67,151,200	6,860,824
British India	11,301,200	1,240,460	12,286,800	1,308,035
Ceylon and dependencies	33,498,100	3,605,033	47,991,900	4,657,041
Other Dutch possessions in Indian Seas	12,283,200	1,286,691	8,608,600	870,634
Dutch East Indies (except other Dutch possessions in Indian Seas)	13,372,200	1,381,220	17,769,400	1,667,780
Other countries in the East Indies and Pacific not elsewhere specified	2,843,800	309,696	2,607,600	268,840
Brazil	18,121,400	1,997,385	18,354,400	1,793,766
Peru	1,184,200	120,349	216,700	20,261
South and Central America (except Brazil and Peru)	478,200	46,201	386,900	36,482
West Africa:				
French West Africa	63,900	5,538	666,800	58,502
Gold Coast	315,200	29,953	231,100	22,239
Other parts of West Africa	1,821,700	172,040	1,210,100	104,379
East Africa (including Madagascar)	943,600	93,330	1,370,000	128,771
Other countries	1,797,700	187,263	3,000,200	259,161
Totals	228,237,700	£24,211,886	248,368,100	£24,556,128
Waste and reclaimed rubber	4,992,400	135,661	8,401,700	165,905
Totals, unmanufactured	233,230,100	£24,347,547	256,769,800	£24,722,033
Gutta percha and balata	12,408,500	£2,142,354	10,190,000	£1,999,058
*Rubber substitutes	......	......	1,026,900	47,722
MANUFACTURED—				
Boots and shoes . . *dozen pairs*	170,610	£294,338	280,481	£714,685
Waterproof clothing	......	15,585	......	13,174
Insulated wire	......	7,446	......	33,054
Submarine cables	......	38	......	50
Tires and tubes	......	2,148,989	......	5,577,078
Other rubber manufactures	......	557,640	......	810,747

EXPORTS

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
UNMANUFACTURED—				
Waste and reclaimed rubber	10,636,600	£240,849	15,247,500	£397,763
*Rubber substitutes	....	....	2,870,300	123,346
MANUFACTURED—				
Boots and shoes . . *dozen pairs*	131,206	£263,284	167,055	£358,743
Waterproof clothing	....	1,728,828	....	2,930,242
Insulated wire	....	827,732	....	1,752,916
Submarine cables	....	622,633	....	1,776,940
Tires and tubes	....	4,257,651	....	6,500,761
Other rubber manufactures	....	2,831,183	....	4,689,739

EXPORTS—COLONIAL AND FOREIGN

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
UNMANUFACTURED— Crude rubber:				
To Russia	168,700	£22,151	139,800	£16,295
Sweden, Norway and Denmark	6,240,100	731,938	2,906,200	270,965
Germany	4,849,700	467,850	11,532,500	996,076
Belgium	8,417,300	710,955	4,845,100	546,455
France	23,953,200	2,579,919	26,701,000	3,034,798
Spain	646,800	71,733	517,400	54,147
Italy	9,994,400	1,091,585	6,024,800	692,953
Austria-Hungary	208,800	22,219	379,700	35,731
Other European countries	7,175,100	706,543	2,420,100	214,797
United States	63,863,500	6,779,508	55,661,100	6,890,203
Canada	6,121,300	655,768	7,270,100	825,124
Other countries	1,015,000	131,706	2,356,100	277,400
Totals, rubber	132,653,900	£13,971,875	120,753,900	£13,854,944
Waste and reclaimed rubber	445,500	£17,382	152,600	£5,596
Gutta percha and balata	1,568,600	215,775	1,381,700	235,394
*Rubber substitutes	....	....	41,100	1,721
MANUFACTURED—				
Boots and shoes . . *dozen pairs*	4,871	£10,195	6,757	£34,970
Waterproof clothing	....	1,188	....	669
Tires and tubes	....	124,504	....	481,808
Insulated wire	....	7,905	....	1,436
Other manufactures	....	55,113	....	42,759

*Included in "Other Articles," Class III, T., prior to 1920.

UNITED KINGDOM RUBBER STATISTICS

IMPORTS

	January			
	1920		1921	
	Pounds	Value	Pounds	Value
UNMANUFACTURED— Crude rubber: From—				
Straits Settlements	3,141,600	£398,543	8,252,700	£481,247
Federated Malay States	4,341,400	526,304	7,710,500	445,846
British India	1,521,000	191,595	800,300	43,715
Ceylon and dependencies	4,914,400	593,765	3,379,200	179,580
Other Dutch possessions in Indian Seas	457,900	55,621	1,227,800	73,595
Dutch East Indies (except other Dutch possessions in Indian Seas)	1,291,500	152,410	1,481,200	82,869
Other countries in East Indies and Pacific, not elsewhere specified	107,400	13,149	295,300	14,954
Brazil	946,100	108,639	693,400	32,668
Peru	7,100	850	7,200	362
South and Central America (except Brazil and Peru)	47,600	5,830	13,300	676
West Africa:				
French West Africa	33,700	3,241	....	....
Gold Coast	12,300	1,413	7,600	386
Other parts of W. Africa	82,400	8,306	57,000	2,631
East Africa (including Madagascar)	185,600	18,685	70,700	3,124
Other countries	135,500	13,565	131,800	6,582
Totals	17,225,500	£2,091,916	24,128,000	£1,368,235
Waste and reclaimed rubber	776,000	20,637	328,900	5,281
Totals, manufactured	18,001,500	£2,112,553	24,456,900	£1,373,516
Gutta percha and balata	816,300	£119,233	1,050,800	£195,312
*Rubber substitutes	400	33	43,700	1,187
MANUFACTURED—				
Boots and shoes—*dozen pairs*	35,372	£69,772	7,231	£22,712
Waterproof clothing	......	130	......	40
Insulated wire	......	1,914	......	2,478
Tires and tubes	......	351,598	......	309,122
Other rubber manufactures	......	117,710	......	66,309

EXPORTS

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
UNMANUFACTURED—				
Waste and reclaimed rubber	1,139,000	£25,676	610,700	£16,513
Rubber substitutes	729,100	13,627	54,100	1,985
Totals	1,898,100	£39,303	664,800	£18,498
MANUFACTURED—				
Boots and shoes . . *dozen pairs*	10,416	£27,478	17,744	£43,316
Waterproof clothing	......	258,819	......	94,053
Insulated wire	......	112,574	......	185,307
Submarine cables	......	81,323	......	93,498
Tires and tubes	......	475,946	......	351,672
Other rubber manufactures	......	288,036	......	360,584

EXPORTS—COLONIAL AND FOREIGN

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
UNMANUFACTURED— Crude rubber:				
To Russia	8,300	£1,280	......	......
Sweden, Norway, Denmark	129,100	11,707	360,300	£21,217
Germany	554,800	55,130	880,500	44,549
Belgium	484,000	53,581	254,200	14,452
France	2,361,500	280,450	547,000	32,922
Spain	31,600	3,812	16,500	922
Italy	305,900	33,668	357,800	16,204
Austria-Hungary	11,200	1,200	29,700	1,666
Other European Countries	187,700	19,136	185,700	12,064
United States	12,599,800	1,554,547	398,600	46,315
Canada	1,452,800	174,805	23,500	700
Other countries	239,100	30,935	27,800	1,644
Totals, rubber	18,365,800	£2,220,251	3,081,600	£192,655
Waste and reclaimed rubber	......	......	900	35
Totals, unmanufactured	18,365,800	£2,220,251	3,082,500	£192,690
Gutta percha and balata	123,400	21,190	15,700	3,656
MANUFACTURED—				
Boots and shoes . . . *dozen pairs*	609	£4,359	578	£2,885
Tires and tubes	......	2,464	......	67,541
Other manufactures	......	5,714	......	2,281
Totals, manufactured	......	£12,537	......	£72,707

EXPORTS OF INDIA RUBBER MANUFACTURES AND INSULATED WIRE AND CABLE FROM THE UNITED STATES BY COUNTRIES, DURING THE MONTH OF JANUARY, 1921.

EXPORTED TO–	Belting	Hose	Packing	Boots		Shoes		Soles and Heels	Automobile Tires				Insulated Wire and Cables	Druggists' Rubber Sundries	All Other Manufactures of Rubber	Totals
	Value	Value	Value	Pairs	Value	Pairs	Value	Value	Casings Value	Inner Tubes Value	Solid Tires Value	All Others Value	Value	Value	Value	Value
EUROPE:																
Azores and Madeira Islands	$368	$2,104							$39	$4						$2,515
Belgium		109	$892			7,032	$8,032		8,734	662			$4,463	$41	$1,614	24,547
Bulgaria		807														807
Czechoslovakia									320	74						394
Denmark	1,090	958	625	50	$50	30,819	29,275		21,146	650	$1,353	$150	8,871		2,791	66,959
Finland		56	290						881			350	200		108	1,885
France	9,033	5,215	1,753			1,033	997		79,117	106		28	45,858	2,064	36,169	180,340
Germany	1,947					75	90		9,129	1,221					1,130	13,517
Gibraltar									195							195
Greece		6,048							3,427	249			2,692		594	13,010
Hungary								$275								275
Iceland and Faroe Islands				996	2,853	6,028	8,291									11,144
Italy									249	21			19,764	1,178	10,430	31,642
Malta, Gozo, and Cyprus Islands									750						10	760
Netherlands		782	552			6,321	6.825		9.693	944		231	133,546	11,083	2,905	166,561
Norway	4.095	728		968	1,805	118,650	120,599	749	26,321	664	5,806		2,199	126	2.147	165,239
Poland and Danzig								340	540	60				4,290		5,230
Portugal						920	1,315							366	237	1,918
Roumania		23	105	72	291	4	8		6,761	1,929			859		265	10,241
Spain	775	10,065		1	6	5,669	6,042	10,000	79,410	4,383	3,394	17,000	24,170	6,451	15,492	177,188
Sweden	7,463	4,760	1,082	101	405	11,722	32,863		74,859	6,650	6,690		427,299	265	15,268	577,604
Switzerland	774	200				24,638	25,465		6,635	89		1,264	6,890		2,793	44,110
Turkey in Europe		1,059				19,061	19,319		25,037	2,370			213	100	1,617	49,715
England	12,650	77,530	5,706	1,901	7,260	12,300	10.735	7,501	288,497	3,394	55,364	1,586	77,423	19,265	157.392	724,303
Scotland	29,947		833			1,330	1,445		2,301	13			5,244		495	40,278
Ireland									53	8					2,776	2,837
Jugoslavia, Albania, etc.													1,530			1,530
TOTALS, EUROPE	$68.142	$110,444	$11,838	4,089	$12,670	245,602	$271,301	$18,865	$644,094	$23.491	$72,607	$20,609	$761,221	$45,229	$254,233	$2,314,744
NORTH AMERICA:																
Bermuda	$133	$1,713	$280	76	$282	3,023	$5,037	$159	$128			$10	$2,090	$323	$1,105	$11,260
British Honduras		138				314	451	27	206	$432			90	69	19	1,432
Canada	8,120	6,042	9,859	351	1,067	4,857	5,546		62,245	7,393	$4.680	2,575	31,466	23,712	91,328	254,033
Costa Rica	2,081	1,120	786			72	89	811	1,128	171	300	400	4,741	281	1,202	13,110
Guatemala	2,313	753	294			1,142	1,507	1,485	7,533	881			3,036	1,846	5,203	24,851
Honduras	190	2,708	162			600	1,016	45	1,365	83			1,199	1,026	2,488	10,282
Nicaragua	1,221	85	44			234	371	3,280	3,448	150		183	1,562	447	509	11,300
Panama	6,961	22,915	6,829	65	332	5,182	6,375	4,868	17,899	8,544	1,566	1,662	11,565	311	3,555	93.382
Salvador		759	255			264	320		13,376	2,612	422	402	822	166	262	19,396
Mexico	31,431	140,945	46,260	134	466	32,179	49,429	11,722	116,163	17,350	4,692	1,739	245,916	23,095	55,254	744,462
Miquelon, Langley, etc.				48	79	264	186									265
Newfoundland and Labrador	381	382	267	2,507	7,854	1,592	2,688						1,165		805	13.542
Barbados	20		46			342	458		3,769	122	250	108	305		897	5,975
Jamaica	1,856	1.416	1,622			4,024	4.938	1,283	18,297	1,291	2.040	243	4,769	412	1.860	40,027
Trinidad and Tobago	1,770	3,259	1,542			923	1.233	578	12,787	749	2,430	488	15,563	355	2,059	42,813
Other British West Indies		273	158			2,425	2.875		2,506	176	414	416	354	166	141	7,479
Cuba	26,096	52,782	18,459	1,164	4,215	227.702	236.131	11.358	226,717	13,089	35.500	9,542	266,648	22,910	35,874	959,321
Virgin Islands of United States		18				1,129	2,021	279	1,622	143			337	165	91	4.676
Dutch West Indies		1,741	217			232	312	174	930	149			58	116	57	3,754
French West Indies						7	13		2,897	333	907	1,041	317		282	5,790
Haiti		735	139			424	486	37	6,636	1,205		211	243	289	916	10,897
Dominican Republic	46	2,399	2,169			2,779	3,436	154	23,060	2,010	2,344	740	6,480	1,470	2,475	46,783
TOTALS, NORTH AMERICA	$82,619	$240.183	$89,388	4,345	$14,295	289,710	$324,918	$36.260	$522,712	$56.883	$55,545	$19,760	$598,726	$77,159	$206,382	$2,324,830
OCEANIA:																
Australia	$8,651	$5,788	$2,960	2,225	$7,591	1,544	$2,898	$1,740	$77,509	$5,452	$250	$2.163	$36.841	$2,095	$17,634	$171,552
New Zealand	11,703	894	1,694	6,201	25,628	2,526	2.643	724	128.696	1,843	3.032	23,741	40,339	1,244	11,952	254,133
Other British Oceania						2,132	2,524		4,632	1,097	148	25				8,426
French Oceania		100				318	432		1,161	75		213			10	1,991
Other Oceania						15	40		34							74
Philippine Islands	11,061	11,232	9,122	1,149	2,430	137,456	172.803	24,647	90,609	17,513	22,429	4,190	89,421	4,628	28,822	488,907
TOTALS, OCEANIA	$31,415	$18,014	$13,776	9,575	$35,649	143,991	$181,340	$27,111	$302,641	$25,980	$25,839	$30,332	$166,601	$7,967	$58,418	$925,083
SOUTH AMERICA:																
Argentina	$17,587	$28,723	$2,115			36,252	$42,182	$2,577	$118,500	$11,944	$7.365	$750	$87,357	$14,902	$40,128	$374.130
Bolivia	710			132	$567			42	3,929	192	405		41,447	68	128	47,488
Brazil	8,300	18,169	6,617			44,575	44,300	19,452	113,412	4,727		810	222,541	4,335	23,135	465,798
Chile	12,193	9.348	5.641	12	32	14.162	13,789	241	17.018	1,707	2,214	100	160,424	3,846	21,905	248,458
Colombia	1,160	1,473	204			1,344	1,403	442	6,994	921	594		23,569	4,752	5,214	46,726
Ecuador		97				724	795		2,378	401			1,996	2,373	922	8,962
British Guiana		163	857			1,537	2,158		2,924	1.624			171	37	405	8,339
Dutch Guiana		479				66	66	64	2,038	198			109	83	108	3,145
French Guiana									100	76						176
Paraguay	744								280	124				33	106	1,287
Peru	7,413	2.354	1,590	182	1,517	120	300	171	39,888	6,603	4,020		21,899	2,754	9,294	97,803
Uruguay		5,257	242			16,523	17.301	25	32,104	1,050			31,508	5,933	10,841	104,261
Venezuela	1,736	1,341	1,163			179	175	1,108	26,420	1,558	743		7,304	1,606	4,545	47,699
TOTALS, SOUTH AMERICA	$49,843	$67,404	$18,429	326	$2,116	115,482	$122,469	$24,122	$365,985	$31,125	$15,341	$1,660	$598,325	$40,722	$116,731	$1,454,272

EXPORTED TO—	Belting Value	Hose Value	Packing Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Soles and Heels Value	Casings Value	Inner Tubes Value	Solid Tires Value	All Others Value	Wire and Cables Value	Rubber Sundries Value	Manufactures of Rubber Value	Totals Value
ASIA:																
Aden	......	......	......	......	......	......	......	......	$3,217	......	....	......	......	......	$70	$3,287
China	$4,525	$5,979	$5,056	......	......	2,528	$3,013	$98	25,864	$991	$150	$163	$135,559	$4,149	8,259	193,806
Kwantung, leased territory	......	......	......	......	......	648	684	......	......	......	......	......	6,983	......	......	7,667
Chosen	......	494	......	......	......	192	198	......	199	......	......	......	......	......	192	1,083
British India	14,284	14,623	2,566	72	$282	415	501	47	54,897	4,245	1,412	......	66,505	1,483	9,134	169,979
Straits Settlements	847	......	......	......	......	3,528	4,752	......	4,667	564	1,060	2,238	1,298	443	392	16,201
Other British East Indies	......	......	......	......	......	288	326	81	788	1,267	1,374	......	......	......	234	4,070
Dutch East Indies	3,275	1,671	......	......	......	48	47	350	23,206	3,787	10,973	1,612	90,128	593	1,377	137,019
French Indo China	......	......	517	......	......	......	......	......	......	......	......	......	156	......	110	783
Hongkong	......	3,800	329	60	199	7,456	8,435	49	6,283	556	1,713	......	354	5,482	871	28,071
Japan	5,907	2,026	1,472	5,496	15,721	39,644	42,635	163	13,165	696	6,387	69	6,619	1,394	43,784	140,038
Siam	......	......	......	......	......	248	296	......	6,350	100	......	......	......	......	143	6,889
Turkey in Asia	150	......	......	156	492	4,182	4,236	19	8,819	2,018	......	......	......	17	401	16,155
TOTALS, ASIA	$28,988	$28,593	$9,940	5,784	$16,694	59,177	$65,123	$807	$147,455	$14,224	$23,009	$4,082	$307,602	$13,561	$64,970	$725,048
AFRICA:																
Belgian Kongo	$76	......	......	......	......	25	$41	......	......	......	......	......	......	$500	$106	$723
British West Africa	......	......	......	1	$4	214	302	......	$8,698	$1,096	......	......	$77	2	41	10,220
British South Africa	25,664	$44,540	$2,641	......	......	1,981	2,150	$1,040	30,206	2,526	......	$193	13,845	1,722	9,368	133,895
British East Africa	......	......	......	......	......	936	900	......	9,249	......	......	......	1,243	85	1,268	12,745
Canary Islands	......	......	......	......	......	......	......	......	2,703	115	......	......	......	......	......	2,818
French Africa	......	60	......	......	......	1	2	......	1,753	390	1,010	......	......	28	500	3,743
Kamerun, etc.	......	......	......	2	13	......	......	......	825	94	......	......	......	32	......	964
Liberia	......	......	......	......	......	......	......	......	......	......	......	......	14	......	......	14
Morocco	2,960	......	......	......	......	......	......	......	940	156	......	......	......	......	......	4,056
Portuguese Africa	......	487	100	......	......	......	......	......	......	......	1,066	......	......	......	933	2,586
Egypt	......	430	......	......	......	3	4	......	8,744	1,892	......	69	......	657	725	12,521
TOTALS, AFRICA	$28,700	$45,517	$2,741	3	$17	3,160	$3,399	$1,040	$63,118	$6,269	$2,076	$262	$15,179	$3,026	$12,941	$184,285
GRAND TOTALS	$289,707	$510,155	$146,112	24,122	$81,441	857,122	$968,550	$108,205	$2,046,005	$157,972	$194,417	$76,705	$2,447,654	$187,664	$713,675	$7,928,262

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORY OF UNITED STATES

	Belting Hose and Packing Value	Boots and Shoes Pairs	Boots and Shoes Value	Tires: Automobile Value	Tires: All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
Hawaii	$17,848	......	......	$82,992	$2,010	......	......	$11,496	$114,346
Porto Rico	10,475	......	......	50,538	275	......	......	$16,368	77,656
TOTALS	$28,323	......	......	$133,530	$2,285	......	......	$27,864	$192,002

Compiled by the Bureau of Foreign Commerce, Department of Commerce, Washington, D. C.

OFFICIAL INDIA RUBBER STATISTICS FOR THE UNITED STATES

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	January 1920 Pounds	January 1920 Value	January 1921 Pounds	January 1921 Value
UNMANUFACTURED—*free:*				
India rubber:				
From France	490,968	$198,476	....	....
Netherlands	1,522,588	722,320	100,800	35,280
Portugal	67,461	33,730	121,000	13,310
United Kingdom	17,104,210	8,024,335	636,468	178,011
Canada	2,585	1,034	....	....
Central America	28,376	8,971	....	....
Mexico	130,655	54,167	....	....
Brazil	4,233,199	1,405,944	2,432,665	310,032
Peru	176,721	65,118	60,681	11,661
Other South Am.	275,256	85,769	131,673	32,672
British E. Indies	35,167,439	14,215,918	20,705,400	6,410,431
Dutch E. Indies	6,171,319	2,684,769	2,617,357	905,494
Other countries	1,056,638	466,677	105,709	25,542
Totals	66,427,415	$27,967,228	26,911,753	$7,922,433
Balata	494,604	292,294	127,146	80,437
Jelutong (Pontianak)	1,215,892	172,049	170,147	20,630
Gutta Percha	816,999	133,742	53,327	8,011
Rubber scrap	981,719	82,046	165,176	10,417
Totals, unmanufactured	69,936,629	$28,647,359	27,427,549	$8,041,928
Chicle (dutiable)	1,203,546	$895,678	818,277	$428,922
MANUFACTURED—*dutiable:*				
India rubber and gutta percha	....	$67,649	....	$44,918
India rubber substitutes	4	5	....	....

EXPORTS OF DOMESTIC MERCHANDISE

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
MANUFACTURED—				
India rubber:				
Scrap and old	1,361,652	$124,891	952,265	$66,568
Reclaimed	339,979	60,609	118,828	20,849
Belting[1]	....	213,779	....	289,707
Hose[1]	....	94,726	....	510,155
Packing[1]	....	50,230	....	146,112
Boots[1] ... *pairs*	42,441	149,928	24,122	81,441
Shoes[1] ... *pairs*	1,197,236	1,202,206	857,122	968,550
Soles and heels[1]	....	30,729	....	108,205
Tires:				
Casings[1]	....	$3,090,924	....	$2,046,005
Inner tubes[1]	....	92,320	....	157,972
Solid tires[1]	....	121,969	....	194,417
All other tires[1]	....	127,919	....	76,705
Druggists' rubber sundries[1]	....	90,145	....	187,664
Suspenders and garters	....	222,030	....	176,821
Other rubber manufactures[1]	....	664,890	....	713,675
Totals manufactured	....	$6,337,295	....	$5,744,837
Fountain pens ... *number*	35,907	$37,472	45,197	$68,749
Insulated wire and cables[1]	....	661,842	....	2,447,654

EXPORTS OF FOREIGN MERCHANDISE

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
UNMANUFACTURED—				
India rubber	563,677	$247,992	1,164,460	$237,383
Balata	54,958	32,698	....	....
Jelutong (Pontianak)	110,000	18,568	....	....
Gutta percha	....	....	74,467	12,497
Totals, unmanufactured	....	$299,258	....	$249,880
MANUFACTURED—				
Gutta percha	....	$115	....	$32,512
Totals, manufactured	....	$115	....	$32,512
India rubber substitutes	....	....	101	53

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
MANUFACTURED—				
To Alaska:				
Belting, hose and packing	....	$5,114	....	$975
Boots and shoes .. *pairs*	3,177	9,934	2,696	9,276
Other rubber goods	....	2,633	....	1,856
Totals	....	$17,681	....	$12,107
To Hawaii:				
Belting, hose and packing	....	$9,305	....	$17,848
Automobile tires	....	145,074	....	82,992
Other tires	....	5,706	....	2,010
Other rubber goods	....	8,905	....	11,496
Totals	....	$168,990	....	$114,346
To Porto Rico:				
Belting, hose and packing	....	$4,751	....	$10,475
Automobile tires	....	157,885	....	50,538
Other tires	....	20,171	....	275
Other rubber goods	....	13,957	....	16,368
Totals	....	$196,764	....	$77,656

To Philippine Islands—treated as foreign commerce.

[1]Details of exports of domestic merchandise by countries during January, 1921, appear in this issue.

RUBBER STATISTICS FOR ITALY

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	Nine Months Ended September			
	1919		1920	
UNMANUFACTURED—	Quintals[1]	Lire[2]	Quintals	Lire
Crude rubber and gutta percha—raw and reclaimed:				
From Great Britain	57		654	
French Colonies in Asia	341		2,075	
British India and Ceylon	22,991		6,448	
Straits Settlements	40,428	89,741,750	26,062	48,661,850
French African Colonies	3,283		1,357	
Belgian Congo	710		2,064	
Brazil	25,798		10,439	
Other countries	858		2,144	
Totals	94,465	89,741,750	51,223	48,661,850
Rubber scrap	14,700	2,205,000	231	34,650
Totals, unmanufactured	109,165	91,946,750	51,454	48,696,500
MANUFACTURED—				
India rubber and gutta percha—				
Threads	188	545,200	273	791,700
Sheets, including hard rubber	114	221,800	235	455,600
Tubes	177	256,300	10C	319,550
Belting	368	607,200	528	871,200
Rubber coated fabrics in pieces	427	901,400	654	1,281,200
Boots and shoes ... *pairs*	34,075	681,500	119,850	2,397,000
Elastic webbing	290	986,000	379	1,288,600
Clothing and articles for travel	4	16,000	155	620,000
Tires and tubes:				
From Belgium	1		758	
France	3,473		4,255	
Great Britain	858	12,138,000	6,816	36,766,800
United States	2		1,265	
Other countries	1		37	
Other manufactures	11,999	22,536,300	16,097	30,143,100
Totals manufactured	......	38,889,700	......	74,934,750
Total imports	......	130,836,450	......	123,631,250

EXPORTS OF CRUDE AND MANUFACTURED RUBBER

	Nine Months Ended September			
	1919		1920	
UNMANUFACTURED—	Quintals[1]	Lire[2]	Quintals	Lire
India rubber and gutta percha—raw and reclaimed:				
To Australia	......		543	
Spain	2,014	1,692,000	708	2,517,000
United States	1,370		3,239	
Other countries	......		544	
Totals	3,384	1,692,000	5,034	2,517,000
Waste	2,669	533,800	6,725	1,345,000
Totals unmanufactured	6,053	2,225,800	11,759	3,862,000
MANUFACTURED—				
India rubber and gutta percha—				
Threads	412	1,277,200	263	815,300
Sheets, including hard rubber	68	126,400	280	511,000
Tubes	664	949,750	1,355	1,770,550
Belting	95	199,500	....	....
Rubber coated fabrics in pieces	165	495,000	410	1,223,600
Boots and shoes ... *pairs*	....	....	495	9,900
Other rubber footwear	....	....	2	3,000
Elastic webbing	564	2,143,200	1,023	3,887,400
Clothing and articles for travel	20	100,000	323	1,615,000
Tires and tubes:				
To Austria	229		2,528	
Belgium	991		1,777	
Czecho-Slovakia	281		1,037	
Denmark	213		1,331	
France	519		2,041	
Great Britain	3,742		9,407	
Netherlands	142		515	
Rumania	41		1,229	
Spain	357	27,987,500	1,187	103,025,000
Switzerland	886		705	
Hungary	......		264	
India and Ceylon	694		4,259	
Dutch East Indies	241		1,824	
Straits Settlements	176		2,485	
Australia	242		890	
Argentina	855		2,591	
Brazil	669		2,530	
Other countries	1,017		4,610	
Other rubber goods	2,499	4,618,200	9,861	18,152,600
Totals, manufactured	......	37,896,750	......	131,013,350
Total exports	......	40,122,550	......	134,875,350

[1] One quintal equals 220.46 pounds.
[2] One lira equals $0.193 (normal).

THE MARKET FOR RUBBER SCRAP

NEW YORK

THE DEMAND for rubber scrap has continued almost totally absent but the trade continues hopeful on account of the steady expansion in rubber manufacturing operation. The tire factories of the Akron district are reported to be operating at half capacity. They are not yet actively purchasing renewal of supplies of raw materials which reacts on the reclaimers and dealers in rubber scrap.

Country holders and people in whose garages scrap tires originate are holding their stocks. Mixed auto tires are quoted at one cent per pound, or less, and at that price, in many instances, are worth less at shipping point than the freight rate.

QUOTATIONS FOR CARLOAD LOTS DELIVERED

Prices subject to change without notice
April 25, 1921

BOOTS AND SHOES:			
Arctic tops	*lb.*	*$0.075 @	
Boots and shoes	*lb.*	*.03½ @	.04
Trimmed arctics	*lb.*	*.02¾ @	.03
Untrimmed arctics	*lb.*	*.02 @	.02¼
HARD RUBBER:			
Battery jars, black compound	*lb.*	*.07½ @	.01
No. 1, bright fracture	*lb.*	.18 @	.20
INNER TUBES:			
No. 1	*lb.*	*.06¾ @	.07¾
Compounded	*lb.*	*.04¾ @	.05¼
Red	*lb.*	.04¼ @	.04¾
MECHANICALS:			
Black scrap, mixed, No. 1	*lb.*	*.02½ @	.03
No. 2	*lb.*	*.01½ @	.02
Car springs	*lb.*	*.02½ @	.03
Heels	*lb.*	*.02½ @	.03
Horse-shoe pads	*lb.*	*.02½ @	.03
Hose, air brake	*lb.*	*.01 @	.01½
fire, cotton lined	*lb*	*.01 @	
garden	*lb.*	*.07½ @	.01
Insulated wire stripping, free from fiber	*lb.*	*.01½ @	.02
Matting	*lb.*	*.01 @	
Red packing	*lb.*	*.04½ @	.05
Red scrap, No. 1	*lb.*	*.07 @	.08
No. 2	*lb.*	*.05½ @	.06
White scrap, No. 1	*lb.*	*.07 @	.07½
No. 2	*lb.*	*.06 @	.06½
TIRES:			
PNEUMATIC—			
Auto peelings	*lb.*	*.02½ @	.02¾
Bicycle	*lb.*	*.01½ @	.02
Standard white auto	*lb.*	*.02¼ @	.02¾
Mixed auto	*lb.*	*.01 @	.01½
Stripped, unguaranteed	*lb.*	*.01 @	.01½
White, G. & G., M. & W., and U. S.	*lb.*	*.02¾ @	
SOLID—			
Carriage	*lb.*	*.02¼ @	.02¾
Irony	*lb.*	@	
Truck, clean	*lb.*	*.01½ @	.02

*Nominal.

THE MARKET FOR COTTON AND OTHER FABRICS

NEW YORK

AMERICAN COTTON. Early in the month the spot market for middling upland cotton experienced a marked upward tendency followed by several days of weakness and decline which brought prices back to 12.30 cents, a decline of 15 points. Trade continues very quiet.

Egyptian Cotton. Present prices are somewhat higher, if anything than one month ago, but the change is not important. In Egyptians, Sakel has somewhat increased its premium over Uppers, and there is some scattered inquiry for Pima, but mills using extra staples are taking very little of this cotton.

Arizona Cotton. Practically the same conditions prevail with this grade as with the Egyptian. Price changes during the past month have been upward but unimportant and very little buying noted.

Sea Island Cotton. This grade continues a negligible feature in the market.

Raincoat Fabrics. There is no encouraging news in this branch of the trade. The only business being done is on bombazine with a heavy gas mask rubber coating. The tendency is for cheap coats calling for lowest-priced material. Prices remain unchanged from last month.

Mechanical Ducks and Drills. Cleaning up of the Goodyear financial matters is having a tonic effect on the fabric market. Cloth prices are very low in relation to costs, in some instances are actually lower. Accelerated demand is hoped for with higher prices established by late August which will permit the mills to operate again at a profit.

Sheetings. There is little or no activity in the market. Buyers' confidence is absent and there seem to be no firm quotations.

Tire Fabrics. The recent marked increase in tire production has not yet resulted in increased activity in the tire fabric mills because of the large stocks which must first be consumed. During May a fair volume of business will probably be moving, mostly against old orders. The principal problem of the fabric manufacturers is to ship and receive payment for the large volume of unfilled contracts at high prices that were on their books when the slump in the tire business came. Until then they will not be actively seeking new business.

NEW YORK QUOTATIONS

April 25, 1921

Prices subject to change without notice

BURLAPS				
32—7-ounce	100 yards	*$3.50	@	
32—8-ounce		*3.50	@	
40—7½-ounce		4.00	@	
40—8-ounce		4.00	@	
40—10-ounce		4.50	@	
40—10½-ounce		4.50	@	
45—7½-ounce		4.50	@	
45 8-ounce		4.50	@	
45 10-ounce		5.00	@	
DRILLS				
38-inch 2.00-yard	yard	.14	@	
40-inch 3.47-yard		.09¼	@	
52-inch 1.90-yard		.15¾	@	
52-inch 1.95-yard		.15⅜	@	
60-inch 1.52-yard		.19¾	@	
DUCK				
CARRIAGE CLOTH				
38-inch 2.00-yard enameling duck	yard	.14½	@	
48-inch 1.74-yard		.16¾	@	
72-inch 16.66 ounce		.36½	@	
72-inch 17.21-ounce		.37½	@	
MECHANICAL				
Hose	pound	.26	@	
Belting		.25	@	
HOLLANDS, 40-INCH				
Acme	yard		@	
Endurance			@	
Penn			@	
OSNABURGS				
40 inch 2.35-yard	yard		@	
40-inch 2.48-yard			@	
37½-inch 2.42-yard			@	
RAINCOAT FABRICS				
COTTON				
Bombazine 64 x 60	yard	.12½	@	
60 x 48		.11½	@	
Cashmeres, cotton and wool, 36-inch, tan		.70	@	
Twills 64 x 72		.10	@	.12
60 x 102		.16	@	
Twill, mercerized, 36-inch, blue and black		.25½	@	
tan and olive		.24½	@	
Tweed		.40	@	1.00
printed		.22½	@	
Plaids 60 x 48	yard	$0.12½	@	
56 x 44		.12	@	
Repp		.32	@	
Prints 60 x 48		.13	@	
64 x 60		.14	@	
IMPORTED WOOLEN FABRICS SPECIALLY PREPARED FOR RUBBERIZING—PLAIN AND FANCIES				
63-inch, 3¼ to 7½ ounces	yard	.81	@	2.22
36-inch, 2¾ to 5 ounces		.63	@	1.62
IMPORTED PLAID LINING (UNION AND COTTON)				
63-inch, 2 to 4 ounces	yard	.71	@	1.57
36 inch, 2 to 4 ounces		.44	@	.84
SHEETINGS, 40-INCH				
48 x 48, 2.35-yard	yard		@	
48 x 48, 2.50-yard		.09½	@	
48 x 48, 2.85-yard		.09¾	@	
64 x 68, 3.15-yard		.09½	@	
56 x 60, 3.60-yard		.08	@	
48 x 44, 3.75-yard		.06¾	@	
SILKS				
Canton, 38-inch	yard	.29½	@	
Schappe, 36-inch		.42½	@	
STOCKINETTES				
SINGLE THREAD				
3½ Peeler, carded	pound		@	
4½ Peeler, carded			@	
6½ Peeler, combed			@	
DOUBLE THREAD				
Zero Peeler, carded	pound		@	
3½ Peeler, carded			@	
6½ Peeler, combed			@	

TIRE FABRICS				
BUILDING				
17¼-ounce Sakellarides, combed	pound	1.10	@	
17¼-ounce Egyptian, combed		.90	@	
17¼-ounce Egpytian, carded		.80	@	
17¼-ounce Peeler, combed		.85	@	
17¼-ounce Peeler, carded		.70	@	
CORD				
15-ounce Egyptian	pound	1.00	@	
BICYCLE				
8-ounce American	pound		@	
10-ounce American			@	
CHAFER				
9¼-ounce Sea Island	pound		@	
9¼-ounce Egyptian, carded		1.00	@	
9¼-ounce Peeler, carded		.90	@	

*Nominal.

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS

NEW YORK

The market for chemicals, pigments and compounding ingredients, although generally quiet, has begun to feel renewal of activity particularly in such items as the lead and zinc products, whiting, china clay, etc., entering largely into the manufacture of rubber goods and tires.

The talc milling capacity in this country is being expanded so rapidly that it will probably have a marked effect on the industry. The additions completed and in process are estimated to raise the capacity to 150,000 tons annually.

Aniline Oil. Stocks have been abundant, the demand inactive, with prices declining from 27 cents to 20 to 22 cents per pound.

Barytes. The demand has been very quiet from consumers in every line.

Benzol. Prices have declined somewhat. There is good surplus of stock and the fairly active demand early in the month declined appreciably toward the end of the period. Pure benzol was quoted at 36 cents and 90 per cent at 30 cents.

Blanc Fixe. Production is at a full stop because of entire absence of demand.

Blue Lead. The demand has been very dull. Prices 7½ to 7¾ cents a pound. Slightly better demand from the rubber trade was noted about the middle of the month.

Carbon Black. Early in the month prices weakened somewhat, lampblack being quoted at 17 cents and carbon black at 16 cents. Routine trade at firm prices ruled about the middle of the month followed by a reduction of one cent a pound for carbon black.

Carbon Bisulphide. The demand has ruled light the entire month. Prices 6½–7½ cents a pound.

Carbon Tetrachloride. A fair demand has held steadily, particularly for small lots, quotations for the last week dropping a cent to 12 cents a pound.

China Clay. The market has been quiet and no arrivals from abroad have been noted. The tire industry is said to be somewhat interested in the use of china clay as a substitute for zinc oxide. However such a movement is not calculated to reach serious proportions when relative technical value is considered.

Dry Colors. There have been few price changes in dry colors although there have been heavy importations of the earth colors.

Litharge. Trade has been routine. There have been some buying and more inquiry by the rubber trade, particularly from the tire industry.

Lithopone. Business has been increasingly brisk during the month. A fair size importation arrived from Germany. It had no effect on the market, however.

Solvent Naphtha. The demand has not been active and fell off toward the end of the month to very quiet, with quotations at 25 to 30 cents a gallon.

Sublimed Lead. Virtually in the same position as blue lead and litharge. Demand quiet with some inquiries from the rubber trade.

Sulphur. There has been no change in prices although the market is described as unsettled.

Talc. Stocks are heavy, demand small and the market inclined to extreme dullness. It is a buyers' market.

Whiting. There have been fairly heavy arrivals of chalk. The market has been very quiet and favorable to the buyer. Toward the close of the month business improved with the demand from the rubber trade becoming somwhat active.

Zinc Oxide. Tire manufacturers are gradually coming into the market but as yet their purchases are a small factor. There has been an increase in importation of French zinc oxide but at non-competitive prices. Stocks are heavy and prices unchanged.

NEW YORK QUOTATIONS

April 25, 1921

Prices subject to change without notice

ACCELERATORS, ORGANIC				
Accelerene (f. o. b. English port)	lb.	13s.	@	
Accelemal	lb.	$0.55	@	
Adco	lb.		@	
Aldehyde ammonia crystals	lb.	1.05	@	1.15
Aniline oil	lb.	.20	@	.25
Excellerex	lb.	.75	@	
Hexamethylene tetramine (powdered)	lb.	1.05	@	1.15
N. C. C.	lb.		@	
No. 999	lb.	14½	@	
Paraphenylene diamine	lb.	2.00	@	2.25
Thiocarbanilide (factory)	lb.	.65	@	.70
Vulcocene	lb.	.35	@	
ACCELERATORS, INORGANIC				
Lead, dry red (bbls.)	lb.	.09¼	@	
sublimed blue (bbls.)	lb.	.07¼	@	.07½
sublimed white (bbls.)	lb.	.08¼	@	
white, basic carbonate (bbls.)	lb.	.07½	@	.08
Lime, flour	lb.	.02½	@	
Superfine, "Cream of Lime"	lb.	.03	@	
Litharge, domestic	lb.	.10	@	
sublimed	lb.		@	
Magnesia, carbonte, light	lb.	.09	@	
calcined extra light	lb.	.55	@	
calcined light	lb.	.25	@	.30
calcined medium light	lb.	.25	@	
calcined heavy	lb.	.06½	@	.07
calcined commercial (magnesite)	lb.		@	
oxide, extra light	lb.		@	
ACIDS				
Acetic 28 per cent	cwt.	2.50	@	3.00
glacial, 99 per cent	cwt.	9.50	@	10.00
Cresylic (97% straw color)	gal.	.85	@	
(95% dark)	gal.	.80	@	
Muriatic, 20 degrees	cwt.	1.50	@	1.75
Nitric, 36 degrees	cwt.	5.50	@	6.50
Sulphuric, 66 degrees	ton	19.00	@	21.00
ALKALIES				
Caustic soda (76% factory)	lb.	.03¾	@	.04½
Soda ash, 58%	cwt.	1.90	@	2.10
COLORS				
Black				
Bone, powdered	lb.	.06½	@	.14
granulated	lb.	.11	@	
Carbon black (sacks, factory)	lb.	.10	@	.15
pressed	lb.	.12	@	.16
compressed	lb.		@	
Dipped goods	lb.	1.00	@	
Drop	lb.	.08	@	.16
Ivory black	lb.	.17	@	.45
Lampblack	lb.	.16	@	.45
Oil soluble aniline	lb.	.95	@	
Rubber black	lb.		@	
Rubber makers' non-flying black	lb.	.40	@	
Blue				
Cobalt	lb.	.25	@	.30
Dipped goods	lb.	1.00	@	
Prussian	lb.	.60	@	
Ultramarine	lb.	.16	@	.35
Rubber makers' blue	lb.	3.50	@	
Brown				
Iron oxide	lb.	.07	@	
Sienna, Italian, raw and burnt	lb.	.06	@	.12
Sienna, Italian, raw (tan color)	lb.	.07	@	
Umber, Turkey, raw and burnt	lb.	.05	@	.06½
Vandyke	lb.	.06	@	.10
Green				
Chrome, light	lb.	.36	@	.40
medium	lb.	.40	@	.52
dark	lb.	.52	@	.58
commercial	lb.	.13½	@	
tile	lb.	.08	@	.12
Dipped goods	lb.	1.00	@	
Oxide of chromium	lb.	.66	@	
Rubber makers' green	lb.	3.50	@	
Red				
Antimony, crimson, sulphuret of (casks)	lb.	.43	@	.46
crimson, "R. P. M."	lb.	.55	@	
crimson F.	lb.	.35	@	
Antimony, golden sulphuret of	lb.	.25	@	.30
golden, "R. M. P."	lb.	.25	@	
golden 1	lb.	.30	@	
golden 2	lb.	.25	@	
7-A	lb.	.42	@	
vermilion sulphuret	lb.	.55	@	
red sulphuret	lb.	.25	@	
Arsenic, red sulphide	lb.	.14	@	
Dipped goods, red	lb.	1.25	@	
purple	lb.	1.25	@	
orange	lb.	1.25	@	

COLORS—Continued

Indian	lb.	$0.13½ @
Iron oxide, reduced grades	lb.	.04 @ .12
pure bright	lb.	.14½ @ .15½
Maroon oxide	lb.	.13½ @
Oil soluble aniline, red	lb.	@
orange	lb.	@
Oximony	lb.	.17½ @
Para toner	lb.	1.60 @
Red excelsior	lb.	@
Rubber makers' red	lb.	3.50 @
purple	lb.	2.50 @
Spanish natural	lb.	.05½ @ .05¾
Toluidine toner	lb	3.25 @ 3.50
Venetian	lb.	.03 @ .06
Vermilion, American	lb.	.25 @ .30
permanent	lb.	.34 @
English quicksilver	lb.	1.10 @
White		
Albalith	lb.	@
Aluminum bronze, extra brilliant	lb.	@
extra fine	lb.	@
Lithopone, Beckton white	lb.	.07 @ .07¼
Lithopone, domestic (factory)	lb.	.07 @ .07½
Ponolith (carloads, factory)	lb.	@
Rubber-makers' white	lb.	@
Zinc oxide, American Horse Head brand (factory):		C.L. L.C.L.
Special	lb.	.09¼ @ .09¾
XX red	lb.	.08¾ @ .09¼
French process, Florence brand (factory):		
White seal	lb.	.12¼ @ .12½
Green seal	lb.	.11 @ .11½
Red seal	lb.	.10 @ .10½
White seal, imported	lb.	.12¼ @ .12½
Azo factory:		
ZZZ (lead free)	lb.	.08¾ @ .09¼
ZZ (under 5% leaded)	lb.	.08 @ .08½
Z (8-10% leaded)	lb.	.07⅝ @ .08⅛
Yellow		
Cadmium, sulphide, yellow, light, orange	lb.	@
red	lb.	@
Chrome, light and medium	lb.	.21 @
C. P.	lb.	.21 @
Dipped goods	lb.	1.25 @
Ochre, domestic	lb.	.02½ @ .05
imported	lb.	.04 @ .05
Oil soluble aniline	lb.	1.60 @
Rubber makers' yellow	lb.	2.50 @ 3.50
Zinc chromate	lb.	.40 @

COMPOUNDING INGREDIENTS

Aluminum flake (carload)	ton	33.00 @ 40.00
hydrate	lb.	.22 @
Ammonium carbonate (powdered)	lb.	.08 @ .10
Asbestine	ton	25.00 @
Barium, carbonate, precipitated	ton	85.00 @
dust	ton	100.00 @
Barytes, pure white (f. o. b. works)	ton	28.00 @
off color	ton	20.00 @
uniform floated	ton	28.00 @
German "Cream"	ton	@
Basofor	lb.	.04½ @
Beta-naphthol	lb.	.34 @
Blanc fixe	lb.	.04½ @
Bone ash	lb.	.10 @
Carrara filler (factory)	lb.	.01½ @
Chalk, precipitated, extra light	lb.	@
heavy	lb.	@
China, clay, Dixie	ton	22.00 @ 35.00
Blue Ridge	ton	22.00 @ 35.00
domestic	ton	10.00 @ 12.00
imported	ton	16.00 @ 25.00
Cotton linters, clean mill run (factory)	lb.	.01¾ @ .02
Fossil flour (powdered)	ton	60.00 @
(bolted)	ton	65.00 @
Glue, high grade	lb.	.30 @ .40
medium	lb.	.25 @ .30
low grade	lb.	.17 @ .19
Graphite, flake (400-pounds bbl.)	lb.	.10 @
amorphous	lb.	.05 @
Ground glass FF. (bbls.)	lb.	@
Infusorial earth (powdered)	ton	60.00 @
(bolted)	ton	65.00 @
Liquid rubber	lb.	.16 @
Mica, powdered	lb.	.15 @
Phenanthrene	lb.	.08 @ .10
Pumice stone, powdered (bbl.)	lb.	.03 @ .08
Rotten stone, powdered	lb.	.02½ @ .04½
Rubber paste	lb.	@
Silica, gold bond (factory)	ton	35.00 @
silver bond (factory)	ton	25.00 @
Soap bark, crushed	lb.	.14½ @ .15
Soapstone, powdered gray (carload)	ton	12.00 @
Starch, powdered corn	cwt.	2.18 @ 2.56
Talc, powdered soapstone	ton	22.50 @
Terra blanche	ton	30.00 @
Tripoli flour, air-floated, cream or rose (factory)	ton	30.00 @
white (factory)	ton	32.00 @
Tyre-lith	ton	95.00 @
Whiting, Alba	cwt.	@
Columbia	cwt.	.65 @ .75
commercial	cwt.	1.20 @ 1.25
Danish (factory)	ton	25.00 @
English cliffstone	cwt.	1.75 @ 2.00
gilders	cwt.	1.45 @ 1.90
Paris, white, American	cwt.	1.50 @ 1.60
Quaker	ton	13.00 @ 15.00
Super	ton	@
Wood pulp, imported	ton	@
XXX (f. o. b. plant)	ton	35.00 @
X (f. o. b. plant)	ton	35.00 @
Wood flour	ton	@

MINERAL RUBBER

Elateron (c. l. factory)	ton	@
(l. c. l. factory)	ton	@
Gilsonite	ton	$70.00 @
Genasco (c. l. factory)	ton	50.00 @
(l. c. l. factory)	ton	52.00 @
Hard hydrocarbon	ton	35.00 @ 45.00
Soft hydrocarbon	ton	35.00 @ 40.00
M. R. X.	ton	@
Pioneer (c. l. factory)	ton	@
(l. c. l. factory)	ton	@
Raven M. R.	ton	@
320 M. P. hydrocarbon (c. l. factory)	ton	50.00 @ 55.00
(l. c. l. factory)	ton	57.50 @
300/310 M. P. hydrocarbon (c. l. factory)	ton	40.00 @
(l. c. l. factory)	ton	45.00 @
States "A" (c. l. factory)	ton	45.00 @
No. 1 (c. l. factory)	ton	40.00 @
Robertson, M. R. pulverized (c. l. factory)	ton	87.50 @
M. R. pulverized (l. c. l. factory)	ton	90.00 @
M. R. (c. l. factory)	ton	62.50 @
M. R. (l. c. l. factory)	ton	65.00 @
Rubrax (factory)	ton	50.00 @
Synpro, granulated, M. R. (factory)	ton	77.50 @

OILS

Avoilas compound	lb.	.16 @
Castor, No. 1, U. S. P.	lb.	.10
No. 3, U. S. P.	lb.	.09 @
Corn	lb.	.08 @
Cotton	lb.	.08 @
Glycerine (98 per cent)	lb.	.18 @ .19
Linseed, raw (carloads)	gal.	.65 @
Linseed compound	gal.	@
Palmoline	lb.	.14 @ .16
Palm niger	lb.	.06 @
Palm special	lb.	@
Peanut	lb.	.09 @
Petrolatum	lb.	.08 @ .10
Petrolatum, sticky	lb.	.10 @ .12
Pine, steam distilled	gal.	1.15 @ 1.25
Rapeseed, refined	lb.	.12 @
blown	lb.	.13 @
Rosin	gal.	.45 @ .47
Synpro	gal.	.35 @ .65
Soya bean	lb	.07½ @
Tar	gal.	.33 @ .38

RESINS AND PITCHES

Cantella gum	lb.	.50 @
Cumar resin, hard	lb.	.09 @ .13
soft	lb.	.09 @ .13
Tar, retort	bbl.	12.50 @ 14.50
kiln	bbl.	12.50 @ 13.00
Pitch, Burgundy	lb.	.04½ @
coal tar	ton	22.00 @
pine tar	lb.	.03½ @
ponto	lb.	.10 @
Rosin, K	280 lbs.	6.00 @
strained	280 lbs.	6.15 @
Shellac, fine orange	lb.	.90 @

SOLVENTS

Acetone (98.99 per cent drums)	lb.	.11½ @ .12
Benzol (water white, 90%)	gal.	.25 @ .31
pure	gal.	.27 @ .34
Carbon bisulphide (drums)	lb.	.07 @
tetrachloride (drums)	lb.	.11½ @ .14
Naphtha, motor gasoline (steel bbls.)	gal.	.26 @ .28
73@76 degrees (steel bbls.)	gal.	.37½ @
68@70 degrees (steel bbls.)	gal.	.35 @
V. M. & P. (steel bbls.)	gal.	.25 @
solvent	gal.	.28 @
Toluol, pure	gal.	.28 @ .34
Turpentine, spirits	gal.	.60 @ .61
wood	gal.	.59 @
Xylol, pure	gal.	.45 @ .51
commercial	gal.	.25 @ .31

SUBSTITUTES

Black	lb.	.08 @ .16
White	lb.	.10 @ .18
Brown	lb.	.12 @ .17
Brown factice	lb.	.07 @ .13½
White factice	lb.	.08½ @ .15
Paragol, soft and medium	cwt.	10.81 @
hard	cwt.	10.81 @

VULCANIZING INGREDIENTS

Lead, black hyposulphite (black hypo)	lb.	@
Orange mineral, domestic	lb.	.12¼ @ .14
Sulphur chloride (jugs)	lb.	.20 @
(drums)	lb.	.07 @ .08
Sulphur, flour, Brooklyn brand (carloads)	cwt.	@
Brooklyn brand (less carload)	cwt.	@
Bergenport (carloads, factory)	cwt.	2.55 @
pure soft	cwt.	2.30 @
superfine (carloads, factory)	cwt.	

(See also Colors—Antimony.)

WAXES

Wax, beeswax, white, commercial	lb.	.55 @
ceresin, white	lb.	.14 @
carnauba	lb.	.20 @
Montan	lb.	.09 @
ozokerite, black	lb.	.30 @
green	lb.	.30 @
paraffin	lb.	.03½ @ .08
Sweet wax	lb.	.12 @

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THE SEIBERLING VALEDICTORY

The retirement of Frank A. Seiberling and his brother, Charles W., from The Goodyear Tire & Rubber Co. brings a pause in the career of two who added to rubber history some of its most dramatic incidents. Beginning in 1908, the Akron works, with a product of $500,000, grew in 1920 to more than $200,000,000. During that period more than $20,000,000 was paid in dividends. There was also added a factory in Canada, and another in California. A third was also planned for Brazil. To assure raw material, there were established rubber plantations in Sumatra, cotton plantations in Arizona, and fabric mills in Connecticut and California. From these bases radiated agencies, selling units and service stations covering the wide territory in which their markets were found. All told, Goodyear employed some 66,000 people.

The creation of this vast enterprise called for the broadest vision, undaunted courage and extraordinary organizing faculty. All of these attributes the senior Seiberling had to a very unusual degree. His brother Charles, an engineer and practical rubber man, although never in the lime-light, was a factor of the greatest value.

It is a pity that the great depression came when it did. One year more of good automobile business and high-priced cotton would have carried the huge business out of the breakers and into safety.

Not that there appears in the valedictory of the senior Seiberling any lessening of his cheerful optimism. He plans a short vacation. He has earned one, and may he return refreshed and again find his place among the leaders of the rubber trade.

TIRES NOT A LUXURY

To the rubber industry the recent pronouncement of President Harding that "the motor car has become an indispensable instrument in our political, social, and industrial life," is particularly significant. It presages a policy of Federal control of highways that cannot help but add to the efficiency and popularity of motor vehicles and incidentally benefit, in a considerable way, the great tire industry. The President further urges Congress to so amend the Federal Road Act that the national agency of administration would be given greater scope and authority, and to prescribe conditions for Federal aid to states that will insure a high standard of road construction and proper maintenance.

The nation's Chief Executive well realizes that waste and improvidence have long been associated with much of the state and county road work in all parts of the country. He recognizes the commanding place of the automobile industry in our national life—attested by sales of $3,500,000,000 in 1920—and the motor vehicle as one of the five major units of transportation. In regarding interstate highways as of vital commercial and military importance, and in insisting upon standards of road construction and upkeep that will vie with the best in Europe, he is doing the automobile and allied industries, and in fact the whole nation, a service of incalculable value.

THE ENGINEERING FOUNDATION AND RUBBER

In aiding engineers not only in varied achievements, but in the furtherance of general scientific research and the advancement of human welfare in the broadest sense, scarcely any agency compares in accomplishment or potential service with The Engineering Foundation of United Engineering Society, New York, N. Y., which has just completed its sixth year of usefulness. In its latest report it points out that there is need of support for further researches, many of them being of especial interest to rubber men, as, for instance, such as concern electrical insulation, colloidal lubricants and the fundamental principles of lubrication, developing maximum energy from all kinds of fuel, highway construction (in-

volving tire-making), principles of heat transfer (involving vulcanization), and industrial education and training. An institution with aims so high, scope so universal, methods so efficient, and sponsored by the nation's foremost and most practical men of science well merits all the substantial encouragement the rubber industry, and all others, can afford it in establishing funds for the uses named as well as for its many other worthy purposes.

THE ABSURD "CAPITAL STRIKE" CLAIM

Failing to make an impression of the unthinking with their old harangues, agitators conjured up a new contention lately in the hope of stirring up dissension between employe and employer. Labor has been told that the real cause of diminished employment and a reduced pay scale has been a combination of the great banking interests of the nation to deflate wages and to humble the worker; in other words, that "capital was on strike against society." The absurdity of such a claim is obvious to any unbiased student of economics. The banks function best and profit most when prosperity is general. Their interests are most intimately involved with the interests of the vast mass of wage-earners, whose savings they conserve and reinvest in thousands of enterprises. The latter can flourish only in good times, and hence it is manifestly foolish to claim that they and the banks that finance them with the earners' savings would "strike" to lessen their business opportunities.

The plain truth is that the United States has had to bear its share of the world-wide reaction after the war, and it is to the great credit of the banks that they prevented American business from "skidding" more than it did in the rapid deflation.

COTTON ACREAGE FOR 1921

Southern cotton raisers obtained from the banks loans totaling hundreds of millions of dollars in anticipation not only of great crops, but also of big prices for those crops. The cotton came in quantity, but not the expected demand for the commodity. Accordingly, prices fell rapidly, cotton reserves piled up, and growers and bankers have been hit hard.

The American cotton production for 1920-1921 is estimated at 13,000,000 bales, with a carry-over of 5,000,000, making a supply of 18,000,000; whereas the demand is not expected to exceed 11,000,000, thus leaving a surplus of 7,000,000, which, added to next season's normal production of 13,000,000, would provide a supply of 20,000,000 against a probable demand of but 12,000,000. A price rise in the face of such a surplus pressing for sale is unlikely.

That cotton prices will be governed more by the world's stock of all kinds of cotton rather than the stock in our country, just as the prosperity of the United States will depend largely on the settlement of the present conditions which are existing throughout the world, is undoubtedly the broader view.

A BRAIN WORKERS' UNION

The Brain Workers' Union, or Confederation des Travailleurs Intellectuels, which was founded in France some time ago, is an experiment which similar workers throughout the world are watching with interest. A membership of over 200,000 has already been reached, and artists, journalists, clerks of all grades and trades, school teachers and scientists, individually and as corporations, are said to be clamoring for inclusion.

In its aims, this organization promises moderation and professes antagonism to no other body in civic life. Its members do state that their interests are being ground between the upper and nether millstones of capitalism and manual labor, and that it is time they took joint action on their own behalf. The saving clause in their constitution is to the effect that they will impose their will on none of their members, giving support only where it is asked, and leaving absolute liberty to all to govern their own affairs. Such an organization, if true to its avowed principles, would neither curtail the production of brain work nor allow itself to be controlled by a few demagogs.

That is, however, hardly probable as mankind is at present constituted, for the reason that men are not equal in a productive sense. As a majority will rule, and as the majority are only ordinary in accomplishment, the capable will be dragged down to the level of the mass. In other words the artist who gets $10,000 for a creation will be forced to turn out $10 daubs and only a limited number of them. That is, of course, if this Union follows such other unions as we wot of.

Human nature admits of but one union where equal effort would result in maximum production and that is loafing. The world is hungry for a loafers' union, a Universal Federation of Loafers, no work, no hours and double pay for overtime.

Proofers, i. e., makers of rubberized cloth, so often troubled with deterioration of the coating on the fabric through the action of certain textile dyes, may find a ray of hope in the report that a southern cultivator has, after several years of plant cross-breeding, produced samples of cotton that shade from light brown to dark brown and from light green to dark green. With a strain of blue-tinted or linted cotton he is getting from India, this Burbank of Dixieland is confident that he will also produce soon an absolutely black cotton and as fast as alpaca compared with lambs' wool.

The Manufacture of Chewing Gum

Processes and Machinery

IN a preceding article[1] the origin and extent of the American chewing gum industry was given, together with a brief description of chicle, chicle substitutes, other chewing gum ingredients, formulas, and a typical factory plan.

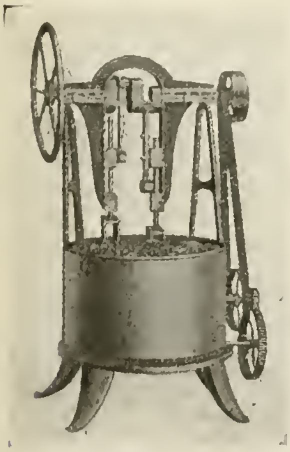
The machinery equipment of a modern chewing gum factory includes such rubber working machinery as washers, mixers and kneaders and some machines utilized in candy making, but most of the mechanical equipment is specially designed for making chewing gum.

American Chicle Co.

FIG. 1. CRUDE CHICLE IN WAREHOUSE

The successive steps in the manufacture of chewing gum are essentially the following:

The blocks of crude chicle are roughly broken into lumps by any convenient means and thrown into bins for storage and drying preliminary to reduction to a fine state of division either in a chicle chopper or a special grinder. The chopper reduces the gum to about the size of beans, and the grinder to that of rice. The chicle is next spread upon a sorting table where bark, chips, etc., are removed by hand.



Clough & Witt.

FIG. 2. CHICLE CHOPPER

From the sorting table the material is taken in trays to a mechanically ventilated drying room where it is dried at a temperature not exceeding 90 degrees F. for a few days or until needed for use.

In the larger plants the ground chicle is dried in rooms supplied with "conditioned" air at 72 degrees F. and 55 per cent relative humidity. These atmospheric conditions are also maintained in the cooling and packaging rooms.

GUM CLEANING PROCESSES

One of the most important features in chewing gum manufacture is making the crude chicle gum and substitutes clean and sanitary by removing the bits of bark, sand, clay, fiber from bags, dirt, filth and other foreign matter which are always present.

The sticky nature of chicle causes it to gather many impurities during its collection by the natives. Foremost are the bark and dirt from the gum trees themselves, which gets into the latex as it is being collected. As the Indians pack the gum great distances through the jungles, an ever increasing amount of dirt adheres to it. When finally it is piled on the shore awaiting shipment overseas, it collects more wind-blown sand and clay. Every stage of its handling is in fact part of a continuous process of gathering dirt.

Hand and other methods commonly employed to remove this dirt are unsatisfactory and costly. Hand picking at best removes only the largest particles of impurities to which considerable gum adheres. Not only is the adhering gum lost, but often what appears to be only bark, when split open shows gum deposited between the bark layers. As a rule, over half the weight of the pickings consists of good chicle gum which is wasted, representing a great annual loss of money. While larger impurities are removable by hand picking or sifting, it is entirely impossible to remove the smaller specks of bark, sand, clay, grit, bat lint and other dirt. These remain and contaminate the finished chewing gum. The presence of these impurities spoils the smoothness of the gum and has a direct effect on the sale of the finished product. Nothing depreciates the chewing quality of a gum more than the presence of grit. Many gum chewers insist on buying only those brands which are free from such contamination. In fact, the production and sale of dirty chewing gum is a menace to public health and in direct violation of the Federal Food and Drugs Act.

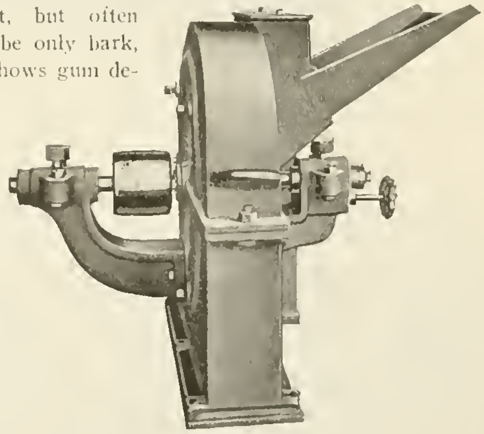
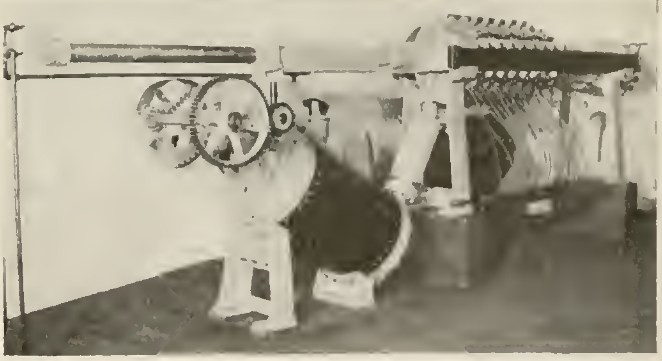


FIG. 3. MEADE MILL

FILTERING CHICLE

The remarkable machine pictured below is standard gum cleaning equipment in the plants of the largest chewing gum manufacturers for blending, sterilizing and filtering free from all impurities the chicle and substitute gums employed. It is estimated that over half the world's production of chicle is now filtered through these cleaning machines.



John Johnson Co.

FIG. 4. CHICLE FILTER

[1]The India Rubber World, May 1, 1921, pages 558-560.

The chicle and other gums to be mixed are placed in the mixing cylinder shown at the left in Fig. 4 and are melted under pressure and mixed by a geared screw. Owing to the pressure created a low-melting temperature is obtained which does not destroy the delicate texture of the gum, which if heated in the

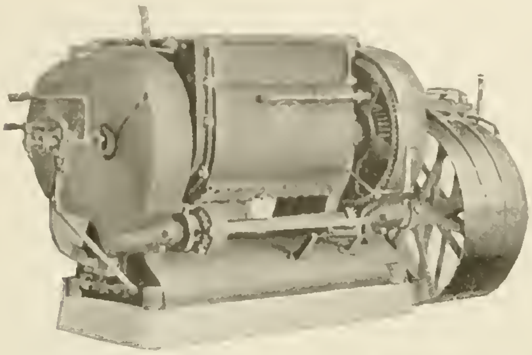
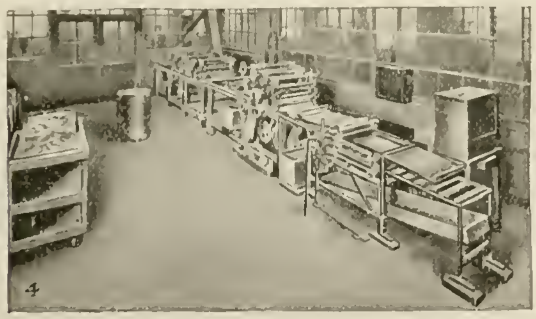


Fig. 5. W. & P. Mixing Machine

atmosphere would rapidly toughen. The correct amount of moisture is controlled and a perfectly homogeneous blending of the mixture obtained. With the gums to be cleaned, a certain amount of clean, soft wood saw-dust is added to the charge in the mixing cylinder for the purpose of forming a mat or filtering surface on the wire screening in the filter press into which the thoroughly melted gum mixture at the proper consistency is forced by compressed air at 200 pounds pressure. The filter press is heated by steam circulation supplied through flexible metallic hose connections to each section.

The filtered chicle is delivered through spouts along the side of the press, and the foreign matter and saw-dust separated from



American Chicle Co.

Fig. 6. Gang Kneader and Roller

the gum is subjected to hydraulic pressure of 100 tons before removal from the press. The hot clean chicle is received from the filter press in weighed amounts in suitable metal containers and transferred directly to the dough mixers for incorporation of the various compounding ingredients.

The separation of foreign matter by the filter press is absolutely complete, all bark, sand, clay, fiber, etc., being removed in the form of dry cakes and the chicle delivered perfectly smooth and clean. All vessels and piping in which chicle is blended, cleaned or filtered are necessarily steam jacketed to maintain fluidity of the gum.

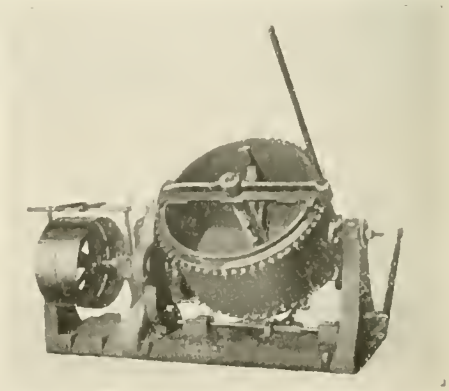
COMPOUNDING

Following the process of blending, cleaning and sterilization the filtered fluid gum is drawn into receptacles in weighed amounts and transferred to a tilting steam-jacketed mixing kettle or dough mixer, for mixing with selected compounding ingredients. These are glucose, paste, powdered sugar and flavoring extracts added to the melted gum in fixed order; first, glucose and caramel paste both of which aid in the absorption of the dry sugar; next, one-half the sugar. As soon as the latter is absorbed in the mixing the remainder of the sugar is added, followed by the flavoring material. The temperature of the mass is about 250 degrees F.

MIXING KETTLES

Mixing kettles vary in capacity from a few gallons to 200 gallons per batch. Two forms much used in the chewing gum industry are illustrated. Fig. 5 shows a rectangular trough of special form, inside which operate two steel blades of special design, carried by two horizontal shafts which pass through the end walls of the trough. Stuffing boxes prevent the material leaking from the trough along the shafts, the bearings of which are separate and distinct from the stuffing boxes. The latter do not act as bearings. The trough is jacketed for cooling or heating and the blades are made hollow for the same purpose. The tilting of the trough is done by a lever. A straight and cross-belt drive is provided by means of which the machine may be run in either direction or stopped at will.

The second form of gum mixer shown in Fig. 7 has a cylindrical steam-jacketed receptacle arranged for tilting. The lever at the right of the machine locks the kettle in any position between the vertical and the horizontal, so that the mixer can be run at any angle desired. The time required for mixing a batch of chewing gum is usually less than an hour.



Clough & Witt

Fig. 7. Tilting Mixer

COOLING

The mixed batch is tilted out of the mixer in small portions into pans or tanks, dusted with powdered starch and sugar to prevent adhesion of the dough, and set aside to cool preliminary to kneading into batches or loaves of convenient size.

ROUGH ROLLING

The stock passes next to the rough-rolling machine which may be either a single set of rolls or a gang roller such as that shown in Fig. 6.

The machine consists of a hopper which delivers the rough stock to a pair of rollers between which a thick sheet passes

American Chicle Co.

Fig. 8. Conditioning Room

downward to the first pair of roughing rolls and by conveyor through the succeeding rollers which finally deliver the stock sheeted approximately to the gage of the final product.

HARDENING

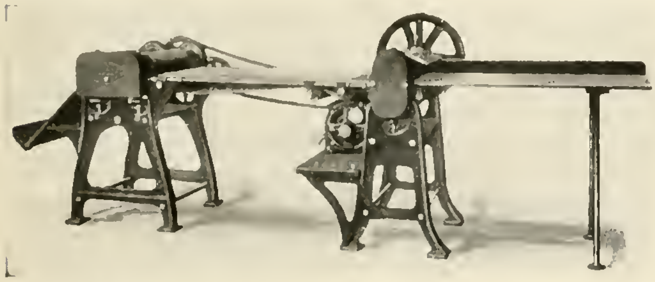
The rough-rolled stock is trayed and set aside to cool naturally for 24 hours or is left for the same length of time in a room supplied with conditioned air. This period of rest and cooling sets the stock so that in the second or finishing rolling the exact gage will be retained.

STICK GUM SIZES

The usual sizes for stick gum are 3 by ¾ by 1/16-inch although the product of the largest manufacturers measures 2⅞ by ¾ by .070-inch.

FINISHED ROLLING AND SCORING

The cooled and hardened rough sheeted gum is rolled to finished gage and scored in a machine provided with two sets of rolls. The first pair have circular cutters spaced to score the rolled sheet lengthwise into stick width, while the second pair have longitudinal knives for cross-scoring the sheet for stick lengths. Both sides of the sheet are scored at the same time, the cuts extending one-third the way through from each side, leaving the center of the sheet to be broken in separating the individual sticks. In the case of gum in small squares such as "chiclets" or "nuggets," the scoring is spaced equally both ways.

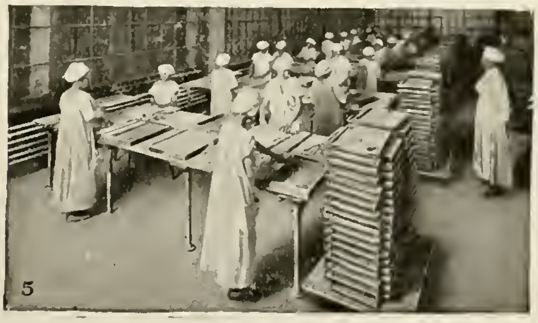


Clough & Witt

Fig 9. Scoring Machine

BREAKING THE SHEETED GUM

The scored gum sheets are hardened for a time in air-conditioned cooling rooms before separation into pieces. Stick gum is broken by hand, a very skillful operation done by women. They remove the side trim from the sheets, break the sticks apart and pack them edgewise in trays at a single handling, ready for the packaging machines.



American Chicle Co.

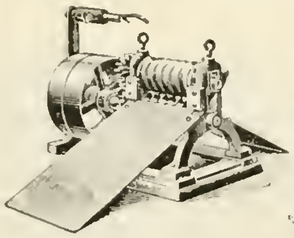
Fig. 10. Gum Breaking Department

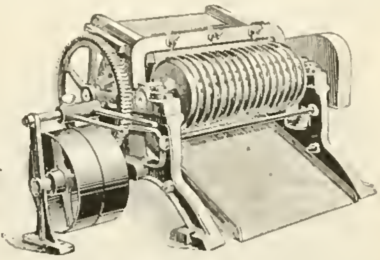
"CHICLETS"

Sheets of gum scored in small squares are broken apart by tumbling in an octagonal revolving barrel open at the front end where the scored sheets are thrown in. These promptly break apart and are removed by the attendant in a large hand scoop which he holds in the tumbler to receive them.

BALL GUM

Chewing gum in the form of balls is made by the use of two separate machines. The first known as a sizing machine consists of a pair of grooved rolls through which a kneaded batch of gum emerges in the form of round bars or cylindrical sticks having the diameter of the finished ball. These cylinders of gum are separated by hand and fed to a ball-making machine. This, like the sizing machine, consists of a pair of grooved rolls, both of which revolve in the same direction, but one has double the speed of the other. The effect on the gum cylinders which are fed sidewise into the ball machine, is to cut the stock into short cylinders which are promptly rolled into approximate spheres by the differential speed of the rolls, and drop out on the side opposite to the feed.





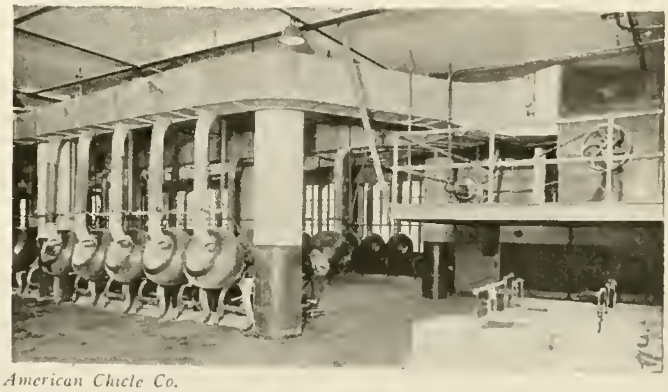
Thos. Mills & Bro.

Fig. 11. Ball Sizing Machine

Fig 12. Ball Rolling Machine

CANDY COATING

The operation of candy coating small squares and balls of gum is an operation in confectionery making and is accomplished in a tumbler known as a coating pan. The pan is made of heavy hammered copper in spherical form, is lined with tin and mounted on an inclined axis on which it revolves with sufficient speed to cause the contents to ascend the sides of the pan to about the horizontal diameter, thus producing a tumbling of the goods as they fall back. This action distributes the sugar syrup evenly over the charge and the friction gives the dried coating a polished surface. To facilitate the operation of coating, conditioned air is constantly supplied to the interior of the pan. By this means the moisture in the sugar syrup is rapidly removed.



American Chicle Co.

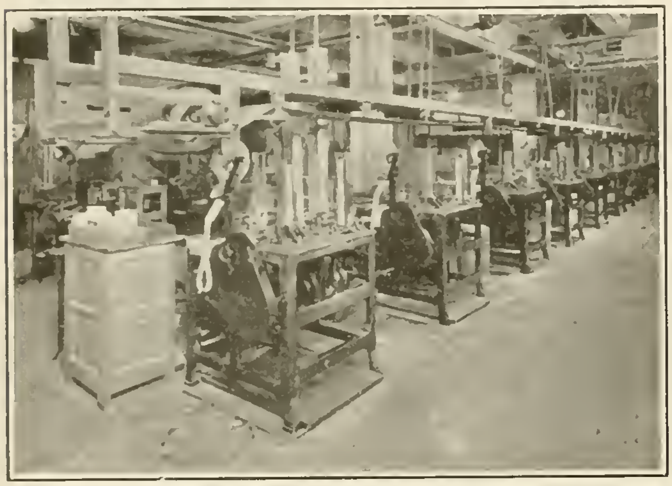
Fig. 13 Candy Coating Department

Coating pans are usually set up in rows and one operator can attend to many. The sugar syrup for coating is supplied to the pan by hand, one ladleful at a time. In the largest gum factories the operation of coating is hastened by the use of conditioned air piped through large ducts with an outlet entering each pan of the group. The low relative humidity, 55 per cent, and the rapid ventilation materially shortens the time of coating and polishing accomplishing the operation in about three hours.

AUTOMATIC PACKAGING

Except in small factories where wrapping and boxing is done by hand, packaging of gum is effected by the use of automatic machines. The model shown in Fig. 14 is specially designed for packaging stick gum. It makes up the standard five-cent foil package of stick gum. The machine wraps each stick in either foil or wax paper, applies a band to the individual stick and seals it. It then assembles five wrapped, banded sticks, reversing the fifth one so that the front of the outside stick shows whichever

side of the package is opened, and finally bands the five sticks together and seals the package with paste. The individual sticks, inside bands and outside bands are fed from magazines and the



American Chicle Co.

Fig. 14. Packaging Department

foil or waxed paper for the first wrapping is fed from a roll and cut to proper length. The output of the machine is 100 boxes of 20 packages per hour.

ANTIMONY SULPHURET, ITS MANUFACTURE AND USE[1]

By D. A. Shirk[2]

In the rubber industry, "antimony sulphuret" is the trade name applied to precipitated sulphides of antimony containing various percentages of free sulphur and adulterants. The sulphides are generally present as pentasulphide or oxysulphide. With certain exceptions, manufacturers use the words "golden" and "crimson" to indicate pentasulphide and oxysulphide, respectively, and the word "golden-crimson" when both are present.

GOLDEN ANTIMONY

Golden antimony is obtained from the reaction between either calcium sulphantimonate, $Ca_3(SbS_4)_2$ or sodium sulphantimonate, Na_3SbS_4 and either sulphuric, sulphurous or hydrochloric acid. It is evident that when sulphuric acid is employed to precipitate from the calcium solution that calcium sulphate is also precipitated. This calcium sulphate being quite insoluble remains in the final product and dries to $CaSO_4.2H_2O$. The free acid is generally washed out by decantation or filtering, although it is sometimes neutralized with an excess of calcium carbonate or calcium hydroxide. Irregularities in the preparation of the salt solutions, concentrations, temperatures, washing, drying and grinding will result in products which, although they may be superficially similar will give many different results under vulcanization.

CRIMSON ANTIMONY

Crimson antimony is commercially produced by the reaction between sodium or calcium thiosulphate and a solution of antimony trichloride in hydrochloric acid, or a suspension of antimony oxychloride in an acid solution. The calcium salt is not as stable as the sodium salt and where it is used there is often present in the finished product certain quantities of calcium sulphite. This product is always tested for acid and should be tested for chlorides as well. It is well known that good qualities of both crimson and golden antimony will sometimes after long standing give a faintly acid reaction due to the formation of a very small amount of sulphur dioxide. This should not be confused with the presence of traces of hydrochloric acid or antimony chloride, the responsibility for which must be borne by the producer.

COLOR OF ANTIMONY

The color of antimony, or rather its ability to retain its color at elevated temperatures, is of important consideration. Contrary to the popular belief a reliable grade of golden antimony, or pentasulphide, does not, under vulcanization, decompose to Sb_2S_3 and sulphur. The physical stability of color is an indication of the chemical stability of the pentasulphide. When golden antimony is subjected to elevated temperatures it does not yield any free sulphur until its color changes. As the color changes to brown certain amounts of free sulphur appear and finally when the color becomes black the amount of free sulphur yielded is about equivalent to the amount calculated upon the theoretical decomposition of the pentasulphide to the trisulphide. It becomes evident, therefore, that to use a golden that just turned brown under cure would result in a situation where the total amount of free sulphur acting would be very indefinite.

ADVANTAGES IN RUBBER GOODS

Antimony sulphuret of proper grade and properly used has three distinct advantages. First, it is an accelerator. Antimony sulphuret in a compound will enable the maximum cure to be obtained at a given temperature and time with the use of less free sulphur. This presents the great advantage of reducing the amount of uncombined free sulphur in the vulcanized product. This in itself gives one explanation of the second advantage, namely, good aging. The superior aging quality of a good red tube is quite generally recognized.

A third advantage is the increased sales value of a bright clean orange or red stock over a blooming grey stock. Some manufacturers use antimony because the free sulphur it carries is generally all precipitated and hence in a much finer state of division than the ordinary flour sulphur. Others stress the fact that with antimony they obtain a stock of much softer "feel" than with any other compounding ingredient.

SOURCES OF SUPPLY

Prior to September, 1914, there was in the United States only one manufacturer of antimony sulphuret in quantity. England and France furnished the major part of the antimony used in this country, although just at that time Germany was beginning to make serious inroads into the business of their other European competitors. When the war shut off the European supply American manufacturers met the situation with products which today represent the very best that can be found in any market.

POINTS ON QUALITY

There are not many differences between a pure golden or crimson antimony aside from color and price. The crimson is considerably more expensive but imparts to the stock a deep red color that the pentasulphide will not give. On the other hand, many prefer the golden shade when it is clean and bright. The chemist should be particular that the antimony retains the brilliancy of its color under his particular conditions of vulcanization, for the reasons given above. The best texture cannot be obtained where there is any large quantity of calcium sulphate. This is chiefly due to the large particle size of this material. Every rubber chemist wishing to be sure of his ground on antimony should make a careful study of particle size and agglomeration. Everything else being the same, the percentage of antimony sulphide present should determine the price. Most of the uncertainty and distress in the use of antimony in rubber work will permanently disappear when the trade accepts as a standard an acid-free, pure, stable pentasulphide, of a specific state of division, carrying a specified percentage of free sulphur.

[1]The Rubber Age, New York, May 10, 1921.
[2]The Rare Metal Products Co., Belleville, New Jersey.

VULCANIZING EFFECT

Antimony sulphuret of itself is not a vulcanizing agent but any effect produced on the physical properties of rubber cured with it is due entirely to the free sulphur which the sulphuret contains. While true, this observation has often been misconstrued and the idea conveyed that aside from the coloring properties of the antimony sulphides, there are no properties which advantageously effect the vulcanization of rubber.

Investigation has shown that although antimony sulphides alone will not vulcanize rubber, they will, when incorporated in a rubber-sulphur mixing, produce a maximum tensile strength in a shorter time and with a lower proportion of free sulphur to rubber than it is possible to obtain when an inert filler is used instead of the antimony sulphides or when a simple rubber and sulphur mixture is employed. It has been demonstrated that in this accelerating action the pentasulphide is more efficient than the trisulphide and that the acceleration of cure is not due to the colloidal nature of the free sulphur contained in the pentasulphide.

The use of commercial flour sulphur with antimony pentasulphide gives results at least equal to those obtained by the use of colloidal sulphur coprecipitated with antimony pentasulphide.

AMERICAN RAILWAY ASSOCIATION, MECHANICAL DIVISION, MASTER CAR BUILDERS' AND MASTER MECHANICS' SPECIFICATIONS.

STANDARD STEAM-HEAT HOSE

Adopted, 1916; Revised, 1917

I. MANUFACTURE

1. SCOPE. These specifications cover steam-heat hose for passenger equipment cars.

2. Steam-heat hose shall be composed of a tube of rubber, wrapped with at least five plies of cotton fabric and the whole covered with rubber.

II. PHYSICAL PROPERTIES AND TESTS

3. The railway company's inspector will select for test one piece at random from each lot of 201 pieces. When this hose is received at the test laboratory, a section 2½ inches long will be cut from one end in order to determine the friction, tensile strength and elongation. The remaining portion will then be subjected to steam heat in the digester. After this section has been heated another section 2½ inches long will be cut from it and used to ascertain the friction, tensile strength and elongation, in order to show the change in these characteristics due to the action of heat.

4. FRICTION TEST BEFORE STEAMING. A section 1 inch long will be cut from the hose and supported in such a manner that it will turn freely on its axis. A 20-pound weight will be suspended from the separated end of the fabric. The latter must unwind uniformly, if at all, and not faster than 6 inches in ten minutes.

5. TENSILE TEST BEFORE STEAMING. A strip cut from the tube with a die or other suitable means to the dimensions shown in Fig. 1 will be marked at points 2 inches apart, and the width and thickness will be accurately measured. It will then be slowly stretched in a suitable tensile-testing machine until it breaks. The ultimate tensile strength must not be less than 600 pounds per square inch and the elongation of the 2-inch section at the time of fracture must be not less than 6 inches.

6. FRICTION TEST AFTER STEAMING. A section 1 inch long will be supported in such a manner that it will turn freely on its axis. A 15-pound weight will be suspended from the separated end of the fabric. The latter must unwind uniformly, if at all, and not faster than 6 inches in ten minutes.

7. TENSILE TEST AFTER STEAMING. A strip cut from the tube with a die or other suitable means to the dimensions shown in Fig. 1 will be marked at points 2 inches apart, and the width and thickness will be accurately measured. It will then be slowly stretched in a suitable tensile-testing machine until it breaks. The ultimate tensile strength must not be less than 450 pounds per square inch, and the elongation of the 2-inch section at the time of fracture must not be more than 8 inches or less than 4 inches.

8. DIGESTER TEST. The digester shall consist of a cylinder containing dry saturated steam at a pressure of 45 pounds per square inch. The hose shall be put into this digester and will remain there for 48 hours continuously. An examination of this section, after being submitted to the heat of the steam, should not disclose any blistering of the inner tube or any loosening of the tube from the fabric. Examination and test after heating, prescribed in the specifications, will be made as soon as possible after the specimen has cooled for 24 hours. The tests will be made at a temperature of not less than 60 degrees F.

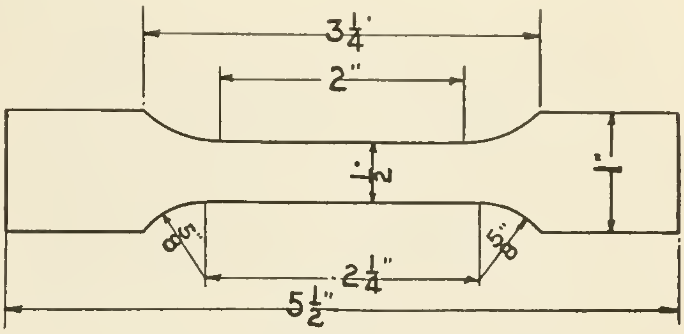


FIG. 1. TENSILE SPECIMEN

III. SIZE AND DIMENSIONS

	Maximum Inches	Minimum Inches
Length	24¼	23¾
Inner diameter	....	....
Outer diameter	....	....
Thickness of tube	....	⅛
Thickness of cover	....	1/16

IV. WORKMANSHIP

9. TUBE. The tube should be composed of at least two calenders of rubber. It must be free from holes, bits of wood, bark, sand and other foreign matter, and from other imperfections. It must be so firmly joined to the fabric that it can not be pulled off without tearing it.

10. FABRIC. The fabric must be of duck, with the warp containing not less than 27 strands, 3 threads per strand, and the filler 18 strands and 4 threads per strand. It must be frictioned on both sides and have, in addition, a distinct layer of rubber on one side, readily visible between the plies when the finished hose is cut open.

11. COVER. The material of the cover should be a rubber compound which has good weather-resisting qualities, as firmly attached to the fabric as is the tube, and to be equally free from defects. The end of the hose should be cut off true to length, but shall not be capped.

V. MARKING

12. SERIAL NUMBER. Each lot of 200 hose or less must bear the manufacturer's serial number, beginning with one on the first of each year and continuing consecutively until the end of the year. Serial numbers of hose which are rejected must not be used again. With each lot of 200 hose or less, one extra piece of hose must be furnished free of cost.

13. LABEL. Each piece of hose must have securely vulcanized to it a label of white or red rubber, as shown herewith.

FIG. 2. LABEL

VI. INSPECTION

14. INSPECTION. If the sample passes all the tests, all pieces represented by it will be accepted if free from injurious mechanical defects.

Rejected hose will be returned at the expense of the manufacturer.

15. REJECTION. If the sample fails to pass the above tests, the lot represented by it will be rejected and the same serial number must not be applied to any other steam hose during the same calendar year.

16. REHEARSING. Samples tested in accordance with these specifications, which represent rejected hose, shall be held for two weeks from date of test report.

Artificial Lighting in the Rubber Industry—V[1]

By E. Leavenworth Elliott

The Two Bases of Figuring the Efficiency of a Lighting System

CONSIDERATIONS THAT DETERMINE THE SELECTION AND ARRANGEMENT OF LIGHT UNITS

In the laying out of an industrial lighting installation there are two considerations which will govern the selection of the units, and their arrangement in the several spaces to be lighted: (1) The effect upon the efficiency of the operatives working under the light, and (2) the mechanical efficiency of the apparatus itself.

Obviously, the first of these considerations is by far the more important. The theologian seeking arguments in support of the dogma of "total depravity" would find a rich source in the field of shop lighting. It is no uncommon thing to find a factory manager who will select a lighting unit on a basis of a cent a day difference in maintenance cost where the use of a twenty-thousand-dollar machine and a twenty-dollar daily pay-roll are more or less completely dependent upon the light supplied. Just stop a moment and figure out the total cost of operating a heavy calender—interest, depreciation, power, superintendence, general overhead, wages of the operatives, and see what proportion of this total is expended for the light used for its operation. Then figure the value of the materials which it handles, and make a similar computation. Can you think of a more exaggerated case of "saving at the spigot and wasting at the bung-hole" than to trim on the cost of light at the possible risk of trimming proportionately on the efficiency of this operation?

The effect of the illumination on the efficiency of production will depend upon the following conditions: (1) The *quality* of the light, which is determined by the different kinds of radiations of which it is composed. (2) The *intensity* of illumination on the objects concerned in the work. (3) The *direction* of the light, which determines the effects of relief and contour. (4) Incidental conditions which interfere with vision—the various forms of glare, and unnaturally sharp or dark shadows.

The selection of the light-source will be determined by a consideration of the first and last of these conditions. The location of the chosen units, or the "lay-out," will be determined by the last three conditions. The facts to be considered in making the selection of the light-source have been discussed in the preceding articles, and also some of the problems pertaining to the lay-out. There remains a little further consideration of the matter of location of units, and a discussion of mechanical efficiency.

THE TWO METHODS OF LIGHTING

In general, there are two ways to figure a lay-out: you can either light the room, or light the job. Most "illuminating engineering" formulas refer to room lighting. This is all right in some cases and all wrong in others. In many cases lighting the job will also light the room sufficiently. In other cases, lighting the room is the most practical way to light the job.

General Electric Company

A Good Example of Room Lighting by Cooper-Hewitt Lamps in the Vulcanizing Department
In This Case Directional Light Is Not Necessary, and a Good General Illumination Answers All Purposes

Lighting the job involves two general cases: machine lighting, and bench lighting. The two important considerations in machine lighting are shadows, and direction of rays. To light the particular parts of the machine and materials that you want to see—without shadows of yourself, or your tools, or other parts of the material falling just where you must see the most clearly—is not always an easy matter, and in practice is much less common than its importance demands.

Take tire-building machines, for example; the core and the tire must be seen from both sides, and the light must come from a position in front of the operator, and not too high up. This is a good example of what we mean by "lighting the job." If the

[1]Continued from The India Rubber World, April 1, 1921, pages 483-486.

greatest mechanical efficiency of lighting is to be obtained, that is, the minimum amount of light used, the machines must be arranged with reference to the light-units. Thus in the case of the machines just referred to, they must be set so that one unit will light one side each of two machines. Similarly, tire-building stands may be set in rows so that the operatives face each other with the light-units hung over the aisle, thus giving the desired front light free from shadows.

To set a machine with reference to a lamp may seem at first a case of the tail wagging the dog, but a moment's consideration will reveal the simple fact that it is just as easy to set a machine so as to permit the most efficient lighting as in any other way. Such a system will more frequently contribute to economy of installation and operation than otherwise.

IMPORTANCE OF DIRECTED LIGHT

The problem of shadows is a matter of the direction of the light and the size of the luminous source—the larger the source the smaller and less distinct the shadows. The mercury-vapor lamp with its luminous tube four feet long presents a corresponding advantage over the incandescent units, which are relatively small. Add to this the greater visual effect of green light at the lower intensities—which constitutes shadows—and the shadow problem is pretty nearly eliminated by the use of these units. In the case of small machines set close together a good intensity—not less than 10 foot-candles—of general illumination by C-H lamps will usually afford the best solution of the problem.

There are many cases in which a strong directional light is essential to the most efficient vision. Thus, fabrics show their texture much more distinctly when illuminated by a strong light from one side. Air bubbles in tires show up plainer by side light than by "end-on" light. In all cases where small differences in the surface must be observed side light should be used. This applies particularly to inspection.

Bench and table lighting is the same general problem, irrespective of the work done, and is the simplest of all problems to solve. Where possible the benches should be double, that is, the operatives working on each side, so that units placed above give an unobstructed light to all. The practice of placing benches along the side of a room in front of the windows is open to serious criticism, and is a relic of the days when daylight afforded the only illumination by which fine work could be done. In modern mill construction with the large area of window space, benches at right angles to the windows are better for both natural and artificial light.

Room lighting is now about as simple a proposition as bench lighting. As we have pointed out before, the law of the survival of the fittest, operating in the development of electric lamps, has reduced the units available for industrial use to two types; the mercury-vapor lamp and the gas-filled tungsten lamp, bowl frosted or enameled, and fitted with a white enameled steel reflector. These give the same distribution of light, and all the necessary calculations can be made by the use of a little simple arithmetic with the assistance of the distribution curves furnished by the manufacturers, as previously explained. With proper room, bench, or machine lighting, the use of drop-lights is practically eliminated —which is good riddance to an old-time nuisance.

WIRING FOR A FLEXIBLE SYSTEM OF LIGHTING

But suppose you "light the job," that is, place the units with reference to the machines, and later rearrange the machines, or use the space for other purposes; will not this require a rearrangement of the light-units, necessitating more or less rewiring? It undoubtedly will. That is part of the cost of improvements due to the general progress in the art, or to faulty engineering, or lack of engineering at the start.

In the case of a building or room specially designed for the operation of certain kinds of machines, the chance that it will be used for other purposes, or that the character of the machines will be radically changed in the near future is sufficiently small to justify a single system of wiring to supply the light-units decided upon. But in a room that is equally well suited to any of the machinery or processes used in the production of the general line of rubber goods, and which may, therefore, be utilized for different purposes in the growth of the plant, it is manifestly better engineering to provide a sufficient number of outlets with their corresponding switches and fuse blocks, to enable light-units to be installed at any point desired with a minimum of special wiring. This, of course, refers to new buildings.

A very practical arrangement of this kind, which is being used by one of the most progressive rubber manufacturers, is to run two rows of outlets down each row of bays, the outlets being "staggered" so as to give three in each bay. The outlet consists of the female half of a plug inserted permanently in the cement ceiling. The light-units are then placed with reference to the illumination desired, connected to the nearest outlet, and controlled by pendent switches.

THE MECHANICAL EFFICIENCY OF THE LIGHTING SYSTEM

There now remains to be considered only the question of the mechanical efficiency of the lighting system as a whole. As in all the other calculations with reference to illumination, rigid exactness is impossible, and we must be satisfied with more or less close approximations.

As in the case of any other mechanical equipment, the cost may be considered under two general heads, namely, fixed charges, and maintenance. In the present case fixed charges will include interest on the original investment and depreciation (amortization). Maintenance will include cost of electric current and repairs or renewals. For the purpose of comparison let us assume that the lighting installation will be operated 3,000 hours a year. In the two available systems, the mercury-vapor and incandescent, there are no two units which are exactly comparable in respect to light produced or current consumed, so the better method will be to take the nearest alternatives and then reduce the results to a common basis—say of 1,000 lumens of light for a year of 3,000 hours. We will, therefore, take the standard mercury-vapor lamp having a 50-inch tube and white reflector, and using 430 watts of current, and the incandescent unit consisting of bowl frosted gas-filled tungsten lamp equipped with the standard R. L. M. reflectors, using 400 watts. The mechanical efficiencies of the units, as given by the manufacturers, is as follows:

Unit	Current	Total lumens	Lumens per watt
Mercury-vapor	430	6,129	14.2
Incandescent, 400-watt......	400	4,350	10.9

The total operative cost by these several units for a year, and 3,000 hours' use, will be:

	Mercury-Vapor	Incandescent 400-Watt
First cost of permanent parts....................	$22.85	$3.21
Interest at 6 per cent on first cost................	1.37	.19
Depreciation at 12½ per cent.....................	2.85	.40
Renewals	4.50	9.45
Current at 1 cent per kilowatt-hour................	12.90	12.00
Total operative cost..........................	$21.62	$22.04
Operative cost per 1,000 lumens....................	$3.53	$5.07

In the above table the cost of lamps is figured on an average quantity discount. Maximum and minimum discounts would make a difference of about 25 cents and 60 cents per 1,000 lumens, respectively.

The figures are also based upon initial performance. The depreciation in candle-power by photometer measurement may be somewhat greater with the mercury-vapor than with the tungsten lamps; but the results of the psychophysical experiments, which accord with general experience, show that any difference of this kind is much more than offset by the higher visual value of mercury-vapor light.

The cost of renewals is based upon a guaranteed life of the mercury-vapor tube, three years, and the estimated life of the tungsten lamp, 1,000 hours.

From the cost per lumen it is very easy to figure the cost for

any given amount of illumination. One lumen gives an intensity of one foot-candle on one square foot of surface. One thousand lumens will therefore light 100 square feet with an intensity of 10 foot-candles, or 200 square feet with 5 foot-candles, or 66 square feet with 15 foot-candles, and so on. It will be easy to remember, and sufficiently accurate, to consider that mercury-vapor light costs $3.50, and tungsten light $5 per 1,000 lumens, with current at 1 cent. Increasing the cost of current increases the cost of tungsten light somewhat more than it does of mercury-vapor light. To be exact, with current at 2 cents, the latter light will cost $5.63 and the former light, $7.82 per 1,000 lumens per year.

No figures are given for cleaning and repairs for the reason that the conditions determining these costs are too variable to admit of any estimation of value. So far as replacements are concerned the mercury-vapor lamp will require attention once in three years, according to the guaranteed average life of tubes; the tungsten unit will require attention three times a year for the same purpose. For cleaning, each will, of course, require equal attention. The mercury-vapor lamp contains an operating mechanism, which will sometimes need attention and repairs. On the whole, this may be considered a fair offset for the labor expended in the more frequent renewals of the tungsten units; so that this item reduces to a fifty-fifty proposition as between the two types of lamps.

A CONVENIENT METHOD OF STATING THE COST OF ILLUMINATION

The true basis for measuring the cost of light, considered simply as a form of power, is by taking the product of lumens into hours, just as electricity is measured by watt-hours, or for practical use, by 1,000-watt or kilowatt-hours. As the costs per 1,000 lumens just given were for 3,000 hours' use, the cost per 1,000-lumen-hour—which we may very properly call the kilolumen-hour—will be .003 of the amounts given, or 1 cent per k.l.h. for the mercury-vapor, and 1½ cents per k.l.h. for the tungsten light.

It is interesting to use these rates to figure the cost of illumination for the individual workman. Suppose he occupies 100 square feet of space, and is supplied with an intensity of 10 foot-candles—which is sufficient for first-class work under most conditions; he will require one kilolumen, and in an eight-hour day will use 8 k.l.h. costing 8 cents for the mercury-vapor, and 12 cents for the tungsten light. The practical reader may amuse himself by figuring what percentage this is of the workman's wages, and of the value of the materials which he handles. Lastly, he may consider the difference between furnishing the workman 10 foot-candles and 5 foot-candles—from 4 cents to 6 cents a day—evaluated in terms of wages, and in spoiled, or defective work. He will then have an example of that principle in logic known as *"reductio ad absurdum,"* which may be freely translated as a "damned absurdity."

In conclusion: It may appear to the reader who has never given particular attention to the technical points involved in modern lighting that we have drawn the subject out to a tedious length. To this I may reply that only those points have been considered which have a direct and important bearing on the subject, and these as briefly as consistent with a fair comprehension of the subject. I may also remark, that besides numerous matters not touched upon in these articles, whole volumes have been written upon most of the topics we have considered, not to mention numerous papers and discussions before scientific societies. The one simple conclusion is, that lighting in modern industrial institutions is not a mere matter of hanging up a lamp here and there, but is a problem of first-class importance in its relation to production costs and general welfare.

SUMMARY

The efficiency of a lighting installation is to be estimated from two standpoints: the effect upon the output of labor, and the cost of producing the light.

The effect of light on the output of labor depends upon (1) the quality of the light, (2) intensity of illumination, (3) direction of light on work, and (4) freedom from conditions which reduce visual efficiency.

The choice of the kind of light-unit will depend upon the first and last of the above conditions.

The lay-out, or location of the units, will be determined by the last three conditions.

There are two ways of making a lay-out: so as to light the room, or light the job.

Lighting the job consists of machine lighting and bench lighting. It differs from room lighting in that the *direction* of the light is of prime importance.

Room and bench lighting are easily arranged in accordance with the simple engineering data given.

The mechanical efficiency of a lighting system is the relation of cost to the quantity of light used. It is most conveniently computed in 1,000-lumen (kilolumen) hours. The items to be considered are: interest and depreciation of installation, electric current, repairs and renewals.

The cost of illumination is less than 2 per cent of the wages of those working under it.

RUBBER TIRES AND THE PROPOSED VEHICLE LAW

A favorable impression is being made throughout the country by the draft of the proposed uniform vehicle law indorsed by the Motor Vehicle Conference Committee of The Rubber Association of America, Inc., the American Automobile Association, the Motor & Accessory Manufacturers' Association, Inc., the National Automobile Dealers' Association, and the Trailer Manufacturers' Association of America. The committee, in preparing the tentative measure, considered not only the road builder, road user, and the vehicle maker, but also the carrying capacity of the road, and the general welfare of the public, and the fees to be imposed are to be in lieu of all taxes. The committee will do its best to have the proposed law adopted as fully as possible in the forty-eight states.

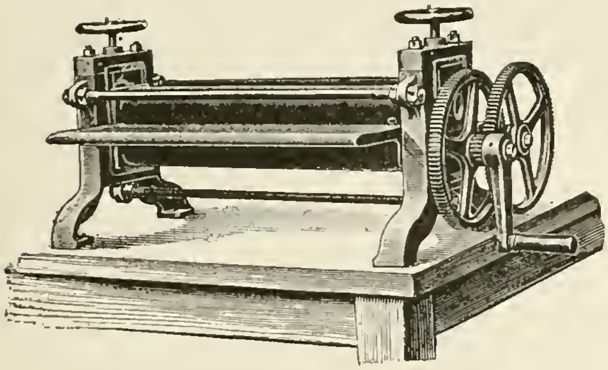
Taking into account the fact that rubber-tired vehicles are less harmful to roads than those with metal tires, the fees for registration, etc., are much less for the former than the latter. Thus, a motor vehicle with pneumatic tires would pay 25 cents per 100 pounds gross weight of vehicle and load, one with solid rubber tires, 35 cents, and one with iron, steel, or other hard tires, 50 cents. The same schedule would apply to tractors, while the rate for horse-power would be 25 cents additional, applicable to all classes of vehicles aforementioned. For trailers and semi-trailers the weight scale ranges as follows: Pneumatic tires, 15 cents per 100 pounds; solid rubber tires, 25 cents; iron, steel, or other hard tires, 35 cents. Motorcycles and motorcycle sidecars would be taxed uniformly $5 each.

In computing the weight of trucks, it is provided that "no vehicle having a load of over 800 pounds per inch width of tire upon any wheel concentrated upon the surface of the highway (said width in the case of rubber tires to be measured between the flanges of the rim) shall be operated in any state."

Vehicles equipped with pneumatic tires of gross weight of not over 7,000 pounds and carrying seven passengers would be allowed to go 30 miles an hour on open country highways, 20 miles on suburban streets, and 15 miles on city streets. Other pneumatic-tired vehicles carrying a weight of from 6,000 to 28,000 pounds would be restricted to 25, 20 and 15 miles in the same order. Solid-tired vehicles of 4,000 pounds gross weight would be allowed to make 25, 20 and 15 miles, but those of 8,000 pounds, 20, 18, and 12 miles. Vehicles of 12,000 pounds would be limited to 18, 15, and 12 miles, and of 16,000 pounds, 16, 15, and 12 miles. All over that weight, and up to 28,000 pounds, would be held down to 15, 15, and 12 miles an hour.

Embossing Machines Used in Rubber Manufacture

The surface ornamentation of soft rubber goods is obtained usually by engraved designs upon plates or molds into which the rubber is forced during vulcanization. Goods that are cured in beds of talc or in dry heat, however, have their surfaces ornamented before vulcanization. This is accomplished as a rule when the material is still in the sheet form and before it has gone either to the cutting or making-up departments.



Muller Cut Sheet Embossing Machine

An example of this is cut sheet from which European tobacco pouches and articles of that sort are made. The very beautiful wavy lines on the surface of cut sheet are simply knife marks left in the cutting process which is analogous to the production of wood veneers. It has often been the ambition of the manufacturers to imitate this by using engraved rolls in connection with the calender, but the result is not good.

Calendered sheet is, however, embossed by the Müller machine so that it looks like cut sheet. This machine is very simple and is operated either by hand or by power. It consists of two fluted rolls the upper of which may be raised or lowered to accommodate different thicknesses of stock which is passed once through the rolls, and the wavy lines are permanently impressed upon its surface.

Fleurs-de-Lis Water Mark Straight Line

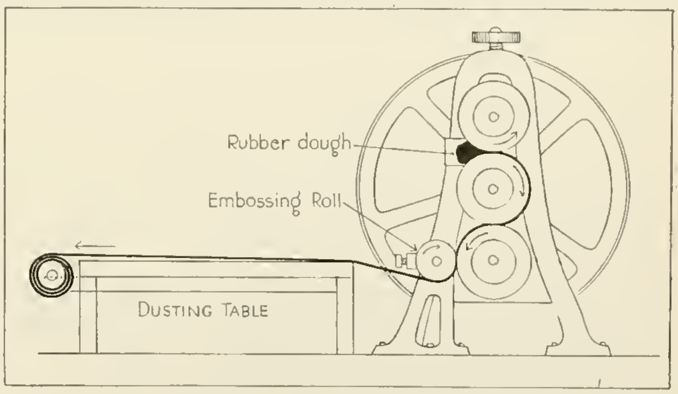
Hot-Water Bottle Embossing

For water bottles, fountain syringes, dress shields and many other ribbed stocks the old-fashioned way was to run the stock on heavily ribbed cloth and trust to the impression thus given. It was far from perfect and was later supplanted by the use of vulcanized squares that were deeply ribbed. Sheets of stock were placed upon these forming sheets and cold pressed for twenty-four hours. They were then stripped and sent to the cutting room. As this process was slow and expensive, it in turn was supplanted by a grooved roll mounted on a frame and bolted fast to the calender bed plate. The roll is adjustable, with screws at both ends, and if the embossed stock is to be dusted when calendered, a dusting table is used.

EMBOSSING CARRIAGE CLOTH

Rubber carriage cloth for covering the tops of automobiles, as it comes from the calender, is of a dull dead black or brown color, similar to the finish usually found on rubber blankets. While this sort of finish is suitable for some work, most users require cloth with a small raised design. The following four styles of impressions are common:

1. The pinhead pebble where the cloth looks as though it were covered with pinheads about 1/32-inch apart.
2. Long grain, which is popular with the automobile top manufacturers, looks as though scratched all over with the point of a pin, no regular design being carried out.
3. English grain. Here raised lines are about 1/16-inch wide by 3/4-inch long, and all one way, but no two lines cross.



Side Roll Embossing Calender with Dusting Table

4. Flat grain, in which the lines are about 1/16-inch wide, very short and crooked, and are scattered over the cloth close together and running in all directions.

In order to give the cloth this finish it is run through an embossing calender.

THE STANDARD EMBOSSING CALENDER

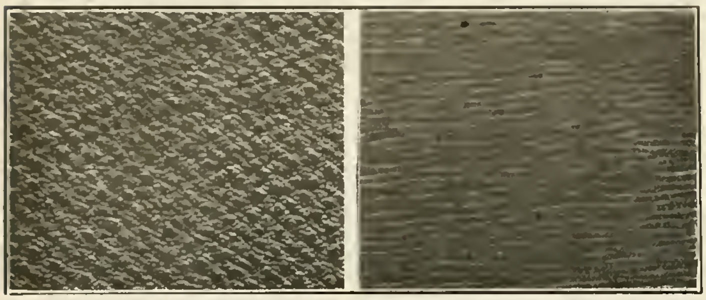
This machine usually has three rolls (sometimes two), set horizontally. The middle or drive roll is of steel, 8 inches in diameter by 60 inches long, and is engraved with the reverse pattern desired on the surface of cloth. The top and bottom rolls are of steel, covered with paper by hydraulic pressure, and are twice the diameter of the middle engraved roll. The driving arrangement is the same as in any ordinary calender, with gears on the rolls to run them at even surface speed, as the engraving on the 8-inch steel roll forms an impression on the paper rolls

Cut Sheet Tobacco Pouch—Note Wavy Lines

and must follow this impression at each revolution. The operation of the machine is as follows:

A roll of cloth that has been previously coated is placed in the friction let-off bearings on the feed side of the calender, and the end of the cloth passed between the engraved roll and the lower paper-covered roll. This end is attached to a wind-up arrangement and rolled as fast as calendered.

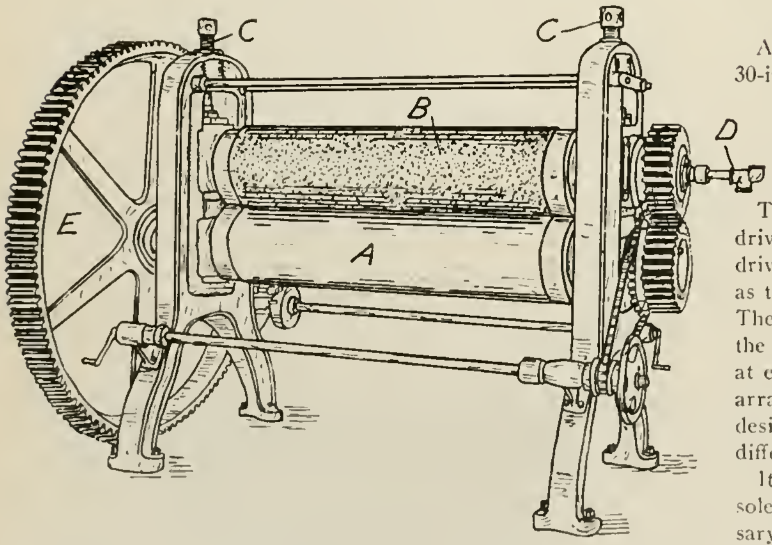
Speaking of the paper rolls, when the machine is new the rolls are ground or turned down smoothly. The pattern of the steel roll is run into them by dampening the paper and running the machine until the paper roll or rolls are well tracked. In this way, with a small steel roll, a good impression may be obtained on the tightest goods.



Leather Pebble Leather Grain
Carriage Cloth Embossing

TWO-ROLL EMBOSSING CALENDER

A two-roll embossing calender for producing carriage cloth with a pebble or leather-grained pattern is shown in the illustration. The lower roll *A* is 15 inches in diameter by 60 inches long, and is made with a cast-iron center built up to the required diameter with layers of paper hydraulically compressed. The top roll *B* is of the same size and is made of forged steel. The surface of the roll is engraved with a pebbled or grained surface to produce the desired pattern on the rubber surface of the cloth. The upper roll is adjusted vertically by screws *C* at each end and it is cored for steam and provided with steam connection *D*.

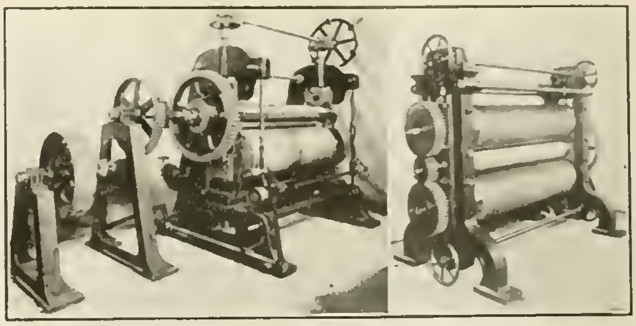


Two-Roll Embossing Calender

The large gear *E* is keyed to the shaft of the lower roll and is driven from the usual spur pinion on the driving shaft under the bed of the machine.

RUBBER FOOTWEAR EMBOSSING

Rubber shoe, boot and tennis soles are all embossed on calenders fitted with specially engraved steel rolls. So also are the uppers of rubber shoes whenever they are ornamented. The pebbled leg sometimes found on rubber boots is embossed either on the paper roll used in carriage cloth work, or on steel rolls fitted to an upper calender. Upper and soling calenders are either separate machines or made in combination.



Standard Embossing Calenders

There are several designs of combined soling and upper calenders in use, but they are about the same in principle, varying only in the way the rolls are arranged.

Sole and Heel Embossing

A good standard type of machine is as follows: Three 12 by 30-inch chilled iron rolls are set horizontally in housings, and one 10 by 30-inch steel roll is set against the upper chilled roll. All of the rolls are bored out and arranged with stuffing boxes having goose necks connected with steam and water for controlling temperature.

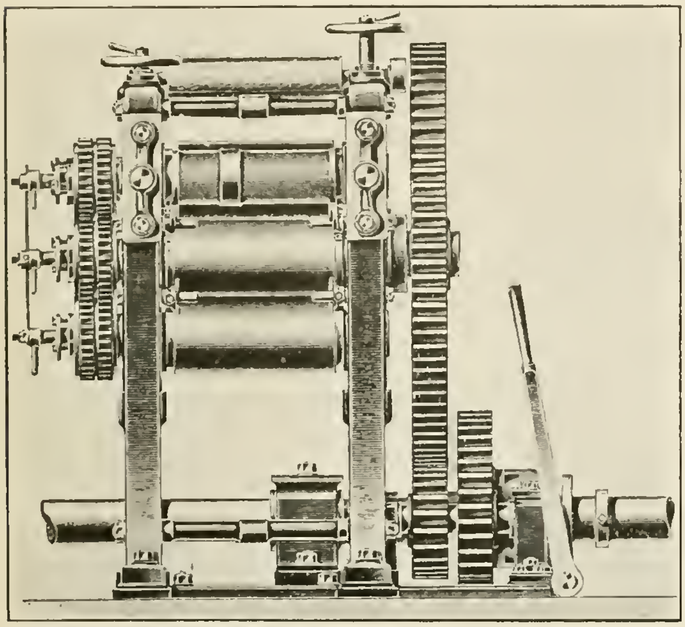
The middle chilled roll is a drive roll and is driven from the driving shaft underneath the machine. The lower chilled roll is driven from the middle or drive roll with gears on the same end as the drive gear, giving a friction on the bottom roll of 1½ to 1. The top chilled roll is driven by gears on the opposite end from the drive gear at even speed. The engraved roll is also driven at even speed from the even gear on the end of the top roll. The arrangement of the engraved roll in the housings is especially designed so that this roll can be easily removed and rolls of different pattern substituted.

It is well to have at least two speeds on an engraved upper or sole calender, as in running heavy material a slow speed is necessary to give best results. A good standard is 8 yards per minute for slow speed and 12 yards per minute for high speed. The machine described requires about 15 h.p. to operate. It is built regularly in the following sizes: 8 by 18-inch, 10 by 18, 10 by 26, 12 by 30 and 12 by 36; but a good average size is 10 by 26 or 12 by 30.

SHOE UPPER CALENDER

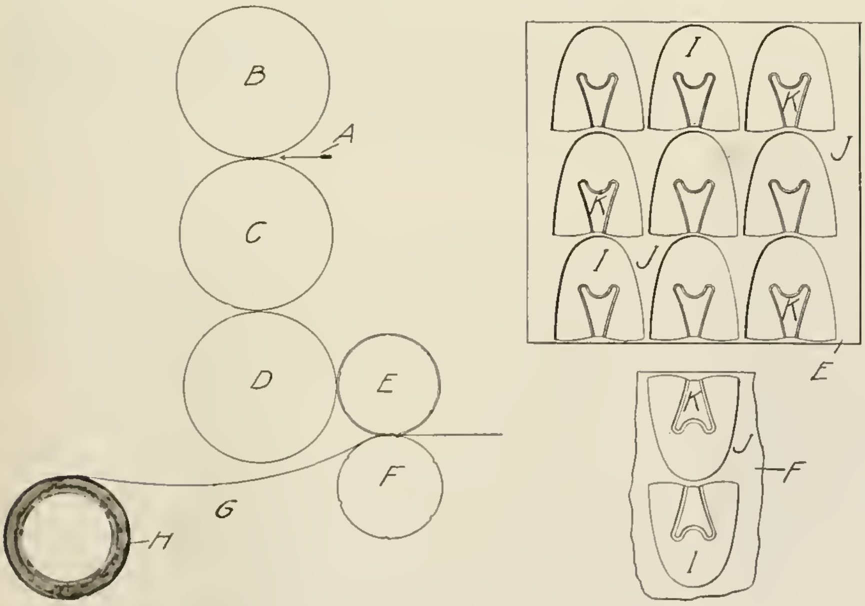
In the Pearce shoe upper calender the arrangement of the rolls is as follows: The rubber compound is fed at *A* between the

rolls B and C. It passes around roll C, then between this and the roll D, where it is sheeted to the proper thickness. Adjacent to the lower roll D, is a pattern roll E, in which the patterns are cut of the proper shape to form the shoe uppers. The roll F



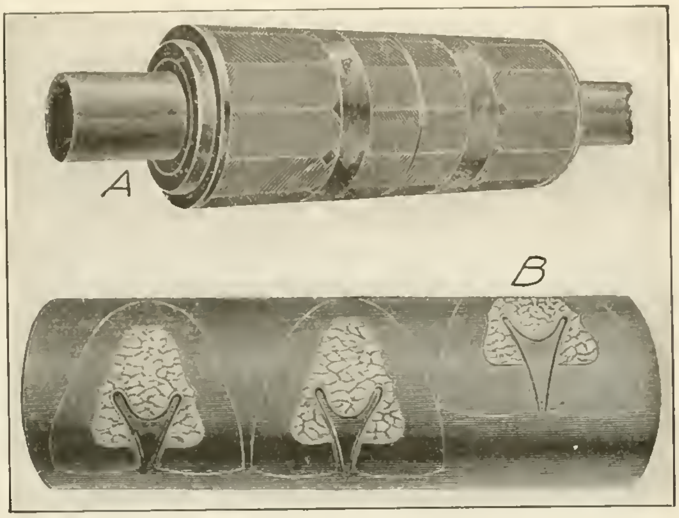
Sole Embossing Calender

has supplementary patterns raised above the surface to fit in those on roll E. These two rolls form cutting dies, which cut the patterns from the sheet of rubber. A strip of fabric G from the roll H passes between rolls E and F with the rubber. The rubber and fabric are pressed together over the area of the patterns; but since those portions of the rolls between the patterns do not contact, the two sheets are not united at these points, and are pressed together only within the limits of the patterns. The



Pearce Calender—Arrangement of Rolls—Designs

rubber scrap between the patterns is again mixed with the batch to be sheeted, and the only waste is the fabric cut from the edges of the patterns. The drawing on the right in the illustration shows the design of the surfaces of the pattern rolls E and F.



Engraved Embossing Rolls—Soles and Uppers

The rubber and fabric are pressed together between the surfaces I, while the material between the intermediate spaces J and K does not adhere and may be easily separated after passing the rolls.

GREATER SAFETY IN THE RUBBER FACTORY

That there is no basis nowadays for the old-time claim that work in a rubber shop is more hazardous and unhealthy than in most other factories, was demonstrated by Sidney M. Schott, of Morgan & Wright, Detroit, Michigan, in an address given at the meeting of the Rubber Division of the Ninth National Safety Congress held in Milwaukee, Wisconsin.

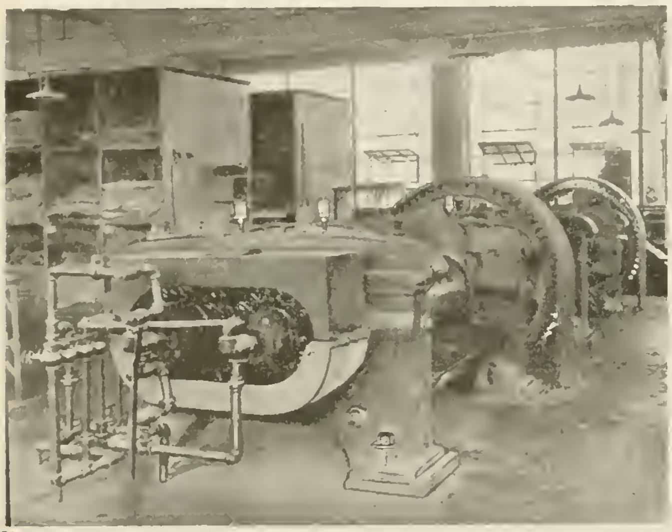
Rubber manufacturing concerns, from the president down to the humblest employe, are learning that safety pays, and an intensive campaign for safety, started more than a year ago under the auspices of the Rubber Division, is already bearing good fruit. The successful executive today is the one who insists upon all processes and machinery being made as safe as possible, even going to the extent of refusing to buy equipment that lacks all possible safeguards.

Accident statistics are being carefully standardized so that causes can be more definitely determined and proper remedies applied. Firms now engage in friendly rivalry to see which will produce the best percentage record of improvements in casualty lists. Workers are being educated with bulletins showing how the lost-time and minor accidents may be easily avoided; and the Rubber Division is preparing standard safety rules for mill and calender rooms, tire-building rooms, cement shops, etc. The same division has made recommendations as to the best types of floors for mill and calender rooms and is working on standards to insure the safe working of these machines. Knowing that the larger organizations are well able to take care of themselves in the matter, the Rubber Division is making a greater effort than ever to enlist the interest of and assist the smaller concerns which need guidance and hearty cooperation.

Declared exports from Belize, British Honduras, to the United States amounted to $3,035,459 in 1919, $1,961,128 of which was the value of 2,878,579 pounds of chicle, while in 1920 exports amounted to $3,726,029, of which were 3,-411,466 pounds of chicle valued at $2,392,060.

Rubber Mill and Calender Lubrication

The power transmissions and heavy machinery employed in modern rubber factories for washing, mixing, warming and calendering require careful selection of suitable lubricants, because of the excessive weight of the moving parts and the severe load conditions.

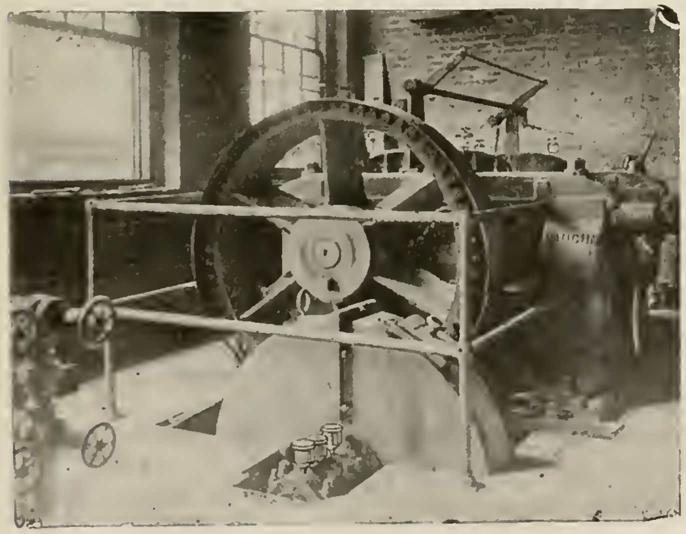


Keystone Lubricating Co.
Mill Equipped with Spring Grease Cups on Roll Bearings

Before the introduction of the present heavy types of mills and calenders the use of oils for lubrication was the general practice. It is doubtful if this was ever good practice, even on the relatively small mills and calenders of years ago; certainly, it cannot be rated as good practice today, because practically all oils and most greases thin down so readily under present working conditions of speed and pressure that without constant attention and frequent renewal of lubricant excessive frictional heat will develop, with danger of fire and injury to the machinery.

BEARINGS

Bearing troubles come from many causes. Among these are: poor alinement, improper grooving, inefficient lubrication, too great pressure per square inch of bearing area, inferior bearing metal, scored bearings, etc. The elimination of this list of mechanical defects must precede efficient lubrication, which will then depend on proper choice of the lubricant to meet the conditions of speed and pressure.



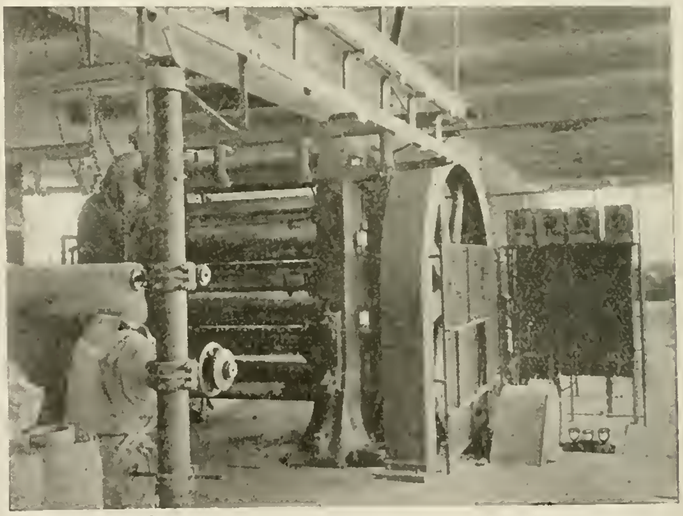
Keystone Lubricating Co.
Rubber Mill Showing Gravity Cups and Hand Compression Grease Cups

VALUE OF THE LUBRICANT

The value of a lubricant lies not only in its capacity for reducing the frictional load under moderate bearing pressure, but also in developing a low coefficient of friction under severe loads. Such lubricants have been developed for heavy machinery of every type, in the form of special greases, applied by means of suitable feeding cups.

GREASES

Originally, the ordinary lubrication greases were little more than soft soap containing a filler such as wax, paraffine, rosin, rosin oil, talc, clay, graphite, etc., having little or no lubricating quality. Many greases are made wholly or in part from animal fats which may become rancid and very offensive. Such greases are usually highly scented with oil of myrbane, which smells like almond oil, to disguise the odor arising from this cause. Pine petroleum grease and other semi-solid lubricants have been found by test to possess the greatest relative capacity and lubricating efficiency under various bearing pressures.



Keystone Lubricating Co
Rubber Calender Equipped with Gravity Grease Cups

RUBBER MILL APPLICATIONS

Driving gears and reduction gears require a grease not too light in density that will not be thrown off by centrifugal force at the operating speed. Such greases will possess unusually tenacious lubricating properties and maintain their original densities under the severest operating conditions.

Cleanliness is a vital feature in the lubrication of rubber mill machinery, as misplaced lubricant frequently comes into contact with the rubber, resulting in injury and loss. Trouble of this sort may be overcome by the use of specially designed cups feeding by gravity or pressure according to the density of the grease used.

In the case of ordinary rubber mills grease pockets are sometimes used in place of automatic spring cups. In order to secure adequate and efficient distribution of grease over the contact surfaces of bearings it is vitally important that attention be given to the grooving of the bearings.

The illustrations show the application of both gravity and pressure types of grease cups to rubber mills and calenders, which today has practically become standard practice.

Repairing Rubber Gloves and Mittens—IV[1]

A New and Valuable Line for Repairmen

Care and Use of Rubber Gloves—Two General Classes—Surgeons' Rubber Gloves—Hospital Glove Repairing—Applying Surgeons' Gloves—Sterilizing Rubber Gloves—A German Invention

CARE AND USE OF RUBBER GLOVES

Contrary to a popular notion, rubber gloves will give good service and last a long time if given reasonable care, as manufacturers and repair men well know. Glove makers advise dealers to look over their stock every week, and to dip their rubber gloves in warm water and to roll them in the hands. This simple treatment not only makes the goods look more attractive to customers, but actually adds to their life, pliability, and preserves their elasticity.

Types of Rubber Gloves

(1) Finger Cot. (2) Surgeons' Glove. (3) Surgeons' Sleeve. (4) Obstetrical Glove. (5) 3-Finger Surgeons' Glove. (6) Household Glove. (7) Electricians' Light Gloves. (8) Electric Linemen's Gloves, Heavy. (9) Motormen's Mittens. (10) Cement Workers' Gloves. (11) Driving Gloves. (12) Firemen's Gloves. (13) Firemen's Mittens. (14) Tanners' Gloves, Gauntlet. (15) Tanners' 1-Finger Mittens. (16) Tanners' Mittens. (17) Mercury-Workers' Mittens. (18) X-Ray Workers' Gloves, Gauntlet. (19) Acid-Workers' Gloves, Tips Reinforced. (20) Acid-Workers' Short Gloves. (21) Cyanide-Workers' Gloves.

Users of household gloves are told that when putting gloves away they should be carefully cleaned and dusted with starch or talcum powder. They are cautioned, too, against using any oil, as many oily substances ruin rubber. Glycerine, however, is quite harmless.

Rubber gloves should be worn one size larger than kid gloves. In putting them on, tearing may be avoided if the gauntlet is turned back a couple of inches and then, by seizing this double thickness, the glove can be drawn over the hand. In removing gloves they should never be pulled by the fingers, but rolled backward until the gauntlet reaches the finger tips. The glove thus turned inside out can easily be blown back into its original shape, if it is the household, or surgeons' type.

TWO GENERAL CLASSES

Rubber gloves divide themselves into two general classes, light and heavy. The light dipped glove is made on porcelain forms dipped in rubber solution many times and vulcanized before taking off the form. These are used by surgeons, nurses and, to a degree, in the household. As these sell often as low as 30 cents a pair, it is hardly worth while attempting to repair them, except in an emergency, when it can easily be done.

SURGEONS' GLOVES

The finest article in rubber gloves is the kind worn by surgeons. The best grade is made by dipping porcelain forms in pure Pará rubber solution, after which they are carefully vulcanized, the aim of the makers being to get gloves in various sizes to fit the hand perfectly and to obtain a membrane that, while tough, will yet be thin and pliant enough not to interfere with the wearer's sense of touch. They are, of course, seamless and the wrists are usually reinforced with rubber tape or cord. The gloves not only afford the operating surgeon practically perfect immunity from infection and save him repeated scouring of the hands with powerful antiseptics, which sometimes induce eczema, but they also safeguard the patient from infection.

Some surgeons' gloves are made quite smooth and others have a finely pebbled surface by means of which a surgeon may get as firm a grip on instruments, threads, ligatures, etc., as with the bare fingers. These gloves come in sizes from 6 to 11, inclusive, in light, medium, and heavy weights, and while most of them are wrist length, some are made to cover also half the forearm. For special uses, surgeons' gloves are made in three-finger styles—thumb, index, and middle fingers. For obstetrical operations, gloves are made 16 inches long, and extra sleeves, 16 and 18 inches, to fit from wrist to shoulder, are also provided. A patented surgeon's glove is made with allowances for the knuckles, thus preserving the "cuticle touch." Gloves similar to surgeons', but a trifle stronger, are also made for nurses, internes, midwives, and others, where the sense of touch need not be very keen. These gloves range in size from 6½ to 9 inclusive, and cover the wrist well.

HOSPITAL GLOVE REPAIRING

Repairs are made to surgeons' gloves in some hospitals by attendants, who cut suitable patches from old, torn gloves, and affix them to reparable gloves with ordinary rubber cement. While exacting physicians may not use the mended gloves, the latter serve many useful purposes, nevertheless, in big institutions.

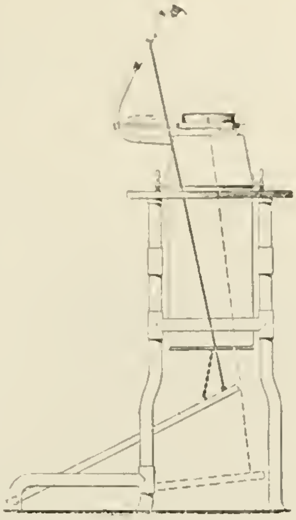
APPLYING SURGEONS' GLOVES

Surgeons' gloves in many large hospitals are often thrown away as useless after one or two operations. After the strain of a severe operation a surgeon will impatiently tear the gloves from his hands, when they could be saved from damage by either of two modes of removal. One is opening the glove at the wrist and allowing water from the faucet to flow into the glove; and the other way is to roll the glove downward from the wrist until it comes off the hand inside out. The turning or reversal makes the right hand glove a left-hand one, and vice versa, and equalizes wear. The gloves should never be pulled by the fingers.

In many hospitals thin gloves are frequently torn by surgeons while putting them on. To avoid this and to expedite the work of surgeons in speedy operation, a British inventor has devised a simple apparatus which either a surgeon or a nurse may operate. Referring to the illustration, the wrist part of a glove is

[1]Copyrighted by Henry C. Pearson. Continued from The India Rubber World, May 1, 1921, pages 567-570.

stretched with forceps over the neck of the cylinder, and is then engaged with the lower one of the rings. By depressing a treadle the air in the cylinder can be partly exhausted and the unclamped part of the glove is drawn inward and inflated. The treadle at the same time brings down an arm carrying the second ring, which snaps upon the first. When the treadle is released the arm carries up with it the rings holding the fully opened-up glove ready for the surgeon's hand. Often the glove is made easier to put on by being dusted while distended in the cylinder neck.



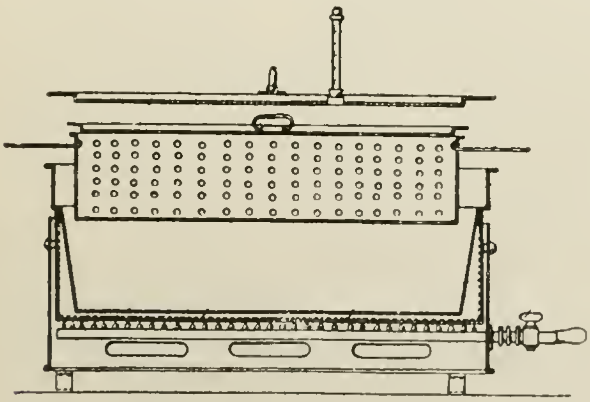
Machine for Applying Gloves

STERILIZING RUBBER GLOVES

Oversterilization by prolonged boiling is the commonest cause of damage to surgeons' gloves. The makers suggest limiting the boiling to two or three minutes, after removing powder and sticky material, but often hospital attendants think that because infected fabrics should be exposed to 20 pounds of steam for 20 minutes, surgeons' gloves should receive equally drastic treatment. Bacteriologists say that the exposure of rubber goods to live steam for disinfection is rarely needed, and suggest that steeping surgical rubber articles in a 2 per cent formaldehyde solution be substituted for the destructive sterilization by steaming.

A GERMAN INVENTION

A German inventor has patented a device for sterilizing rubber surgical goods in hot glycerine. The articles and the glycerine are placed in a wire tray contained in a small metal trough that is then covered and heated. After 10 to 15 minutes when the temperature of the glycerine has been raised to 110 or 115 degrees C., one of the two gas burners is shut off, leaving the other to maintain an even sterilizing temperature for a further fifteen minutes. The case inclosing the trough has double walls with several layers of wire netting between them to distribute the heat evenly and prevent decomposition of the glycerine which occurs at 300 C. by excess of heat in any one spot.



German Glove Sterilizer

In a subsequent article the methods used in repairing the various types of rubber gloves will be described.

A new firm for foreign business called the Nisshin Trading Co. has been established in Osaka, Japan. The rubber department will handle boots, overshoes, toys and brushes.

INTERESTING LETTERS FROM OUR READERS

THE TIRE MERCHANT CONCENTRATES

To the Editor:

Dear sir: The progress made in business methods by the great majority of tire dealers in the past few years has been a source of a great deal of satisfaction to the tire manufacturer, and especially so just at the beginning of his new year which has all the indications of being one of the largest years that the tire industry has experienced.

The tendency of the live, energetic tire dealer to concentrate his efforts on one or two makes of tires was impressed on my mind very forcibly during a recent trip through this territory. It has not been so very long since the tire dealer felt that, to be a success, it was necessary for him to stock almost all makes of tires, so that he would be in position to give to the motorist the tire that he asked for. The dealer of that day did not practice salesmanship, but followed the line of least resistance and filled the orders of his customers. Today, the energetic tire dealer is picking out one or two of the quality tires on the market, and concentrating his effort on those lines, and his success in following this procedure has been most remarkable, not only from the sales standpoint, but from the standpoint of raising his business in the eyes of the ultimate consumer, the motorist.

When the motorist goes into a dealer's store and finds that the dealer has a great variety of different makes of tires, he becomes confused and invariably loses confidence in that dealer, whereas, if the dealer is carrying one or two high-class tires, and concentrates his sales talk on those particular lines, the motorist is immediately impressed with the apparent sincerity of that dealer.

It is certainly false economy for a dealer to have a variety of makes of tires, for he has his money tied up in duplicate stock, and is wasting both money and space in his establishment. There was a time when the dealer thought that the heavy and wasteful stock was a matter of demand and supply, and to meet the demand it was necessary to have some of all the various makes of tires, until he finally found out that he could not afford it, that it was needless duplication of stock, was very poor practice from an investment standpoint, and also cut down his efficiency as far as service was concerned, and naturally the public suffered.

Today, we find the wise tire dealers selecting the line that will give the most service, at least cash. He is concentrating effort and using salesmanship with much better results. The dealers recognize the fact that the motorist has ceased to be interested in the so-called cheap tires and is now interested only in a quality tire at a fair price—a product that will give him value for the money expended. In other words, the motorist is interested in tire mileage.

N. E. West.

Los Angeles, California.

THE QUESTION OF TUBING OR CALENDERING HEEL STOCK

To the Editor:

Dear sir: The quality of the product of a rubber article would not be different molded from the same stock whether run on the tubing machine or slabbed on the calender. Technically, each method of stock preparation has its advantages dependent on the ultimate form of the object molded. The controlling consideration is most frequently that of cost. For example, a perfectly good heel may be prepared by tubing machine or calender, but a large producer would naturally employ the method of slabbing the stock on the calender and dieing out the heel shapes to fit the mold cavities, because this method admits of greatly increased weight of output and lowers cost. The calender method, too, affords an opportunity for uniting different grades of stock in the same slab if desired.

Superintendent.

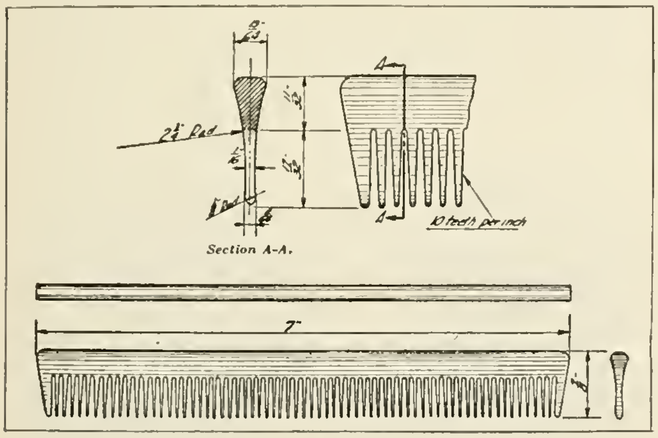
Manufacture of Hard Rubber Combs[1]

By William Roberts[2]

There are thousands of different styles of combs, the standardization of which is quite impossible, as the consumer is always looking for something new and the manufacturer has to cater to the fancies of the trade. Every customer has his own specifications and ideas. Even the United States War Department prescribes specifications for the combs to be supplied to the Government. There are dressing combs for men and women; special combs for barbers; pocket combs and fine-toothed combs in a great variety of styles. Hard rubber comb making is a highly specialized industry, requiring expert knowledge and special machinery.

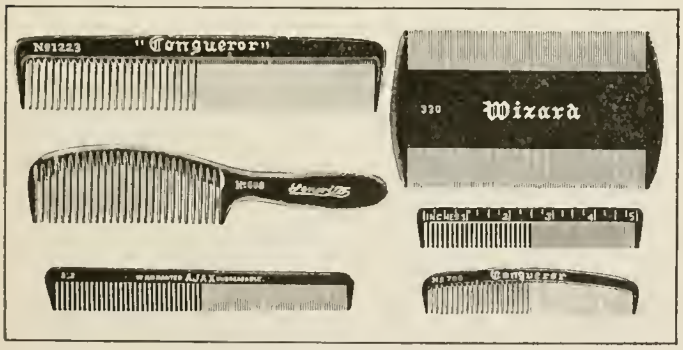
PREPARING AND ROLLING THE STOCK

The compounded stock is first warmed on a mill and then calendered, after which the rubber sheets are plied up on a drum



Construction of Government Rubber Comb

to obtain the proper thickness and eliminate air pockets or blisters. The warm stock is next rolled in pieces approximately one yard square, between two sheets of tin foil approximately .015-inch thick. This requires a great deal of care and attention. An iron-top, steam-heated table is necessary for this work, with a large iron roller ranging in weight from 1,200 to 2,000 pounds, depending on the thickness of material and the finish that is required in polishing the comb. First, one sheet of tin-foil is applied and then the other, care being taken not to let the roller rest too long at any one place, as it is likely to make ripples or slight grooves. This will cause trapped air between the tin-



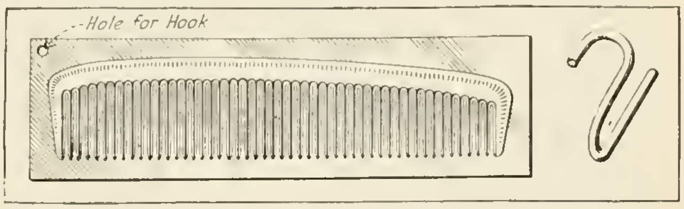
Standard Rubber Combs

foil and the material and may mean a blemished comb. It also results in unevenness in the gage of the stock and will undoubtedly be the cause of scrapped finished material.

Mechanical devices are used by some manufacturers but the principal manufacturers still use the hand method which requires two men to operate the rollers and through experience they become very skilful in this work. The sheets of tin-foil with the rubber stock between are then cut into rectangular blanks of the proper size. This operation is done on a special cutting and shearing machine, after which the pieces are ready to be formed into the shape of comb required.

THE COMB MOLD—FORMING AND CURING

The forming die is made a little larger than the required size and shape of the finished comb. Hydraulic power-presses are

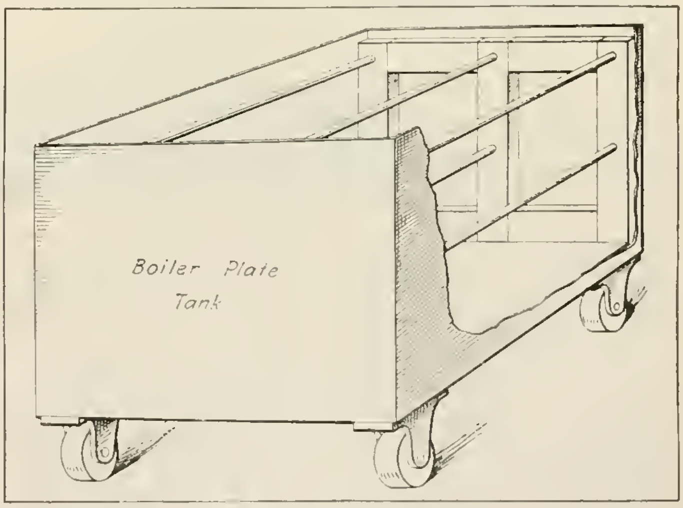


Comb Mold and Hook

generally used. The blanks of compound with layers of tin-foil on the outside are then placed in the die and formed, the tin-foil taking on the shape and form of a comb and acting as a mold. Holes are pierced in one corner of these comb molds through which hooks are placed and the molds are hung on a frame built inside a rectangular tank-truck made of boiler plate. The tank-truck is next filled with water and rolled into the heater where the combs are cured or vulcanized for about 12 hours under 75 pounds steam pressure.

TRIMMING THE FLASH

After vulcanization the tank is drained and the tin-foil stripped from the hard rubber comb blanks. The thin flash of hard rubber



Curing Truck-Tank

around the form is then removed, various devices being employed for this purpose. The three principal methods are: (1) Stacking a dozen combs together and whacking them with a flat wood stick, the flash being so thin that it readily breaks off; (2) Grinding off the flash on a disk grinder; (3) Grinding the two long sides at once between two grinding wheels. The centrifugal force of the wheels carries the blanks through a specially formed chute into a box. The ends are then finished off individually on a disk grinder, and the comb is ready to have the teeth cut.

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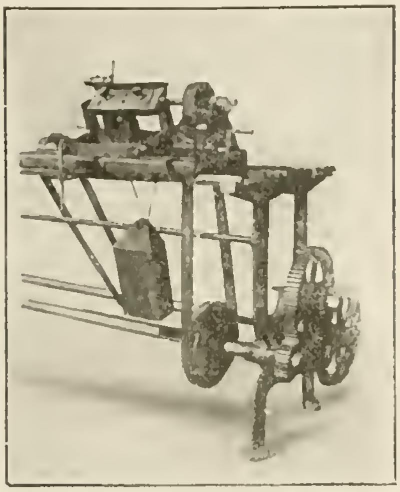
[2]Engineering School of Drawing, Springfield, Massachusetts.

COMB-CUTTING MACHINES

The American machine shown herewith feeds and stops automatically. The weight draws the comb down on the saw that cuts the first tooth, and a cam then raises the comb from the saw which is carried along the space for one tooth by a cam and rack. This continues until all the teeth have been sawed, when the machine stops. The rack and cam can be taken out and others substituted if a different number of teeth to the inch are to be sawed.

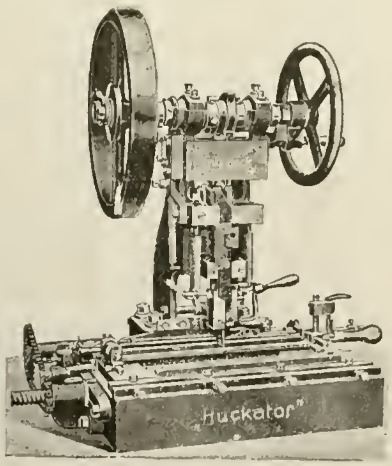


Dressing-Comb Sawing Machine

These machines are usually operated in gangs, 15 machines being operated by one operator who can turn out under favorable conditions 1,200 to 1,500 dressing combs a day.

A GERMAN MACHINE

This German comb-cutting machine is claimed to be self-acting. It cuts fine and coarse teeth with one pair of knives without interruption. Both edges of the teeth are completely cut automatically. Furthermore, the machine throws out the comb when finished. It is recorded that 12 dozen combs each 8½ inches long can be cut in one hour, and that one man can easily handle two of these machines which work at 90 revolutions a minute.



"Huckator" Comb Cutter

In making a toilet comb with fine and heavy teeth the length of the teeth is measured upon an adjustable ruler. The width of the corner teeth is regulated by a special adjuster. After the plate is inserted, the machine is turned by hand a few revolutions until the knife has found the proper position for cutting the corner tooth. The first comb is cut and the machine is adjusted for further work.

RUBBING-DOWN PROCESS

To give the combs a very high luster, a rubbing-down process is employed. Dried corn husks are used to make large buffing wheels, and this is quite an art in itself. These wheels are then treated with water and coated with fine rotten stone. The comb is next applied to this wheel in a manner similar to applying the comb to a flannel buffing-wheel when polishing. This is dirty work and the labor turn-over is somewhat large. After the corn husk wheels are used for several days a very strong sour odor permeates the atmosphere which adds to the disagreeableness of the task. It is not, however, injurious to the health, as various tests and experiments by able health authorities have shown.

POLISHING AND FINISHING

The combs are then washed in plain water and sent to the buffing and polishing department, where girls are employed. The buffing and polishing wheels are made of large flannel disks and the outside diameters of the assembled wheels are treated with oil, fine rotten stone, and rouge. The combs are then inspected for evenness of teeth and luster and sent to the stamping or marking room where the manufacturer's or customer's name is stamped thereon. This is done with a kick-press, the stamp being electrically heated. When letters in gold are required, the impression is first made and a sheet of paper with a very thin coating of gold is inserted under the die which is brought down on the comb again. The combs are then packed in boxes for shipment.

POSSIBLE SHORTAGE IN WORLD'S COTTON SUPPLY

That a reduction in acreage, such as proposed for cotton planters in order to bring up the price level of the staple, would be a grave mistake, is the view of some of the best-informed experts in the industry. It is pointed out that were the acreage reduced one-third, as some advocate, or from 35,504,000 to 23,670,000 acres, the approximate yield on the past five years' basis would be 8,000,000 bales. Such a crop could not fail to be inadequate, despite the surplus carried over from the current season, to meet even the present slackened demand. All signs indicate a very decided and early improvement in business this year in both the tire and general textile trades, and a demand for probably 14,000,000 bales in the 1921-22 season. As this demand would have to be met almost entirely from the crop planted this spring, it is not hard to see what would happen were acreage reduced as agitators unwisely advise.

For five years American cotton prices kept steadily mounting until in 1920 they reached the highest level known since the Civil War; and in the same year they dropped to the lowest level known in the country's history. Naturally the violent reaction hit many planters and dealers hard, and there has been much casting about for ways and means both to mitigate their plight and to strengthen their position. Some of them decided that the best way out of the difficulty would be to curtail the crop in order to get higher prices, overlooking the fact that they might be inviting trouble through a federal inquiry as to "combinations in restraint of trade."

Much sympathy is expressed for the planters who have suffered considerably from unfavorable weather and boll-weevil depredations, coupled with higher labor and living costs; but clear-sighted students of the situation contend that the remedy for the adverse conditions does not lie in retaliation on the mill owners who failed to keep on buying at high prices as their own trade fell off, but in a sensible get-together policy. Mill owners need an ample supply, and planters need a fair price. Hence conferences are advised at which both producers and consumers may frankly discuss the status of the industry and devise some cooperative course that will be mutually helpful.

Cotton prices are low, abnormally low, but the far-sighted planter must realize that the whole world will soon be clamoring more than ever for cotton, and that the wise ones who can meet the demand will be the ones who will profit most, not the resentful or the faint-hearted who are planning to plant less. He may, too, take some comfort from the speculator's axiom that booms always begin in gloom and end in gladness.

HERMETIC AIR BAG

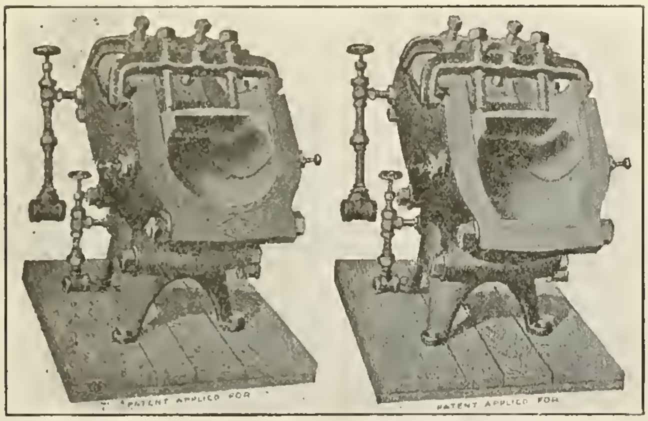
A new construction of air bag for use in curing straight-side automobile tires is the bag built of special rubber compound upon a patented flexible air container. Another patented feature is the hard bead wedge protected and bound by fabric cured to the rim side of the bag. There is no heavy splice in the construction. Uniform pressure, expansion, and compression are secured by this construction. Compression at the beads is due to the patented bead wedge.—Cupples Co., St. Louis, Missouri.

Pneumatic Truck-Tire Repair Vulcanizers

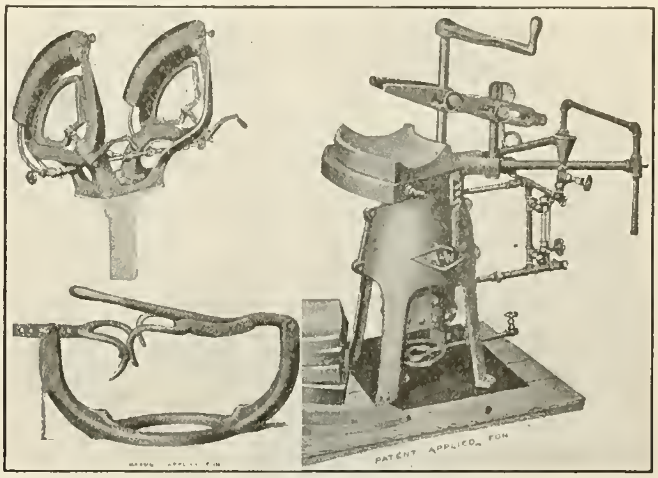
Manufacturers of tire repair equipment have consistently kept pace with the development of the giant pneumatic tire. There is today a great variety of types of equipment for vulcanizing pneumatic truck tires. There is also a great diversity of opinion in respect to the success of different methods of adjusting molds to fit more than one size of tire. The object of this article is not to point out the best method of vulcanizing truck tires, or the molds which will best serve present and future requirements of the tire repair man, but to bring to the attention of our readers the development of truck tire repair equipment.

AKRON-WILLIAMS EQUIPMENT

The Akron-Williams pneumatic truck-tire sectional vulcanizers are made in five sizes, to handle 6, 7, 8, 9 and 10-inch tires, in two types—one for round tread and the other for flat tread tires. These are assembled in two types—one mounted on short legs and fitted to take its steam supply from an outside source or separate steam connection, the other equipped so that it will generate its own steam. The self-contained, steam-generating, sectional vulcanizers are provided with boiler, safety valve, water gage, steam gage, filling funnel, valves, etc. The boiler is of tubular construction, and can be equipped so that either gas or gasoline can be used as fuel. One pair of crucible steel straight-side bead molds is furnished with each sectional vulcanizer. The split mold construction is used, giving separate steam circulation to either side of the sectional cavity, thereby permitting live steam to enter one side of the cavity at a time, or both sides at once. A distinctive feature of these molds is the two-screw pressure yoke, one screw applying on either half of the bead molds, assuring more positive and evenly distributed pressure than is possible with one screw.



Round and Flat Tread Vulcanizers



Bead Spreader—Inside Patch and Side-Wall Vulcanizer

Akron-Williams Truck Tire Equipment

INSIDE PATCH VULCANIZER

The inside patch vulcanizer should be used in conjunction with sectional vulcanizers. The best vulcanizing results are secured when the tire is placed on an inside patch vulcanizer and partially cured and then fitted into the sectional vulcanizer to complete the cure. These vulcanizers are furnished in five sizes the same as the sectional vulcanizers, and fitted with either left or right-hand brackets which can be mounted directly on a table or stand without building special support. The wrap-tightening device gives effective pressure and repairs quickly with little effort on the part of the operator.

SIDE-WALL VULCANIZER

The side-wall vulcanizer is built in two types—one with a boiler to generate its own steam, the other to take its steam supply from an outside source or separate steam connection. Five side-wall plates, carefully machined, go with the equipment to care for the five sizes of tires. The clamping arrangement gives positive pressure on the repair by means of an iron plate on a sand-bag inserted in the tire. The sand-bag is not furnished with the equipment. Adjustable hooks at both ends of the steam plate can be hooked over the lower bead of the tire when in position and the pressure-arm crank, by reversed movement, can then be utilized in spreading the beads apart so that the sand-bag and iron pressure can be easily inserted. This vulcanizer serves for inserting inside and outside patches and repairing side-wall abrasions.

TIRE-BEAD SPREADER

The tire-bead spreader is easily adjustable to any size of truck tire, spreading the beads, without injury to the tire, as far apart as is desired and locking against the back-pull. There is no cross-arm or obstruction between the beads; they are held apart from the outside. The spreader bolts to the floor. Spreader hooks are placed over the beads without difficulty, and the spreading is accomplished by simply pulling back the lever. It is also a great help when inserting the inner tube.

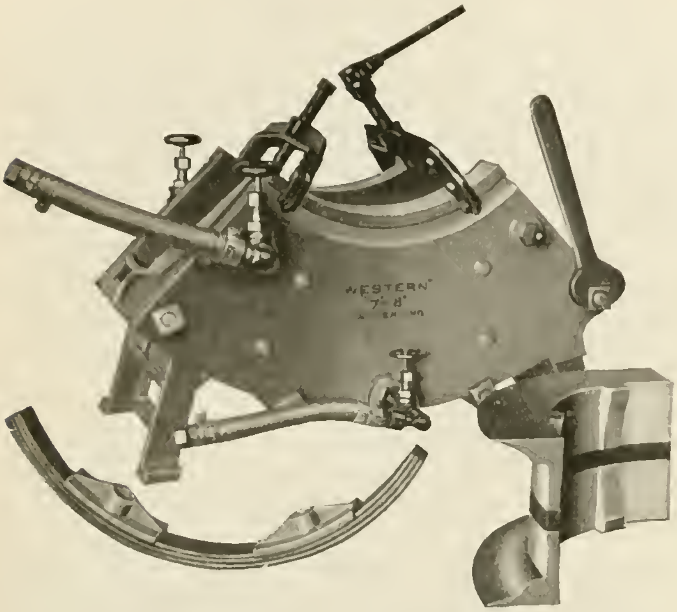
THE WESTERN VULCANIZER

The Western one-fourth-circle molds are designed with the idea of fitting all types of treads, therefore one type mold has the bottom with only a slightly curved surface on the tread and an "O. G." curve to the side-wall, which practically fits all types of truck tires after they have worn down a little—and the other mold is the ordinary round-bottom type. These molds can be adjusted to different sizes, should any radical change occur in the oversize, by widening or narrowing the spaces in the bottom of the mold. The spacer is of the same metal as used in matrices and bead plates, and actual test has found that the spacer has the same temperature as the sides of the molds.

The six-inch pneumatic truck-tire mold is designed for both sectional work and retreading in anti-skid designs, and can be equipped with anti-skid matrices in both diamond and rib tread designs.

As the percentage of seven and eight-inch tires taken together is only about equal to that of the six-inch tire alone, a combination seven and eight-inch mold without a reducing shell has been produced. The mold is split in halves, having two separate steam chambers, and a spacer is used between the halves to change the

sizes. The halves are held together firmly by four large bolts. This mold localizes the heat in either one side or the other when



Western 7 and 8-inch Combination Mold

curing side-wall, rim cut, spot or bead jobs. One side of the mold is stationary, bolted to the feet, and the other side adjustable horizontally so as to be changeable from one side to the other.

This vulcanizer can never become obsolete in size should tire manufacturers increase or decrease the percentage of oversizes on seven and eight-inch tires.

MILLER TRUCK TIRE MOLDS

The Miller adjustable sectional vulcanizers handle casings from 5 to 8½ inches in size. A special patented feature of these molds

Miller Adjustable Vulcanizer

is a steam-jacketed sectional cavity having air-cooled flanges and adjustable bead molds or bead straps working up and down on the straight-side walls of the sectional cavity. In this manner several different sizes of tires are fitted into the same cavity without using reducing shells. The bead molds which fit into the same cavity are so designed and constructed that they will take in different styles of beads on different sizes of tires in the same cavity. Special bead molds are furnished to repair different styles, as regular clincher, Q. D. clincher or straight-side beads. The vulcanizers are steam-jacketed all around the cavity and are cast in one piece. This method of direct contact with hot walls insures a more even cure on the rubber. The bead molds are made to fit old tires by simply sliding up a little higher on the straight polished surface of the vulcanizer. They never pinch or wrinkle the fabric or damage the tire in any way. Quick detachable clincher tires are repaired with regular clincher bead molds.

The Miller sectional vulcanizers will repair inner tubes satisfactorily by clamping them on the straight surface in the cavity with two clamps which are furnished at an extra charge. The air-cooled flange is either attached or cast on. Boiler, steam-gage and pop-valve are furnished with all vulcanizers, two pairs of clincher and straight-side bead molds, base, and clamp. All sizes of one-cavity en bloc sectional vulcanizers are for steam line or with boiler and high stand for gasoline or gas burner.

ZWEBELL'S VULCANIZERS

The Zwebell S-8 vulcanizer is equipped with a split aluminum reducing shell which reduces the 8-inch mold to 7 inches, and then to 6 inches. One pair of straight-side bead molds are furnished with each outfit, also two spacers to be used when 7 and 8-inch tires are being cured. The S-8 combination sectional mold is furnished either without or with boiler. Factory tests show that this outfit will steam to 50 pounds in 50 minutes, but this will vary according to size of gas line and pressure of gas in different localities. The mold is drilled and tapped to be connected to a common steam line. Steam is admitted through one of the two ¾-inch openings in the side of the mold and condensed steam is returned to the boiler through the ¾-inch opening provided in the base of the pedestal. A 1¼-inch steam chamber evenly heats the mold. The length of curing surface of the 8-inch mold is about 32 inches, with 7-inch shell inserted the surface is about 30 inches, and with the 6-inch shell, about 28 inches. Instead of a pedestal, the mold is mounted on floor flanges if a generating plant is desired.

Zwebell's S-8 Vulcanizer

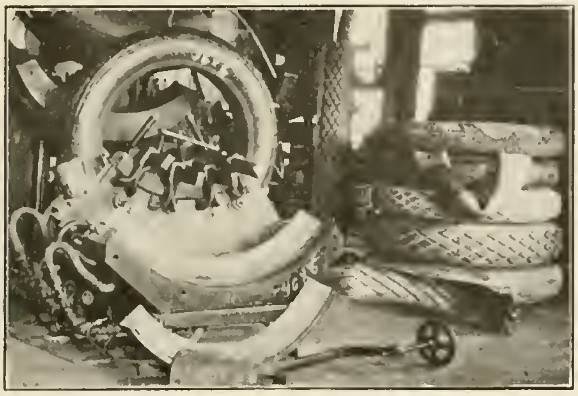
FREDD'S INTERCHANGEABLE MOLDS

Fredd's special all-size truck-tire mold is designed so that no matter how tire types change in the future, only two new tread plates need be gotten to bring that mold up to date. The mold is designed to handle repair work and retreading on all sizes of truck tires up to 48 by 12 inches.

Molds and parts are made interchangeable. Tread plates are furnished with the molds to cover every style of tire now on the market. A feature of this mold is the flat top bases on which the tread plates for either flat or round type tires are placed, and when retreading smooth, ribbed, or non-skid treads.

The base and tread plates are placed between the sides of the mold and held by bolts which pass through holes with metal around them. No gaskets are used. Steam hose connections are then made and the tire, with the air bag within it, is inserted be-

tween the sides. The bolts are then drawn up to the width that best fits the tire, then bead plates are placed in position, held by four bar clamps made with forked, hooked ends, wedge-shaped, having a tendency to slightly draw the top of the mold, yet not to tip when pressure screws are tightened. The 6-inch base takes 6 and 7-inch tire tread plates; the 8-inch base takes 8 and 9-inch plates and the 10-inch base takes the 10 and 12-inch plates.

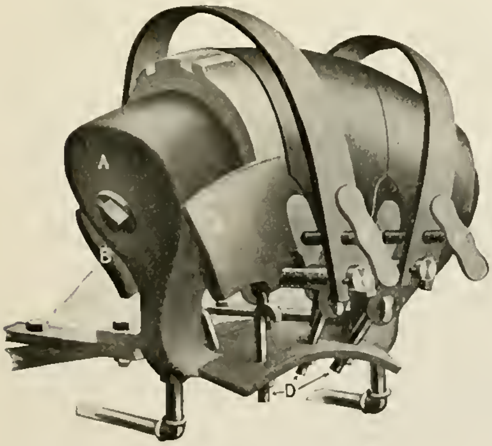


Fredd's All-Size Vulcanizer

This mold is one-quarter circle and can be used as a steam press when the base is entirely omitted. The base may be used as tube plates when not otherwise in service. Each part is drained and heated separately.

THE FISHER SECTIONAL VULCANIZER

The Fisher sectional vulcanizer has an inner steam core *A* over which the repaired section of the tire is placed. Pads are applied to fill the depressions of the non-skid design and two outer side-plates, *B*, *B*, are placed against the side walls and beads of the tire. Over these are placed three metal pressure bands or saddles *C*, *C*, *C*. The lower ends of these bands connect with six heavy bolts *D*, *D*, *D*, by which the bands can be drawn down and a strong pressure applied to the upper portion of the tire. Each band can be drawn down independently and any inequality in the thickness of the repair can be readily adjusted. After this operation, two specially designed screw clamps *E*, *E*, are placed in position and the side-plates *B*, *B*, are forced directly against the side-walls and beads of the tire by tightening the hand-screws *F*, *F*.



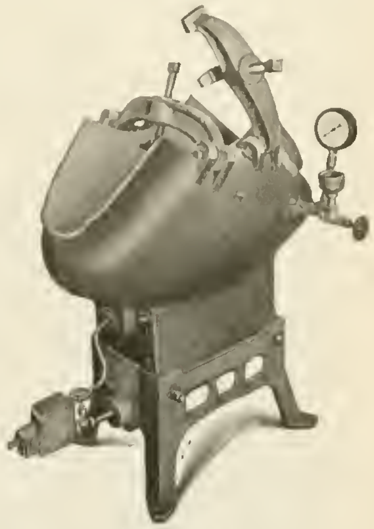
Fisher's Vulcanizer

It will be noted in the illustration that the side-plates and the ends of the side-pressure clamps are carried on two heavy rods extending through and rigidly connected to the lower part of the mold. These rods connect the ends of the clamps and prevent their spreading, twisting, or shifting their positions, which are common troubles where ordinary clamps are used.

The combined forces of the bands over the upper portion of the tire and the side-plates at the side-wall and beads provide a complete pressure of any desired degree to all parts of the section and extending to the extreme points of the beads.

THE DUNCAN VULCANIZERS

The Duncan truck-tire mold is similar in construction to the four-cavity sectional mold and cures pneumatic truck tires in the time usually required, without the use of steam-bags on the inside of the tire or an additional cure over an inside vulcanizer. At present there are but two sizes: one for 5 and 6-inch tires and another for 7 and 8-inch tires.



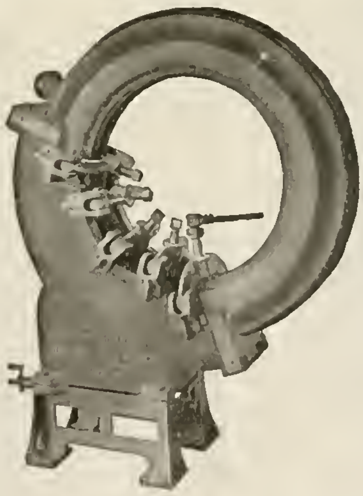
Duncan's Mold

Matrices or reducing shells are not used in these molds, but the cavity is self-adjusting in construction. The cavity walls are sloping instead of straight up and down, allowing the plates to adjust themselves automatically to the exact size and shape of the tire. Bead plates extend down to near the tread line and protect the old side rubber from the excessive heat and always effect a perfect cure of the bead. The molds are constructed of special compound ammonia semi-steel.

This vulcanizer is declared to embody certain technical principles that enable a tire to be perfectly cured through, including a cord shoe, in one and one-half to one and three-quarters hours, with 45 to 48 pounds of steam, without the necessity of additional heat application on the inside of the tire. An air-bag only is used. The molds may be operated with gas, gasoline or steam-line connections. Where gas or gasoline burners are used, the equipment includes the steam generator.

"DRI-KURE" EQUIPMENT

"Dri-Kure" sectional truck-tire molds are quarter-circle molds handling 6, 7, 8, 9 and 10-inch tires. They are equipped with inlet and outlet valves, clamps, wrenches, etc., as are all "Dri-Kure" single-cavity section molds. The steel clamping system makes this mold one of the strongest and most enduring. Both the molds and the bead plates are carefully and accurately machined and polished. The upright position of the molds decreases the usual time and energy expended on the putting in and taking out of heavy truck tires. Also the efficiency of steam-bags is increased as the condensation goes to the lower end and drains off. Wood end-blocks prevent mold marks at the ends of cures. Pipe legs with which these molds are equipped enable the user to change the height to suit his convenience or to suit a different installation. Bead plates are all made of electric steel. The plates are machined down to a knife edge, adding greatly to the appearance of the finished repair job as they leave no marks on the sides of the tires. Inside cure forms are made in two

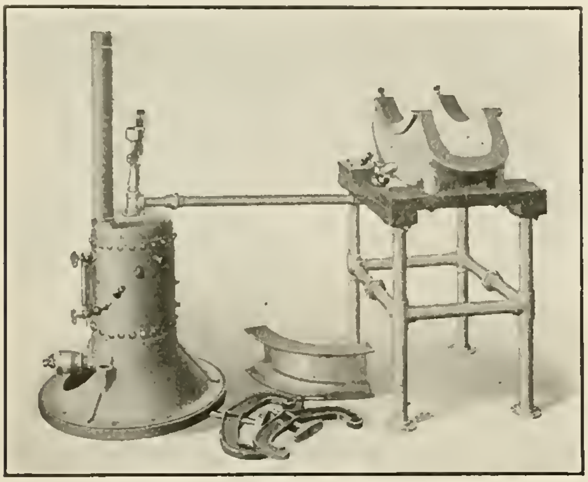


"Dri-Kure" Mold

sizes, namely: 3½ to 4-inch and 4½-inch up. These forms may be attached to section molds, retreaders or to a separate steam line.

THE HAYWOOD VULCANIZERS

Haywood giant truck-tire molds are made in 6, 7, 8, 9 and 10-inch sizes, with an absolutely smooth curing surface and ample steam space, and are supplied with clamps and bead plates. Either steam or air-bags may be used in making the cure. The molds are constructed with three separate steam chests so that it is possible to confine the heat to that portion of the tire being cured.

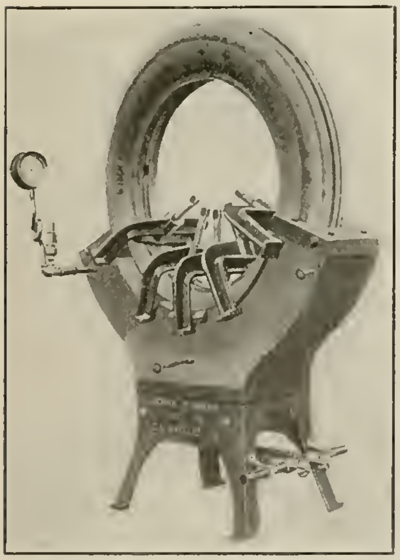


Haywood's Mold and Generator

These molds are made for flat or round tread and can be attached to any steam line or mounted on individual stands.

THE BROWN VULCANIZERS

The Brown pneumatic truck-tire sectional vulcanizer is made in two styles, one for the round tread and one for the flat tread, the round tread being made in 6, 7, 8 and 9-inch sizes, and the flat tread in 6, 7 and 8-inch sizes. These molds are particularly useful for curing retread bands where it is not desirable to use the old method of curing in steam kettles. One pair of bead molds is furnished with each mold. Each tread style and size is made in four types: complete with gas burners to generate its own steam; complete less burners, to be connected direct to steam; complete with gasoline burner to generate its own steam; or complete with kerosene burner to generate its own steam.



Brown's Vulcanizer

The round tread 6 and 7-inch sizes are full one-quarter circle, while the 8-inch is almost one-third circle, being 42 inches in longitudinal length at the bottom of the mold; the same is true of the 9-inch size. The 8-inch size is used for retreading or vulcanizing retread bands, as flanges are cast on the sides of the molds and heavy steel clamps can be furnished for this work. Retreading can be done in four cures. One pair of bead molds is furnished with each mold. The 9-inch mold has no flanges on the sides and is used for sectional and band curing. The flat tread molds are full one-quarter circle, and one pair of bead molds is furnished with each mold.

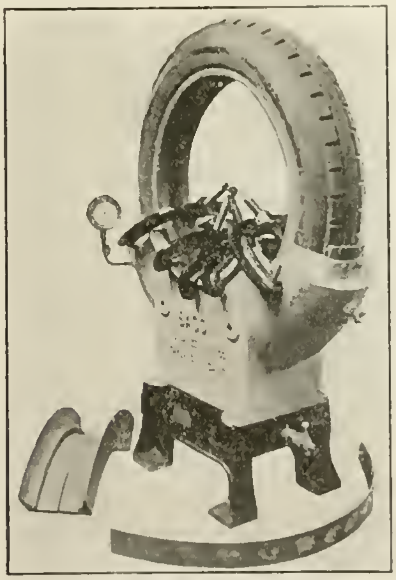
LOWELL VULCANIZER

The Lowell truck-tire equipment for vulcanizing pneumatic truck tires is in four full quarter-circle sectional molds. Models 26, 27 and 28 handle, respectively, 6, 7 and 8-inch tires of the flat tread type, while Model 21, equipped with reducing shells, handles sizes 6, 7 and 8-inch tires of the round tread type. This latter model also, with the use of negative pads, handles flat tread tires. Model 21 is equipped with two pairs of bead molds, inside curing core and core clamp in addition to the reducing shells. This model can be used as a self-contained unit, generating its steam by means of electricity, gas, gasoline or kerosene. It can also be attached to a separate steam supply. The other models are designed for attachment to a separate steam supply only. They are furnished with bead molds, two pressure blocks, air-valve and wrench.

Lowell Mold—Model 21

THE BACON VULCANIZERS

The "K" combination retread and sectional mold is for flat or round tread. Matrices in "Royal Cord," "All-Weather" or rib type treads can be furnished. Provision is made that the steam-bag employed in doing sectional work may be filled with steam from the mold. The 6 and 7-inch molds are equipped with an automatic gas regulator, radius rod, sand-bag, wrench, clamps, etc., as are the 8 and 9-inch molds. Where the cures lap, the tire is only semi-cured on the first heat, due to the arrangement of the cooling flange and matrix extension, and when the tire is turned for the next cure this portion is thoroughly cured. Bead molds are not included in the equipment of these molds. The sides of the central portion of the cavity are raised so that perfect results are obtained when using the mold for sectional work. The weight of the mold is 500 pounds.



Bacon's Combination Mold

Wobbly wheels, besides wearing bearings and otherwise racking the machine, have an equally destructive effect on tire treads. A slight wobble of only one degree actually drags the tire sideways 920 feet in each thousand miles. This rasping increases with the seriousness of the trouble. Such a condition is easily corrected and saves not only tires but the car from excessive strain.—*Miller News Service.*

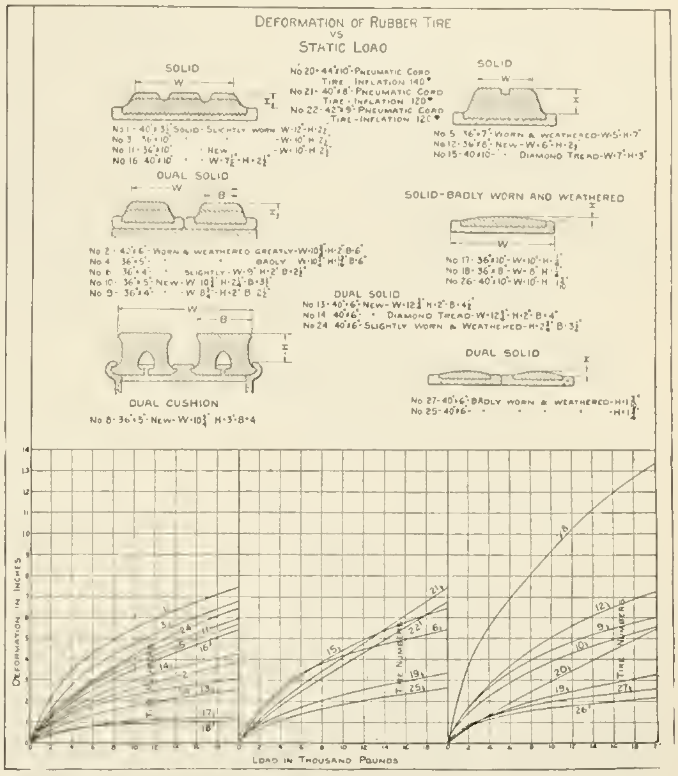
Truck Tires and Road Damage

THE relative effect of the various kinds of automobile truck tires used on highways under various conditions of stress is comprehensively shown in a recent report on motor truck impact tests.[1] The research work has covered a period of two years and has concerned itself primarily with better road design to meet the heavy traffic which the rapid extension of truckportation has occasioned since the war. Four factors have been dealt with by the Federal engineers, namely: impact, pressure or weight of the passing load, horizontal shear and tractive forces, and subgrade and soil conditions, the report on impact being the first available.

In dealing with impact, or the force with which a truck wheel strikes the road surface, it is explained that the injury to the road, and incidentally to the tire depends much upon the type, construction and condition of the tire. Impact will be less when the tire is new, full, and of good quality than when worn, flattened, or almost lacking in cushion. The true, so-called "cushion" tires have a decided advantage in reducing impact, and to such as have less than 40 to 50 per cent of the deflection of a pneumatic tire the writer would deny the name "cushion." Tire deflection is far more important in considering impact than width of tire or load per inch of tire width. Contrary to popular belief, a very wide but thin solid tire will give much higher impact forces than a narrow thick one.

Tire dimensions and deformations are shown in Fig. 1. For each tire a curve is drawn which gives the deflection or deformation under different loads.

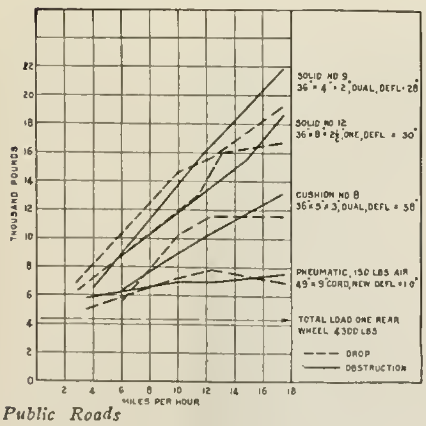
Fig. 2 shows a comparison of the effect of tire equipment upon the value of impact. A 2-ton truck carrying a 2-ton load was used. Four different tires were each tested using in each case the speed as the independent variable. The comparison is shown with both the drop and the obstruction test. In the obstruction test the impact value (the ordinate) shows a considerable change with only a slight change in the tire deflection. The impact value, with all conditions the same except the tire, is the greatest for the solid rubber tires and the smallest for the pneumatic tire, the cushion tire giving an intermediate value. At low speed the difference is not so great. At a speed of 17½ miles an hour the pneumatic tire gives an impact value of only 1.75 times the rear wheel pressure on the road surface, the cushion tire over three times, and the solids 4.3 to 5.1 times. In this particular case, the cushion tire gives an impact value of 63 per cent of the solid tire average, and the pneumatic only 36 per cent. The impact value for the pneumatic tire increases only slightly with the increase of speed.



Public Roads

FIG. 1. STATIC LOAD VS. DEFORMATION OF RUBBER TIRES

COMPARISON OF TIRES



Public Roads

FIG. 2. TRUCK, 2-TON A—LOAD, 2 TONS

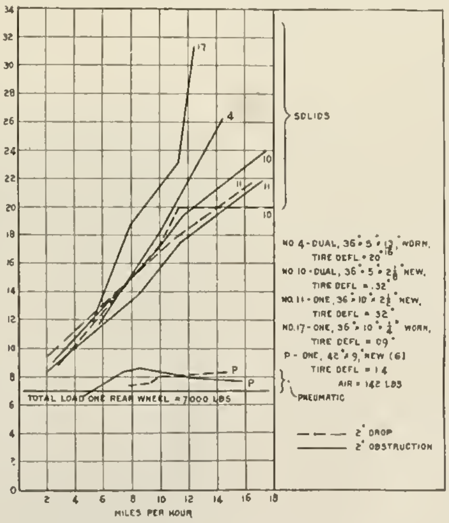


FIG. 3. TRUCK, 3½-TON P—LOAD, 4½ TONS

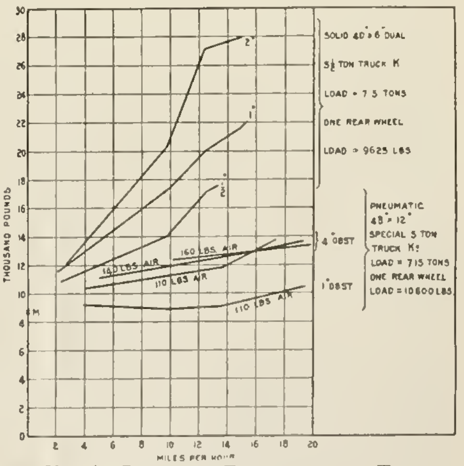
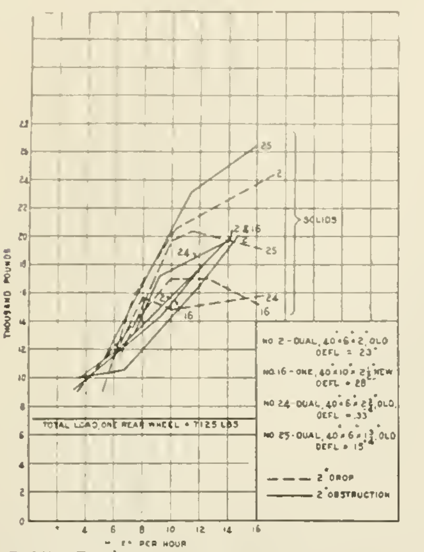


FIG. 4. SOLID AND PNEUMATIC ON TWO SIMILAR TRUCKS

Fig. 3 shows a comparison of the effect of tire equipment. The truck was of 3½-ton capacity, loaded with 4½ tons, the unsprung weight being equal to 1,300 pounds. The total load at one rear wheel was 7,000 pounds. Here, it should be noticed that with pneumatic tire equipment the impact force was only

[1] "The Motor Truck Impact Tests of the Bureau of Public Roads," by Earl B. Smith, Bureau of Public Roads, in Public Roads, Vol. 3, No. 35, United States Department of Agriculture.

15 per cent greater than the actual wheel load. The four different solid tires which were used show very clearly the effect of the condition of the tire. Tire No. 17 gave some very high impact values even at 12 miles per hour. This tire was badly worn, having a thickness of only one-fourth inch above the rim. The other solid tires gave impact values somewhat in proportion to their deflection or condition. The results shown by tires Nos. 10 and 11 indicate the usual impact values that may be expected with good solid tire equipment, while the results shown by tires Nos. 4 and 17 show the increase or extreme values that may be expected from the same truck when the tires are in a badly worn condition.



Public Roads

Fig. 5. Comparison of Tires—5-Ton Truck K—Load, 5 Tons

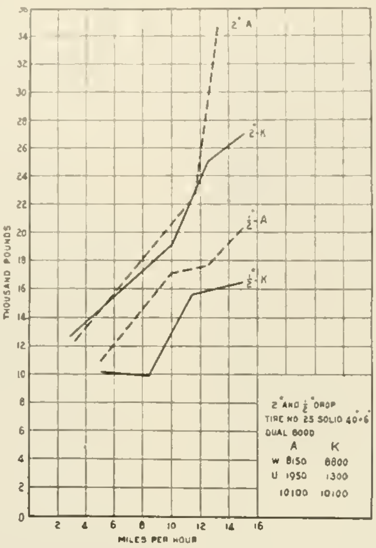


Fig. 6. Comparison of Trucks vs. Speed—Two 5½-Ton Trucks

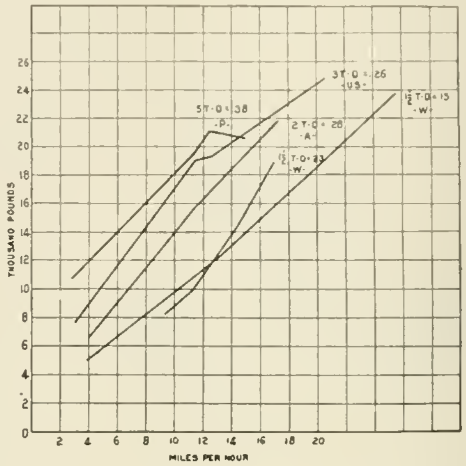


Fig. 7. Comparison of Trucks—Tire Deflections—All 2-Inch Obstructions

Fig. 4 is a comparison between the effects of solid and pneumatic tires. The truck was 5½-ton capacity loaded with 7½ tons. This graph shows the very great cushioning effect of pneumatic tires in comparison with solid tires. In this case a 4-inch obstruction was used during the test with the pneumatic tires, and the effect was much less than when using a solid tire on ½-inch, or 1-inch, or 2-inch obstruction. The effect of the air pressure in the pneumatic tires upon the value of the impact force is also shown.

Fig. 5 shows a comparison of tires; that in general the magnitude of the impact force is dependent upon the condition and deflection of the tire. It shows graphically the wide variation in impact values that may be expected from the same truck equipped with tires of different conditions.

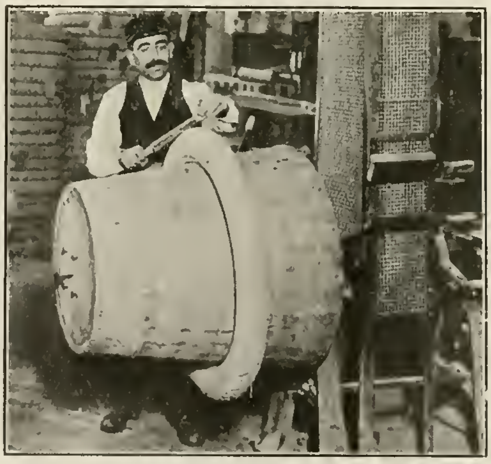
Fig. 6 shows a comparison between trucks. Two 5½-ton trucks were each loaded so that the total rear wheel load was the same in each case. Truck A had an unsprung weight of 1,950 pounds and truck K had an unsprung weight of 1,300 pounds. Both trucks were equipped with the same set of tires. This comparison shows the effect of unsprung weight upon the impact value. It is very clear that the truck having the lighter unsprung weight produced the smaller impact values under the conditions of this test.

Fig. 7. This graph shows the possible impact values which may be obtained by using trucks of different capacities. It is clear that the light truck, W, if run at a sufficient speed, may give impact values as high as a heavy truck, when run at the ordinary truck speeds of 8 to 10 miles an hour. These impact values were all obtained from a 2-inch obstruction. This graph shows that it cannot be said that a heavy truck always gives the highest impact values, without stating several qualifying conditions, especially the condition of speed and of tire equipment. This statement refers to impacts only. It should be noted in particular that a light truck running at high speed will produce large impacts only occasionally and never very heavy load pressures; while a heavy truck will produce in addition to impacts a continuous heavy pressure on the road surface.

As might be expected, the pneumatic tire is given the front rank. Its maximum impact value is about 1¾ times the static load at one rear wheel, with an average value of not more than 25 per cent. For a solid tire passing over a 1-inch obstruction at 16 miles an hour the impact value may be as high as seven times the load at one rear wheel and the average value about 4 times the static load. Truck speed has an important influence on the degree of impact force, the impact increasing with the speed in the following approximate ratio: Solid tires, 10 to 100 per cent; cushion tires, 10 to 75 per cent; and pneumatic tires, 0 to 10 per cent.

A SIMPLE BUFFING CONE

How the finishing touches are put to a tire made by the unit molded system is shown in the accompanying illustration, and simple as the process is, it is very effective.



Tire Finishing Drum

The essential apparatus is a truncated cone, shaped not unlike an exaggerated butter-tub, mounted on a short, projecting shaft. On this tapering form the workman places a casing of any size, and while it is being revolved quickly and neatly, removes with a rasp, the overflow left on the casing at the center of the tread by the twin tire mold.

Meeting of the Rubber Division of the American Chemical Society

The sixty-first meeting of the American Chemical Society was held in Rochester, N. Y., April 25 to 29. Two days were devoted to sessions for consideration of the programs of the various divisions. Those of the Rubber Division drew an average attendance of about sixty rubber chemists. Much interest was shown in the papers, discussions and in the exhibition, under the microscope, of rubber compounded with various ingredients.

The following is a brief record of the proceedings, with abstracts of the papers presented:

METHODS FOR THE ANALYSIS OF VULCANIZED RUBBER

The methods of analysis recommended by the Joint Rubber Insulations Committee were discussed in detail, and various changes of procedure suggested. Elaboration and test of these methods was referred to a committee, as follows: W. W. Evans, The B. F. Goodrich Co., chairman; F. J. Dugan, The Goodyear Tire & Rubber Co.; S. Collier, Bureau of Standards; A. H. Smith, Thermoid Rubber Co.; W. B. Wiegand, Ames Holden McCready Limited; Professor H. S. Simmons, Municipal University of Akron.

THE DIRECT DETERMINATION OF THE SULPHUR OF VULCANIZATION[1]

By S. Collier and Michael Levin

The sulphur actually combined with the rubber is determined by dissolving the rubber and polyprene sulphide in cymene. The solution is diluted with petroleum ether and filtered after the fillers have settled out. The filtrate containing the polyprene sulphide is evaporated to dryness by heating on the steam bath and by means of a gentle current of air. The residue is dissolved in nitric acid and the solution evaporated to dryness. Three cc. of nitric acid are added to the residue and then five gm. of sodium carbonate. The mixture is fused and the amount of sulphur determined.

THE ANALYSIS OF RUBBER GOODS CONTAINING ANTIMONY PIGMENTS[1]

By S. Collier and Michael Levin

The amounts of rubber and antimony are determined on the same sample. A sample previously extracted with acetone is dissolved by heating in cymene. The solution is diluted with petroleum ether and filtered through a Gooch crucible after the fillers have settled out. The antimony sulphide is dissolved out with hydrochloric acid, precipitated with hydrogen sulphide, and determined volumetrically by titration with standardized potassium permanganate. A correction for insoluble organic matter is made by drying, weighing and igniting the crucible. The sulphur fillers are determined on a separate sample, which has been filtered from the cymene-petroleum ether solution and washed with solvent.

THE SOLUBILITY OF GASES IN RUBBER AS AFFECTING THEIR PERMEABILITY[2]

By Charles S. Venable and Tyler Fuwa

An experimental study was made of the various factors influencing the solubility of a gas in rubber. It was found that when rubber absorbs the gas, this gas is held in true solution and not by absorption. In the case of carbon dioxide, which has about an average solubility, the amount of gas thus held in true solution by the rubber is directly proportional to the pressure, and decreases with increasing temperature. This solubility is unaffected by degree of vulcanization or by the presence of compounding ingredients. Evidence was presented to show that the other gases behave in a similar manner.

Relative solubility values obtained for various gases in rubber show that there is a general relationship between the solubility and density of the gas and its rate of penetration through rubber. These results, in general, confirm the original hypothesis of Graham that the penetration mechanism consists in the solution of the gas at one surface of the rubber and the diffusion of the undissolved gas through the rubber and its evaporation at the other surface. The indications are, however, that the actual size of the gas molecule is also an appreciable factor. A striking relationship between the solubility of various gases in rubber and in water has been noted.

THE INFLUENCE OF PIPERIDINE-PIPERIDYL-DITHIOCARBAMATE ON VULCANIZATION[2]

By G. Stafford Whitby and O. J. Walker

Tested in a 90:10 rubber-sulphur mix, one per cent of the base mentioned is found to reduce the time of cure by seven-eighths, and even at 130 degrees C., to lead to curing in about one-third of the time required at 141 degrees C. in its absence. At the optimum cure, rubber containing the base showed (a) a noticeably lower sulphur coefficient, (b) a very considerably higher breaking stress, (c) a noticeably smaller elongation, and (d) a lower position of the stress-strain curve (strains as ordinates) than did rubber from which the base was absent. On aging for seven months, vulcanizates prepared with the base behaved in a manner essentially similar to that shown by vulcanizates prepared without it; the stress-strain curves coming down the paper to a similar extent and the breaking points altering in a similar way.

CONTRIBUTION TO THE KNOWLEDGE OF THE RESINS OF HEVEA RUBBER[2]

By G. Stafford Whitby and J. Dolid

A number of crystalline substances, as follows, have been isolated from the acetone extract of plantation Hevea rubber. At least two of these are sterols. The less soluble of the two constitutes roughly 5 per cent of the extract. It decomposes without melting, and forms an optically active acetate crystallizing in leaflets and melting at 169 degrees C. With this sterol, another substance, not yet isolated in a state of purity, was associated. The more soluble of the two sterols consisted of matted, flexible leaflets, melting at 127 degrees C., and showing $(\alpha)_4$ — 25 degrees C.[3] In addition, a substance, optically inactive, melting at 62 degrees C., and also constituting roughly 5 per cent of the extract, was obtained. Quebrachitol was isolated from the extract, and was found to occur generally in sheet and crêpe. Further: the results of a quantitative study of the oxidation of caoutchouc under the catalytic influence of copper are reported.

RELATIVE THERMAL CONDUCTIVITIES OF SOME RUBBER COMPOUNDS[2]

By A. A. Somerville

A series of thin sheets of rubber with thermocouple junctions between were placed on a steam chest kept at 100 degrees C. On top of this pile a vessel containing melting ice maintained a temperature of 0 degrees C. By comparing the time necessary for the center thermocouple to reach maximum temperature for various stocks a measure of their relative heat conductivity was obtained. The conductivities of stocks containing 3 and 10 per cent sulphur on the rubber and 10 per cent sulphur with 2 per cent accelerator were found the same. This value was taken as

[1]Published by permission of the Director of the Bureau of Standards, Washington, D. C.

[2]Abstract of paper delivered before the Rubber Section of the American Chemical Society in Rochester, N. Y., April 27, 1921.

[3]Meaning that the angle of rotation of the plane of polarized light was 25 degrees counter-clockwise.

unity. The following table contains the values obtained with 10 per cent sulphur, 2 per cent accelerator and 150 per cent zinc oxide or its equivalent volume of other filler based on 100 parts of rubber:

Base stock	1.00
Zinc oxide (150 per cent)	1.65
Glue	.87
Asbestine	.91
Lampblack	1.02
Gas black	1.14
Crimson antimony	1.15
Whiting	1.23
Lithopone	1.33
Magnesium carbonate	1.45
Soapstone	1.45
Clay	1.67
Litharge	1.78
Red oxide	1.86
Fossil flour	1.90
Barytes (ground)	2.28
Barytes (precipitated barium dust)	2.65
Frictioned fabric	1.07

The state of cure of the various stocks was found to have no effect on the conductivity.

REACTIONS OF ACCELERATORS DURING VULCANIZATION—III CARBO-SULPHYDRYL ACCELERATORS AND THE ACTION OF ZINC OXIDE[2]

By C. W. Bedford and L. B. Sebrell

Reactions of accelerators producing mercapto groups by action of sulphur are discussed. Thiocarbanilide with aniline in benzol solution will dissolve zinc oxide and will vulcanize a zinc oxide cement at room temperature. Other zinc salts of mercaptans, such as zinc thiophenol and zinc-ethyl-xanthate, will vulcanize pure gum cements containing sulphur at room temperature. These accelerators are free from nitrogen or alkali and also function in press or steam cures. Without zinc oxide no accelerator has been found which will vulcanize at room temperature. Zinc salts of carbo-sulphydryl accelerators furnish the key to the paper.

RAPID BOMB METHOD FOR DETERMINING SULPHUR IN RUBBER COMPOUNDS

By W. W. Evans and Ruth Merling

A new method for determining sulphur in rubber compounds. The sample consists of 0.2-gm. of rubber suitably packed in sodium peroxide with a little sugar and potassium chlorate on top. Ignition is secured in a Parr calorimeter. The total time for running a determination was placed at three hours. Results follow:

Sulphur Incorporated	Nitric Acid-Bromine Method	Bomb Method
....	2.23	2.39
....	2.75	2.98
3.50	3.55	3.73
6.35	6.41	6.36

The method works with high amounts of sulphur, as in an antimony tube or hard rubber analysis. A blank should be run, as chemically pure sodium peroxide sometimes contains sodium sulphate.

VOLUME INCREASE OF COMPOUNDED RUBBER UNDER STRAIN

By Henry Green

At the Philadelphia meeting a year and a half ago, H. F. Schippel pointed out that compounded rubber increases in volume when strained. He demonstrated this fact by indirect methods. The present author has been able to observe and photograph, by means of the microscope, the actual changes which take place. Working with rather coarse barytes, he obtained cavities at either end of the barytes crystals. He noted that some particles developed cavities when the piece containing them was stretched, but some did not. In seeking an explanation of this, he advanced the theory that many of the particles were surrounded with an adsorbed film of air. In such cases the rubber did not adhere to the crystal. In other cases, when this film was absent, there was adhesion between the rubber and crystals and no cavities were obtained. Referring to zinc oxide, Mr. Green stated that in a stock containing 100 volumes of zinc oxide to 100 volumes of rubber, no agglomerates were discernible under the microscope.

ROUND TABLE DISCUSSION

FACTORY CONTROL OF VULCANIZATION

A simple form of apparatus for comparison of thermometers used on vulcanizers and curing presses was described by Arnold H. Smith. It consists of a wrought-iron pipe three or four inches in diameter and about three feet long with capped ends, arranged for steam inlet and drainage. A number of openings are provided on the top and one side of the pipe for receiving the thermometers to be compared with the correct or standard instrument reserved for reference. This device is practically the same as one illustrated and described in THE INDIA RUBBER WORLD, June 1, 1904.

In the discussion it was noted that to render the tests reliable a pet-cock should be provided at each thermometer connection to insure venting trapped air and provide circulation of steam around the thermometer bulb.

TESTING CRUDE RUBBER AS RECEIVED AT THE FACTORY

Sampling a lot of crude rubber for test is either a matter of selecting from each bale and averaging, or selecting portions from the broken down averaged lot and averaging again for test purposes.

The view was advanced that test of the curing quality of crude rubber should be: (1) by compounding with zinc oxide, sulphur and an organic accelerator, or, (2) by compounding with litharge and sulphur. Dr. G. S. Whitby suggested that stress-strain curves will be found very illuminating in connection with judging the curing value of crude rubbers.

REACTIONS BETWEEN SULPHUR AND VARIOUS SOFTENERS

This topic did not elicit much comment, except that the function of softeners in compounding was principally to augment plastic flow in the mixing. Dr. Bingham, of Lehigh University, Easton, Pennsylvania, and Henry Green of The New Jersey Zinc Co., have published researches on the subject of plastic flow.

PHYSICAL TESTING COMMITTEE

A new physical testing committee was appointed as follows: C. Olin North, chairman; W. J. Wiegand, S. Collier, E. H. Grafton, and H. E. Simmons. This committee was instructed to consider the standardization of methods of plotting stress-strain curves and other data, standardization of experimental mixings, and testing of various rubbers and other materials. An investigation of new methods of physical testing was advocated for better judging degrees of vulcanization for the probable life of rubber compounds.

SHOE BILL PROHIBITS LEATHER SUBSTITUTES UNLESS LABELED

The Caulfield bill recently referred to the Committee on General Laws of the State of New York amends the general business law regulating the sale of boots and shoes, and adds the following new sections, to take effect September 1, 1922:

> UNLAWFUL SALE: No person, association or corporation, within this state, shall sell, offer or expose for sale any boot or shoe with a counter, sole, insole, middle sole or slip sole made in whole or in part of leatherboard, strawboard, leatheroid, fibreboard, horn fibre, pate or any other substitute for leather whatsoever, without printing upon a tag securely affixed to each boot or shoe, in plain sight and in the English language, stating what substitute for leather, if any, has been used, designating each part of such boot or shoe where such substitute has been used. And if no substitute for leather has been used, the tag shall bear a statement to that effect. The removal of such tag upon a sale, exposure or offer of sale of any boots or shoes by any person other than by the purchaser shall be deemed a violation of this article.
>
> EXCEPTIONS: This article shall not be construed to apply to the use of a rubber heel on any boot or shoe, or eyelets, or straps used to assist in pulling on the boot or shoe.

What the Rubber Chemists Are Doing

SPONTANEOUS COAGULATION[1]

Spontaneous coagulation in the air gives a slimy ,yellow to brown surface layer, which, during crêping, causes a loss in rubber and makes the crêpe streaky and somewhat discolored. The coagulation is sometimes incomplete and the serum milky. Coagulation with sugar, and spontaneous coagulation in the absence of air have been proved by many investigators.

1. Comparative experiments in which the portions of undiluted latex were weighed and the rubber collected showed close average percentages of air-dried crêpe when coagulated by various means, that is: by acetic acid; spontaneously in air; the same in absence of air; and by sugar in air.

These rubbers showed tensile strength and slope practically the same. The spontaneously coagulated rubber cures somewhat faster and shows a somewhat higher viscosity. The samples coagulated in the air had two days to mature as against one day for the others, cured much faster and showed a higher viscosity and somewhat smaller slope.

2. Spontaneous coagulation proceeds well in latex from trees that have had a period of rest and therefore give a latex of high rubber content, and a slow-curing rubber. The properties of the rubber lie in the above-mentioned direction, but the rate of cure, when crêping after 24 hours, increases much more than in normal latex, so that the abnormally slow rate of cure of ordinary crêpe disappears to some extent.

3. From a series of experiments on heavily tapped trees under varying conditions it is clear that heavy tapping causes the substances (sugars?) that are responsible for the progress of spontaneous coagulation to decrease, so that coagulation is less easy and complete. The substances, however, that have an influence on rate of cure (natural accelerators in the latex, decomposition products formed by maturation) are not so affected by heavy tapping that this can be detected in the properties of the spontaneously coagulated rubber, which are the same for light or heavy tapping.

4. Experiments on an estate with spontaneous coagulation in the absence of air showed that coagulation proceeds well in undiluted and 15 per cent latex, but the crêpe was somewhat dull and the color not so light as the market demands.

[1]By De Vries and Spoon. Archief voor de Rubbercultuur, July, 1920. Communication of the Central Rubber Station.

ON THE DRYNESS OF PLANTATION RUBBER[1]

There are irregularities in raw rubber which make their appearance in the masticating and mixing operations of the rubber manufacturer. It is obvious that a soft resinous rubber such as an African grade will break down easily in the mill and requires but little power to reduce it to a suitable consistency for the incorporation of the mineral ingredients. A tougher and higher grade of rubber will naturally require more power for this purpose. Plantation rubber, as a class, takes more power than wild rubber, even the best wild rubber such as fine hard Pará. Manufacturers complain of irregularity in plantation rubber in this respect, and assert that some of it is excessively "dry," that is, it cannot be made sufficiently plastic to take up the minerals except as a result of a very prolonged treatment. The resulting compound is also affected, being unusually hard and tough.

Thus far the author has not succeeded in devising a really satisfactory test by which the dryness of rubber can be measured. An interesting series of experiments was carried out on five specimens of plantation crêpe variously prepared and including one of unknown origin which was found to be particularly difficult to break down on full-sized mills in the factory. Each sample was masticated to the same state of plasticity. After three months, solutions were prepared in xylol and the viscosity of a 0.25 per cent solution determined and compared with the viscosity of the rubber before mastication.

From the results obtained it appears that a rough grading of raw rubbers as to plasticity may be obtained by an experienced operator by masticating small quantities on an experimental mill, also that the viscosity of the raw rubber is an indication of plasticity, but it must not be assumed that in all cases high viscosity is necessarily accompanied by low plasticity. In the past there has been a tendency to associate high viscosity with "nerve" or high quality, but it has been found that the relationship between viscosity and the properties after vulcanization is more complicated and less concordant than was at first supposed.

It is, however, asserted that viscosity tests, if combined with vulcanization tests, give valuable indications as to the quality or "nerve" of the rubber. From the foregoing experiments it would appear, however, that high viscosity is not of itself a desirable property, as it appears to be accompanied by low plasticity and the most desirable type of rubber from the manufacturer's point of view would appear, therefore, to be one giving a low viscosity but high figures after vulcanization.

We are ignorant of the cause of "dryness" in plantation rubber. The acetone extract, resin content, does not vary sufficiently to explain the difference between the samples. It is possible that the nature and proportion of the coagulant may have an influence. Certain batches of sulphuric-acid-coagulated rubber were found to work "dry," and were difficult to break down, but we failed to show that sulphuric-acid-coagulated rubber always works dry. In any case, for other reasons sulphuric acid should not be used for coagulation. Another possible cause of dryness is insufficient washing on the mill. Crêpe which is lightly rolled and full of holes is said to be difficult to break down. Occasionally rubber is not used for a year or more after arrival. Such rubber freezes in the winter. When thawed it is still harder and tougher than before, and requires more power to break down than if it had been used fresh. Freezing and careful thawing of rubber considerably increases the tensile strength in the unvulcanized condition, and, therefore, probably affects the plasticity.

[1]By Henry P. Stevens, Bulletin of the Rubber Growers' Association, January, 1921, page 43.

THE CAOUTCHOUC MOLECULE[1]

Harries in his work on caoutchouc[2] regards the caoutchouc molecule as a polymerized assemblage of units consisting of the basal hydrocarbon $C_{25}H_{40}$, of such a nature that depolymerization may occur with great ease. Presumably, as when his earlier formula was enunciated, he considers the polymerization as due to auxiliary valences of the nature of Thiele's partial valences.

In one respect Harries' newer formulation of the caoutchouc molecule approaches Pickles' formulation. The 20-carbon ring which he adopts is identical with the ring proposed by Pickles, if the number of isoprene units included in the latter is limited to five. Pickles, however, regarded the ring as including at least eight such units. The essential difference between the two views remains. The former regards the caoutchouc molecule as consisting of a number of 20-carbon rings polymerized; the latter as consisting of a single larger ring.

The chief considerations which Harries urges against the view that the molecule consists of a single large ring are: (1) the readiness with which caoutchouc depolymerizes; (2) the oc-

[1]Dr. G. Stafford Whitby. The India-Rubber Journal, February 12, 1921, page 313.
[2]Untersuchungen Ueber die Natürlichen und Künstlichen Kautschukarten, Berlin, J. Springer, 1919, 258 pp.

currence of several forms of caoutchouc, representing, he supposes, different degrees of polymerization; (3) the behavior of caoutchouc in some respects as a saturated hydrocarbon, namely, its failure to become reduced by hydrogen in the presence of platinum black or palladium.

POLYMERIZATION

Mention may be made of a recent very interesting paper on the general subject of polymerization in which Professor Staudinger[3] strongly urges the view that polymerization processes should and can be regarded as involving only normal valences, and that auxiliary or partial valences should not be called in to explain polymerization. In accord with this view, he favors the closed-chain formula for caoutchouc proposed by Pickles. He also interprets on the basis of a similar closed-chain formula the results of Steimmig who obtained as scission products of samples of caoutchouc prepared by the polymerization of isoprene with sodium, not only laevulinic acid, but also acetonylacetone and succinic acid.

VULCANIZATION

Among Harries' most recent work on rubber are some observations on the nature of the vulcanization process. Harries distinguishes between primary vulcanization and aftervulcanization. In primary vulcanization sulphur becomes adsorbed, but not chemically combined. The essential change is in the condition of the caoutchouc from a metastabile form, soluble in organic solvents, to a stabile form insoluble in such solvents. The stabile caoutchouc, as obtained after the exhaustive extraction of sulphur from the primary vulcanized material, he found to be unvulcanizable. No chemical difference between the two forms could be ascertained by an examination of the ozonides.

In addition to an account of his work on natural caoutchouc, Harries' recently published volume gives an interesting review of his work on synthetic caoutchouc derived, by a variety of polymerization methods, from butadiene, isoprene, piperylene and dimethylbutadiene.

[3]Berichte, 1920, page 1073.

VARIATION IN FINE HARD PARAS AND PLANTATION RUBBER[1]

From the earliest plantation days fine hard Pará rubber has served as a standard by which plantation rubber has been judged. It is now generally agreed that much first latex plantation rubber is on an average quite equal to fine hard Pará but shows greater variation in rate of cure. It is generally assumed that the latter shows no appreciable variation in this respect and various theories have been put forward to explain the difference between it and plantation grades. But few comparative tests between different samples of these rubbers, have been made. It seems, therefore, that adequate experimental proof of the superior uniformity of fine hard Pará in rate of cure does not exist.

The results of his own work and that of others is summarized by Stevens in the following table, remarking that the variations calculated on the basis of the average deviation from the average allows an approximate comparison in spite of the difference in the number of samples.

	Average deviation from the average; per cent of time of cure
Eaton and his collaborators on 26 samples (probably each a mixture from different balls of fine hard Pará)	6.1
Stevens on 5 samples from different balls of fine hard Pará	9.5
Stevens on 23 samples of crêpe prepared for testing on different occasions under uniform conditions	4.8
De Vries and Spoon on—	
193 samples of smoked sheet	10.5
131 samples of first latex crêpe	5.1

Assuming that the conclusions arrived at are correct, namely, that fine hard Pará rubber shows much the same variation in rate of cure as probably smoked sheet, we are faced with the difficulty of explaining the manufacturer's preference for fine hard Pará and his complaints as to the variability of plantation rubber. It should be noted that plantation rubber is not all first latex and quite a considerable proportion originates from native holdings. This fact is sufficient explanation of the variation in plantation rubber apart from other contributory causes.

[1]By Dr. H. P. Stevens. Bulletin of the Rubber Growers' Association, September, 1920, page 347.

EFFECT OF ACIDS IN RETARDING THE RATE OF CURE[1]

In general as regards rate of cure, the effect of treatment with hydrochloric acid is intermediate between that of sulphuric acid and that of acetic acid. Hydrochloric acid, like sulphuric acid, reduces the rate of cure, although to a lesser extent, and the rate of cure is restored more completely by soaking in water than in the case of sulphuric acid. The amount of hydrochloric acid retained by the rubber is very small and similar in quantity to the amount of acetic acid retained under similar circumstances, and much smaller than the amount of sulphuric acid retained. This is in accordance with the volatility of hydrochloric acid, and a large part appears to be lost by evaporation when the crêpe rubber is hung to air dry. The relative action of acetic, hydrochloric and sulphuric acids on rate of cure therefore is not proportional to the amounts of these acids retained by the rubber. Hydrochloric acid has probably a greater retarding effect than sulphuric acid, having regard to the very small amount retained.

From this point of view, hydrochloric acid is very unsuitable for latex coagulation. It is also unsuitable because rubber so coagulated frequently becomes soft and tacky on keeping. This does not happen with sulphuric acid, and it is evident that hydrochloric acid has a degrading or oxidizing effect on raw rubber, and it should never be used for coagulating latex under any circumstances.

[1]By Henry P. Stevens. Bulletin of the Rubber Growers' Association, November, 1920, page 435.

SYNTHETIC RUBBER

In the *Allgemeine Automobil-Zeitung* Dr. Albert Neuburger sketches the historical development of synthetic rubber in Germany, referring to its usefulness during the war, and advances the opinion that under economic conditions which prevail in Germany, synthetic rubber may be perfected to actually compete seriously with the natural product. It is planned to develop the German coal industry intensively, and by distilling the coal at the mines, conserve all its by-products. These supplies of acetone and benzol will give the necessary source materials.

The important consideration is the possibility of developing synthetic rubber with essentially the same technical characteristics as the natural product. Germany, since the war, naturally retains greater interest in the future prospects of synthetic rubber than any other country. Dr. Neuburger, in fact, suggests that it is possible that Germany in time may not need to import natural rubber.

CHEMICAL PATENTS

THE UNITED STATES

Process of Treating Vulcanized Rubber, consisting of reducing it to a finely divided state under conditions of exclusion of oxygen, adding a small quantity of new, unvulcanized rubber in solution, sufficient merely to film the particles of old rubber, expelling the solvent, and forming and vulcanizing in the usual manner.—Joseph Porzel, Buffalo, New York, assignor, by mesne assignments, to Superior Rubber Co., Pittsburgh, Pennsylvania. United States patent No. 1,374,231.

Adhesive Cement and Process of Manufacture. A cement consisting of rubber, and water as solvent for the dextrin.—Thomas Edwards, Milton, Massachusetts. United States patent No. 1,374,992.

Vulcanized Oil Product Process. Depolymerizing a vulcanized oil product in the presence of gaseous hydrochloric acid.—

Walter O. Snelling, Allentown, Pennsylvania. United States patents No. 1,376,172 and No. 1,376,173.

Vulcanized Oil Product. A liquid vulcanized oil product capable of being transformed into a solid factice-like material on contact with water.—Walter O. Snelling, Allentown, Pennsylvania. United States patent No. 1,376,174.

THE UNITED KINGDOM

Accelerators for Vulcanizing Rubber. Furfuramide and other nitrogen derivatives of furfuryl are used as accelerators. Several furfuryl derivatives are mentioned, in particular the condensation products of pyromucic aldehyde with ammonia or amines.—British patent No. 157,050. (Not yet accepted.)

Insulating Compositions. Cellulose derivatives, particularly esters, such as nitro-cellulose, acetyl cellulose, and viscose, and ethers are mixed with non-hygroscopic, liquid or plastic insulating substances such as waxes, oils, fats, resins, gutta percha, etc., with or without bitumen and filling ingredients. Castor oil, either treated with hydrogen or not, is stated to be a suitable insulating ingredient.—Siemens-Schuckertwerke, Siemensstadt, near Berlin, Germany. British patent No. 157,120. (Not yet accepted.)

India Rubber Composition for soles and heels, packing for steam and water joints consists of rubber 50 parts; sulphur 10 parts; disintegrated waste fabrics coated with non-vulcanized rubber 39 parts; and an accelerator such as para-nitroso-dimethylaniline one part. This mixture is calendered and vulcanized under pressure for one hour at 149 degrees C.—India-Rubber, Gutta Percha & Telegraph Works Co., Limited, 31 rue de la Boetie, Paris. British patent No. 157,821. (Not yet accepted.)

Rubber Substitutes made by heating sulphur and any animal or vegetable fixed oil, in a closed vessel until the reaction is completed. The mixture is also agitated, and zinc oxide, litharge, magnesia, or other catalyst or accelerator is employed.—Western Rubber Co., Washington, assignee of H. H. Hazeltine and M. Gregory, Tacoma, Washington, U. S. A. British patent No. 157,836. (Not yet accepted.)

Coagulating Latex. Latex is sprayed in a current of a drying medium which may be heated to 200 degrees F., to obtain a product containing all the solid constituents of the latex. Premature coagulation is prevented by the addition of ammonia or the like. Vulcanizing agents as sulphur, nitro-compounds, sulphur compounds, and fillers, namely, carbon black, zinc oxide, etc., may be added to the latex or may be introduced into the spraying chamber with the latex. When additions are made to the latex, the preservative added is preferably saponin, glycerine or glue in the proportion of about 0.1 per cent. The mixing thus obtained is more homogeneous, does not require drying, mastication is rendered unnecessary, and after vulcanization by the usual methods, a product of greater tensile strength is obtained.—E. Hopkinson, 1790 Broadway, New York, U. S. A. British patent No. 157,975. (Not yet accepted.)

Coating for Balloon Fabrics consisting of Turkish birdlime dried at 180 degrees F. and coated with shellac, varnish or rubber solution. Mercuric chloride is added to the birdlime as a preservative.—C. A. Cleghorn, Brackenside, Woburn Sands, Bedfordshire. British patent No. 158,366.

Devulcanizing. Finely divided rubber is impregnated with cold solution of alkali, and heated in a closed vessel to about 338 degrees F. The product may be further treated with hydrochloric acid and washed.—J. Smith, 12 Terregles Avenue, Pollokshields, Glasgow. British patent No. 158,783.

Non-inflammable Composition of Rubber. Hydrated Oxide of aluminum, litharge, and sulphur, with or without asbestos (see patent No. 125,622), is used by itself in sheets, blocks, tubes, etc.—W. H. Perkin, Oxford University, and J. H. Mandleberg and Mandleberg & Co., Limited, Albion Waterproofing Works, Pendleton, Manchester. British patent No. 159,014.

OTHER CHEMICAL PATENTS

GERMANY

PATENTS ISSUED WITH DATES OF ISSUE

No. 326,541 (October 10, 1918.) Vulcanization of rubber on metals. A layer of adhesive, viscous material, which is not absorbed by rubber, is interposed between the rubber and the metal. The intermediate and by-products obtained in the manufacture of synthetic rubber are suitable for the purpose. Felten and Guilleaume, Carlswerk, A.-G.

326,819 (February 20, 1917.) Vulcanized rubber products of great strength and extensibility are obtained by using antimony pentoxide in the mixture; the result is a red product of greater softness, elasticity and toughness than those obtained with golden antimony. Farbenfabriken formerly Friedrich Bayer & Co., Leverkusen, near Cologne-on-the-Rhine.

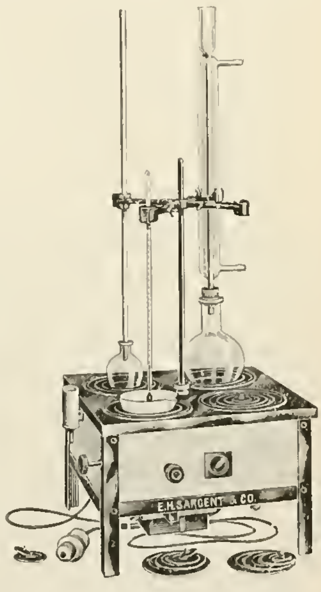
336,146 (July 25, 1919.) Method of separating rubber from crude or vulcanized waste rubber. Peter Friesanhahn, Hubertusallee 41, Berlin-Grunewald.

336,476 (February 15, 1918.) Plastic masses. Farbenfabriken formerly Friedrich Bayer & Co., Leverkusen, near Cologne-on-the Rhine.

LABORATORY APPARATUS

CONSTANT TEMPERATURE WATER BATH

The demand for a water bath electrically heated and provided with a constant temperature control that is sufficiently sensitive for the general laboratory has led to the design and manufacture of the apparatus illustrated.



Sargent's Electric Water Bath

The range of constancy in the temperature of this water bath is one degree C., which is sufficiently close for general analytical work. The regulator may be set to produce and maintain any temperature between a few degrees above room temperature and the boiling point of water. Dishes of any form may be used with this apparatus. A support is provided to hold condensers, thermometers, etc. The area of the bath is 13 by 13 inches and the top is provided with four holes, each five inches in diameter and provided with concentric rings. It is made for 110-volt and 220-volt currents and may be used on either alternating or direct current. It is equipped with an attachment for maintaining a constant water level in the bath and with cord and plug for attaching to the electric line.—E. H. Sargent & Co., Chicago, Illinois.

LABORATORY GASOLINE TORCH


"Dreadnaught" Torch

A gasoline torch is frequently useful in the rubber laboratory for many purposes. The illustration shows a new and greatly improved torch of this sort known as the "Dreadnaught." Among the features claimed, which give it pre-eminence, are these—it gives the hottest fire, withstands the hardest knocks, is quick-starting, durable and non-leaking.—P. Wall Manufacturing Supply Co., Pittsburgh, Pennsylvania.

RUBBER MICRO-FUNGUS

The purer and more elastic grades of vulcanized rubbers when exposed to moist air are liable to develop growths of micro-fungus which to the naked eye often resemble dust. The fungus threads penetrate the surface rubber and may cause disintegration. Rubber thus injured wrinkles curiously and may become very weak.—J. Scott, *The India Rubber Journal*, London, 1920, 60, 410-412.

NEW TRADE PUBLICATIONS

The Rubber Association of America, Inc., New York, N. Y., has issued its Twenty-First Year Book, 1921, prepared by the general manager and secretary. The pamphlet is smaller this year, containing more practical information for the use of members. Information concerning the constituency of the general membership, of the various divisions and committees, and miscellaneous matter as charter, constitution and by-laws, necrology record, officers and directors since the Association was organized, may be found in the year book.

The Firestone Tire & Rubber Co., Akron, Ohio, has issued a brochure entitled "Simplified Methods of Repairing Giant Pneumatic Truck Tires," which deals with tire, valve, and tube repairs of all types, and in the last few pages displays all repair materials manufactured by Firestone, and a list of the Firestone branches in the United States.

The tire division of the Converse Rubber Shoe Co., Boston, Mass., is distributing to the trade a novelty booklet describing the Converse tire and its construction. On the front cover a section of a tire is pictured, showing a small part of the tread, and the inner construction and bead. The back of the folder has a tab cut to fit over the front picture of the tire and into a slit along the section where the tread and inner construction are shown, thereby picturing a perfect section of a Converse tire.

"Boys' Book of Indians" is a booklet published by The B. F. Goodrich Rubber Co., Akron, Ohio, for its "boy friends." It contains much information on Indian customs and life, together with colored illustrations of well-known Indian characters. Indian signs and their meanings are illustrated and the tribal divisions shown over an outline map of the United States. The center page is devoted almost entirely to a picture of the three styles of bicycle tires made by the Goodrich company and a word to the boys regarding their satisfactory service on bicycles. The back cover contains some interesting facts about auto tires.

The crude rubber department of The Rogers-Pyatt Shellac Co., New York, has issued its standard blotter showing fluctuations of standard grades of rubber for 1920. The blotter also shows prices from January, 1911, through April, 1921.

An interesting series of illustrated and descriptive bulletins on rubber machinery has been prepared by The Wellman-Seaver-Morgan Co., Cleveland, Ohio. The machines treated are fully illustrated and described and include the full line manufactured by the company, such as rimming press, mixing mill, molds and cores, calender, tire press, cracker and washer, hydraulic vulcanizer, also an instruction book for the tire press.

Chat No. 4 of "The Black Art of Rubber Compounding" is being distributed to the trade by Binney & Smith Co., 81 Fulton street, New York. It contains brief explanatory remarks on the colloidal state; Micronex black as a colloid, and the rubber stress-strain curve and its requisite characteristics, with notes on continuity of stress and energy of resilience.

Bulletin R-1401 with Supplementary Sheet No. 2, issued by the Yarnall-Waring Co., Chestnut Hill, Philadelphia, Pennsylvania, explains the recent development of the Yarway balanced control valve in both angle and globe patterns, together with several forms of operating mechanisms.

"The Dangers of Faulty Brakes," a booklet issued by the Thermoid Rubber Co., Trenton, New Jersey, explains how scientific research is solving the problem of increased traffic, and brings to the attention of the reader the necessity of keeping the brakes safe by periodical inspection, claiming that a tremendous burden is being placed on brakes as a result of modern motoring conditions. In addition to half-tone and line-cut illustrations the pamphlet contains many tables which should be of great interest to drivers of pleasure cars or trucks.

"C-H Iron-Clad Solenoids," Publication 873, April, 1921, a four-page leaflet of the Cutler-Hammer Manufacturing Co., Milwaukee and New York, contains drawings and tables of stroke and pull of solenoids. The descriptive matter covers electric solenoids for operating brakes, clutches, valves and similar devices where a straight-line motion is desired.

"Hopewell Points the Way to Better Insulation," is the title given Catalog No. 1 of the Hopewell Insulation & Manufacturing Co., Hopewell, Virginia. The Hopewell products are illustrated and described in a thorough manner, with a brief introduction in which is explained that "Paramold,' a hard rubber compound of which the insulators are made, is of high dielectric and mechanical strength.

"The Serial Number," Volume 1, Number 1, the official organ of the National Tire Dealers' Association, Cleveland, Ohio, made its appearance dated May 7, 1921. It is a four-page paper, 8½ by 11 inches, devoted to news of interest to the retail tire trade, editorials and open letters. Whether the sheet will be published monthly or bi-weekly remains to be determined by a vote of the members.

"Stretching a Rubber Band Across the Sea." Leaflet addressed to rubber manufacturers by the committee on organization of the Foreign Trade Financing Corporation, 66 Broadway, New York.

This is a brief exposition of the large-scale plans for developing American export business which the Foreign Trade Financing Corporation intends to put into effect as soon as the $100,000,000 of stock in the new international trading concern has been floated, and for which subscriptions have been promised by some of the largest banks in the country. This concern, with a potential credit-extending capacity of a billion dollars, was organized under the Edge Act of 1919 to render for international commerce much the same service as is given domestic trade by the Federal Reserve Board. Realizing that while war-spent foreigners urgently want our goods, but cannot pay for them until their own industries begin to get on their feet, the new corporation would aid them and at the same time benefit American labor and capital by shipping to our foreign friends the goods they need, allowing them to pay with long-term promissory notes backed by good securities.

Manufacturers of rubber products, facing the serious problems resulting from rapidly-shrinking export orders, are reminded that they have but two avenues of relief, one being to cultivate trade in the sections of the world which suffered least in the war, as South America and the Far East, and the other being to cooperate actively with other American manufacturing interests, through some such agency as proposed, for extensive financing of overseas trade.

THE ADVANTAGES OF WATER VULCANIZATION

By Arthur E. Friswell[1]

My first introduction to rubber manufacturing was in a department devoted to the manufacture of rubber thread. There I learned how and why rubber sheet for thread was and still is vulcanized in water. The following is a non-technical description of the process.

The rubber is calendered into sheets by a specially designed calender, which produces and doubles two sheets into one simultaneously. The sheet is rolled on itself as it comes from the calender, talc being used to prevent adhesion. When the sheet is thoroughly cooled, it is wound on a drum, and between each ply of rubber there is wound under tension a web from a roll of finely woven cotton cloth, absolutely free from all unevenness of

[1]Rubber factory consultant.

weaving, skipped threads, knots, etc. This cloth is applied wringing wet and great care is exercised to lay it taut and smooth and free from wrinkles or folds in every direction. The length of the rubber sheet is 60 to 65 yards. The width is determined by the calender rolls and varies in different factories from 36 to 60 inches, or even wider.

After wrapping, the entire roll on the drum is cross-wrapped or spirally bandaged under tension by a woven strip of strong cotton webbing to insure positive solidity of the rubber mass and to prevent the formation of air pockets between the plies. The drum upon which this winding occurs is about three feet in diameter and the precaution is observed of not bringing the first end of the rubber sheet into contact with the metal of the drum, but the drum is first wound or padded for several turns with wet, woven cotton sheeting. The reason for this is to prevent over-vulcanizing of any one part of the rubber sheet by metallic contact and to ensure uniformity of vulcanizing conditions throughout the entire thickness or mass. The drum is then placed vertically in a vertical vulcanizer, the drum resting on end on a false perforated metal bottom placed several inches above the true bottom of the vulcanizer. Water is then admitted to the vulcanizer to a height to completely submerge the drum but not to completely fill the vulcanizer. A foot or more of space is left at the top of the vulcanizer above the water level to provide for expansion and for a body of steam. The cover of the vulcanizer is bell shaped. Steam is admitted through the bottom of the vulcanizer until the temperature of the water is raised to 280 or 285 degrees F. and brisk circulation of steam is maintained by means of a freely opened pet-cock or valve at the top of the vulcanizer. This is of vital importance. The water must be kept agitated, otherwise vulcanization is never uniform, and soft, partially cured spots show under later test.

The time required to effect vulcanization varies from 65 to 85 minutes for a compound of—in this country—one ounce of sulphur to one pound of fine Pará, and in England, of two ounces of sulphur to one pound of fine Pará. There is a curious feature here presented, namely, that of climatic and atmospheric conditions as affecting vulcanization. Where the atmospheric humidity is normally heavy, as in Manchester, England, more sulphur is required to effect vulcanization than in Massachusetts, where the air is normally lighter and dryer; and also the time required to effect vulcanization varies with the seasonal changes from extreme sharp cold in winter to extreme humid heat in summer, and this is quite aside and distinct from any differences whatsoever in the strength or nerve of various lots of rubber.

When the sheet of vulcanized rubber is unwound from the drum, its color has changed from amber to dirty green and it is saturated with water. Contrary to the opinion usually held by laymen, rubber does absorb water, and in the form of freshly vulcanized sheet for thread as described, it contains from 18 to 20 per cent by weight. The sheet is next suspended on racks in a drying room which is metal-sheathed throughout, to radiate heat from steam pipes. The temperature of the room is from 100 to 110 degrees F. Within 24 hours the moisture is evaporated and the sheet assumes the gray color usually associated with pure vulcanized rubber which has not been subjected to any alkaline desulphurizing process. (Some thread is later desulphurized, some is not, but, as Kipling says, "That's another story.") Whether the original manufacturers of rubber thread—whoever they may have been—found by experience that necessity compelled them to employ water as a vulcanizing medium, or whether it just naturally occurred to them in the first instance, I cannot say, but it is a fact that no other way of vulcanizing rubber sheets has ever been found to equal it. Water is an ideal heat conductor, and sheet vulcanized as described possesses a degree of permanent elasticity, due no doubt in part to the practically spontaneous conducting throughout the mass of a uniform temperature and perhaps in part to a beneficent chemical action which sheet vulcanized in any other way never possesses. Sheet so vulcanized and thread cut from it have a quality of something so lastingly virile, so velvety, in brief, so rubber-like, that there is nothing to touch it where elasticity is the main objective.

Another fine feature of water vulcanization is that it overcomes the bothersome shrinking problem. As every rubber man knows, sheet rubber cured in open steam or suspended from racks and exposed to dry heat shrinks unevenly, thus altering the gage or thickness as delivered from the calender.

Manufacturers of elastic bands have found that the best results are obtained from calendered sheet by suspending the tubes made from the sheet from poles or racks submerged in water raised to vulcanizing temperature. Wherever it is possible to employ water vulcanization, it will be found to posses distinct advantages over nearly every other form of curing.

THE RELATIVE ACCELERATING ACTION OF DIFFERENT COMPOUNDS OF LEAD IN THE VULCANIZING OF RUBBER

By J. M. Grove

INTRODUCTION

The more one studies the subject of organic accelerators the more puzzling it becomes. Much has been learned about their immediate effect, but much more remains to be learned. Hence the numerous papers on the subject, and if, finally, dicta may be laid down governing their immediate action in varying proportions, there will still remain the question of their action as affecting the ultimate life of vulcanized rubber.

It was while engaged in an extensive investigation of the immediate action of various organic accelerators upon the vulcanization of different compounds that the writer was asked to determine the relative accelerating action of the most widely used compounds of the known—the old lead group.

So far as he was able to learn by reference to many compounds laid before him for investigation, there appeared to be no rule governing their use, although their use has for many years proved beneficial where it is possible to use them at all. Of course, their employment is prohibited where colors other than gray or black must be obtained.

METHOD OF EXPERIMENTATION

The accelerating action of one per cent of litharge was taken as the basis of comparison. The formula used consisted by weight of: smoked sheet 80 per cent, sulphur 2½ per cent, zinc oxide 5 per cent, and varying percentages of barytes, and the given lead compound under investigation to make up 100 per cent by weight. As the percentage of the lead compound introduced into the above formula was increased, the percentage of barytes was proportionately decreased. Thus, the relative percentage of smoked sheet, sulphur and zinc remained unchanged in all of the trials. (See Table 1.)

Table 1

Formulas of Compounds

Ingredients	1	2	3	4	5	6	7	8	9	10	11	12
Smoked sheet ...	80	80	80	80	80	80	80	80	80	80	80	80
Sulphur ..	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½
Zinc oxide	5	5	5	5	5	5	5	5	5	5	5	5
Barytes ..	11½	5½	6½	7½	9½	8½	6½	11½	10½	9½	7½	5½
Litharge .	1	..	..	..	..	..	..	..	..	..	..	..
Sublimed white lead	..	7	6	5	..	..	..	..	..	..	..	..
Basic lead carbonate.	..	..	..	..	3	4	6	..	..	..	..	..
Sublimed blue lead.	..	..	..	..	..	..	..	1	2	3	5	7
	100	100	100	100	100	100	100	100	100	100	100	100

The ingredients of the different compounds were very carefully weighed and mixed in the laboratory, under conditions exactly alike. After a period of 24 hours' rest a sample from each compound, ⅛-inch in thickness, was cured in a press

for one hour at 280 degrees F. These vulcanized samples were allowed to rest for 24 hours. Then test pieces ¼-inch in width were cut from each slab with a suitable die, each piece was marked with lines two inches apart and physical tests were made by use of a Scott testing machine, the rate of speed being 20 inches per minute.

The results recorded below for tensile strength, elongation and set at break represent the average results of three tests of each sample. In taking the permanent set, the original marks two inches apart were stretched to twelve inches and so held for ten minutes, then allowed to recover for ten minutes, when measurements were taken and the percentage increase in length recorded.

RESULTS

When cured and tested as described above, Compound No. 1 (see Table 1) gave the following results:

Tensile strength per sq. in.	1,915 pounds
Elongation, or stretch	750 per cent
Permanent set	9 per cent
Set at breaking load	13.5 per cent

The first lead compound compared with litharge in accelerating action was sublimed white lead. It was found to require seven per cent of this compound to obtain results at all comparable with those given by one per cent of litharge. Six and five per cent of sublimed white lead gave tensiles far below that of one per cent of litharge.

Table 2

Results Obtained With Sublimed White Lead

	5%	6%	7%
Tensile strength per sq. in. ... *lbs.*	907	1,552	2,195
Elongation, or stretch	700%	885%	800%
Permanent set	15%	7.5%	8%
Set at breaking load	16%	18%	15%

Basic lead carbonate was next compared with litharge in accelerating action and it was found to require 3 per cent of this compound to give results approximating those given by one per cent of litharge.

Table 3

Results Obtained With Basic Lead Carbonate

	3%	4%	6%
Tensile strength per sq. in. ... *lbs.*	1,853	1,635	2,079
Elongation, or stretch	800%	800%	850%
Permanent set	8.5%	7.5%	4%
Set at breaking load	19%		

Finally, sublimed blue lead was compared with litharge in accelerating action. The nearest approach to the results obtained with one per cent of litharge, was obtained with three per cent of sublimed blue lead. Further addition of this lead compound indicated decided overvulcanization; while one and two per cent indicated that the samples tested were very much undercured.

Table 4

Results Obtained With Sublimed Blue Lead

	1%	2%	3%	5%	7%
Tensile strength per sq. in. ... *lbs.*	210	779	1,663	1,733	2,125
Elongation, or stretch	800%	800%	800%	800%	750%
Permanent set	25%	11.5%	6.5%	4.5%	3.5%
Set at breaking load	43.6%	17.8%	12.8%	13%	12.5%

The results thus indicated that basic lead carbonate and sublimed blue lead have approximately the same accelerating action in the vulcanization of rubber.

In the course of his investigations, the writer tried combinations of lead compounds with hexamethylene tetramine, with remarkable results. It was found that such combinations enable one to greatly reduce the percentage of hexamethylene tetramine used; and when the price was high, this was quite an item of cost.

To further test the relative accelerating action of basic lead carbonate and of sublimed blue lead, and also to determine whether the accelerating action of basic lead carbonate is entirely dependent upon the lead hydroxide present, three per cent each of basic lead carbonate, of sublimed blue lead; and of chemically pure normal lead carbonate were introduced separately into the following formula and the compounds thus obtained were then cured in a press for 40 minutes at 290 degrees F. and tested as described above.

Formula of Compound No. 13

	Per Cent
Smoked sheet	65
Sulphur	2¼
Zinc oxide	2
Blanc fixe	5
Barytes	22½
Hexamethylene tetramine	¼
Basic lead carbonate or sublimed blue lead, or normal lead carbonate	3
	100

In this connection, it may be stated that tests were made with the formula as given above, using blanc fixe and barytes in place of barytes alone. The results were sufficiently interesting to warrant further work that is now in process, the results of which will be presented in the near future.

Table 5

Results Obtained With Basic Lead Carbonate, Sublimed Blue Lead and Normal Lead Carbonate in Compound No. 13

	3% Basic Lead Carbonate	3% Sublimed Blue Lead	3% Normal Lead Carbonate
Tensile strength per sq. in. ... *lbs.*	1,487	1,475	1,481
Elongation, or stretch	700%	750%	750%
Permanent set	8%	8%	9%
Set at breaking load	18%	19%	20%

Three per cent of sublimed white lead and of chemically pure lead sulphate was introduced separately into the same formula.

Table 6

Results Obtained With Sublimed White Lead and Chemically Pure Lead Sulphate

Tensile strength per sq. in. ... *lbs.*	872	906
Elongation, or stretch	750%	725%
Permanent set	10%	10%
Set at breaking load	20%	16.5%

SUMMARY

The conclusions to be drawn from this investigation are:

1. That, of the most commonly used lead compounds, litharge possesses the greatest accelerating action.
2. That the relative accelerating action of basic lead carbonate to that of litharge is in approximately the proportion of 3 to 1.
3. That the relative accelerating action of sublimed blue lead is approximately the same as that of basic lead carbonate.
4. That the relative accelerating action of sublimed white lead is much below that of the other compounds of lead.
5. That it may be questioned whether the accelerating action of basic lead carbonate is entirely dependent upon the lead hydroxide present.
6. That combinations of lead compounds with hexamethylene tetramine enable one to greatly reduce the percentage of the organic accelerator used.

THE ACTION OF CERTAIN ORGANIC ACCELERATORS IN THE VULCANIZATION OF RUBBER—II[1]

By G. D. Kratz, A. H. Flower and B. J. Shapiro[2]

One of the early patents[3] for the use of synthetic nitrogenous organic substances in the vulcanization of rubber refers to the dissociation constant of 1×10^{-8} as the dividing line between accelerating and non-accelerating bases. On the other hand, Peachey[4] has pointed out that certain other substances which are not basic, or but slightly so, are also exceedingly active as accelerators. The number of examples in this class, however, is relatively small.

[1]Presented before the Rubber Division of the American Chemical Society at Chicago, Illinois, September 6 to 10, 1920.
[2]The Falls Rubber Co., Cuyahoga Falls, Ohio.
[3]German patent No. 280,198, 1914.
[4]Journal of the Society of Chemical Industry, 36, 1917, 950.

In the course of the experimental work described in this paper we have made a comparison of the sulphur coefficients of a type mixture vulcanized with the assistance of a number of accelerators closely related to aniline and for which the dissociation constants are known. We have also employed the hydrochlorides of two of these substances, relatively weak and strong bases, in order to observe the effect of the acid portion during the vulcanization. The results obtained and the conclusions drawn led us to employ the sulphides of ammonia as accelerators and vulcanizing agents.

Briefly summarizing these results, it was found that with the substances tested there was apparently no direct relationship between their dissociation constants and their excess sulphur coefficients or physical properties after vulcanization. In a closely related series, such as aniline and its methyl derivatives, the substance with the largest dissociation constant was found to be the most active. However, the relative activities of the members of this series were not proportional to their dissociation constants. Generally speaking, the activity of all of the substances could be traced to the amino group, and depended to a large extent upon whether or not substitution had taken place in this group. In this respect, they should probably be regarded as substituted ammonias, rather than as the more complex derivatives of other substances.

One effect of the basicity of two of the substances, methylaniline and *p*-toluidine, was determined with the hydrochlorides of these two substances. Our results showed that with substances of this type, the first effect of the base is to neutralize the retarding action of the acid formed in the decomposition of the salt during vulcanization. We had previously suggested this in a foot-note in a former paper.[5] We also found that when the acid liberated in the decomposition of such a salt is neutralized by other substances in the mixture, the activity of the hydrochloride is very close to that of the free base. These results are of particular interest, as Van Heurn[6] has shown that, whereas ammonium carbonate is moderately active as an accelerator in a mixture of rubber and sulphur, ammonium chloride is inert. The former salt decomposes into ammonia and a weak acid, the latter into ammonia and a strong acid, according to the following reactions:

$$(NH_4)_2CO_3 \longrightarrow 2NH_3 + H_2O + CO_2$$
$$NH_4Cl \longrightarrow NH_3 + HCl$$

Our final experiments, wherein we found that in a closed system rubber is vulcanized by heating with ammonium polysulphide or ammonium hydrosulphide, were carried on in order to obtain a reaction mixture of undoubted basic character, which at the same time would include H_2S as one of the decomposition products. The function of H_2S in connection with the vulcanization of rubber has long been made a subject of controversy. In the present instance it may be regarded as a very weak acid.

Our results with ammonium polysulphide may be explained as due to the decomposition of this substance into ammonia, hydrogen sulphide, and sulphur, the latter substance being liberated in an active (nascent) form which readily combines with the rubber. The analogy between our results with ammonium polysulphide, and those obtained years ago by Gerard[7] with potassium tri- and pentasulphides, is taken up in greater detail in the experimental part of this paper. It is equally evident, however, that if this explanation is advanced in the case of ammonium polysulphide, vulcanization with ammonium hydrosulphide requires that this substance decompose not into ammonia and hydrogen sulphide only, but with the subsequent formation of a polysulphide which liberates sulphur in the active form.[8]

It has been shown by Bedford and Scott[9] that many of the more complex substances which accelerate the vulcanization of rubber react with sulphur, with the liberation of H_2S and the formation of thiourea derivatives. In view of our results with the ammonium sulphides, the action of such thiourea derivatives would depend upon their ability to enter into a subsequent reaction with the H_2S formed, or the sulphur present in the mixture, with the formation of a polysulphide. Further, although the formation of a polysulphide in this manner would, to a certain extent, be dependent upon the basicity of the substance originally added as the accelerator, it is obvious that the dissociation constant of the reaction product would be a better indication of its activity than the dissociation constant of the original substance.

In a previous paper[10] we have suggested that the activity of certain nitrogenous substances may be interpreted on the basis of a change in valency of the nitrogen, with the nitrogen functioning as a sulphur carrier. This suggestion was made to assist in correlating the nitrogen content with the activity of the substances employed, although, as pointed out in the above paper, results obtained by others already indicated that the sulphur is not necessarily attached to the nitrogen. While our present results show that vulcanization may be effected by polysulphide formation, they do not exclude the possibility of the active nitrogen group acting as a catalyst.

The experimental results are shown in the following table:

Table I

First latex pale crêpe	100
Sulphur	8.1
Accelerator	x

Vulcanized for 90 min. at 148° C.

Substance	Formula	x = 0.01 G.Mol.	Determined M. P. or B. P. of Accelerator[1]	Dissociation Constant K at 15° to 18° C.	Excess Sulphur Coefficient	Physical Properties: Tensile Strength Lbs. Per Sq. In. at Break	Physical Properties: Final Length at Break
Control		....	.....	....	(2.581)	1,229	1,090
Aniline	$C_6H_5NH_2$	0.93	183.1	3.50×10^{-10}	2.400	2,005	910
Methylaniline	$C_6H_5NH.CH_3$	1.07	192.0	2.55×10^{-10}	0.612	1,665	1,050
Dimethylaniline	$C_6H_5N(CH_3)_2$	1.21	192.5	2.42×10^{-10}	0.250	1,938	1,060
p-Toluidine	$CH_3.C_6H_4.NH_2$	1.07	45.0	1.60×10^{-9}	2.987	2,476	920
m-Phenylenediamine	$NH_2.C_6H_4.NH_2(1:3)$	1.08	62.6	1.35×10^{-12}	2.986	1,933	830
p-Phenylenediamine	$NH_2.C_6H_4.NH_2(1:4)$	1.08	140.6	2.48×10^{-12} [2]	5.248	193	430
p-Benzidine	$NH_2.C_6H_4.C_6H_4NH_2$	1.84	126.2	7.40×10^{-13} [2]	3.056	1,464	810
Phenylhydrazine	$C_6H_5NH.NH_2$	1.08	240.0	1.60×10^{-9}	0.751	1,052	1,080
Hydrazobenzene[3]	$C_6H_5NH.NH.C_6H_5$	1.84	126.0	....	0.777	2,165	1,140

[1]All m. p. are below, and b. p. above the temperature of vulcanization. [2]Figure applies to second "K." [3]Does not have basic properties.

Conclusions

1. The activity of synthetic nitrogenous organic substances as accelerators is not proportional to the dissociation constants of the original substances and, with the exception of members of a closely related series, no definite relationship exists between

[5]Chemical & Metallurgical Engineering, 20, 1919, 420.

[6]Communications of the Netherland Government for Advising the Rubber Trade and the Rubber Industry, Part 6, 202.

[7]R. Hoffer, "Treatise on Caoutchouc and Gutta-Percha" (trans. Brannt), H. C. Baird & Co., London, 1883.

[8]As an aqueous solution of NH_4HS was employed, the action of this substance may also be explained by its dissociation products. It would dissociate with NH_4^+ as the cation and HS^- the anion. As the HS^- ion itself is weakly acid, there would probably be many H^+ and HS^- ions and but few S^{--} ions in the aqueous solution. The H^+ and S^{--} ions in turn react to form H_2S. On the other hand, $(NH_4)_2S$ dissociates with NH_4^+, the cation, and S^{--}, the anion. The latter, in the presence of water, dissociates with the formation of OH^- and HS^- ions. Thus, NH_4HS dissociates with the formation of a greater number of H^+ ions than in the case of $(NH_4)_2S$, and consequently with a greater reformation of H_2S. This may account for the difference in the relative activities of the two substances. The same may be true in the absence of water, as most organic accelerators are apparently soluble in rubber, the high dielectric constant of which indicates that this substance itself may be a good dissociating medium.

[9]Journal of Industrial and Engineering Chemistry, 12, 1920, 31.

[10]Journal of Industrial and Engineering Chemistry, 12, 1920, 317.

the activities and the dissociation constants of the original substances.

2. Substances which decompose or dissociate into other substances of acid character, or react with other components of the mixture to form substances of acid character, do not accelerate unless a neutralizing base or salt is present.

3. Vulcanization is effected by heating rubber in a closed system with concentrated aqueous solution of ammonium sulphides.

THE EDITOR'S BOOK TABLE

"INDIA RUBBER." BY HENRY P. STEVENS, M. A., PH. D., F. I. C. Reprinted from the Reports of the Progress of Applied Chemistry, Vol. V, 1920, issued by the Society of Chemical Industries, London.

To the busy man this summary of what has been recorded in rubber literature during the past year is particularly welcome. The author finds no event comparable to Peachey's cold vulcanizing process; but he notes much interesting progress in various lines of research, as, for instance, on the reactions among the materials employed in the Peachey process.

As to production of the raw material, he estimates that plantation rubber now represents 89.5 per cent of the world's output, and that the excess this year will likely be 50,000 tons, with a total plantation production of 343,000 tons as compared with 302,000 in 1919. There is but little change in the output of wild rubber, especially Brazilian.

Commenting on plantation researches, he cites specific gravity tests that seem to reveal incipient disease in latex-bearing trees and tells how to improve them. He tells of tapping experiments toward obtaining the best latex; the effect on subsequent vulcanization of soaking coagulum; the inability to correct mould trouble on sheets; the effect of air in maturing rubber; the question of the superior uniformity of fine hard Pará over plantation rubber; how the vulcanizing mass expands in proportion to the high rubber content and the extent of milling; what results have attended the extensive study of accelerators, and why some results of much practical value are expected from experiments being made on the reaction of raw rubber to the bromine addition product.

Of much interest is the author's view of the tests made with compounding ingredients, zinc oxide and carbon black being especially favorable; on the aging of raw and vulcanized rubber; on the interpretation of the rubber stress-strain curves; on synthetic rubber, which still fails to excel the most inferior dark plantation crêpe when vulcanized; and of the newest methods of estimating sulphur in vulcanized rubber, the action of antimony in compounding, on modes of estimating the rubber hydrocarbon in raw and vulcanized rubber, and of determining cellulose in vulcanized products.

RUBBER, RESINS, PAINTS AND VARNISHES. BY R. S. MORRELL, M. A., Ph. D., F. I. C., and A. de Waele, A. I. C. D. Van Nostrand Co., New York, 1920. Cloth, 236 pages, 5¼ by 8½ inches.

This is one of a series of text-books on the chemical industries from the chemical rather than the engineering standpoint, giving a general survey of the industry, showing how chemical principles have been applied and the influence of new inventions.

The volume is divided into five parts: (1) The Rubber Hydrocarbons; (2) Drying Oils; (3) Resins and Pitches; (4) Pigments and Paints; (5) Varnishes. The section on rubber discusses the British rubber plantation industry and the work of the Agricultural Departments in the Far East. This is followed by an account of the formation in nature, the distribution of the raw materials of rubber and the rubber-bearing species. The physical and chemical properties of latex are treated at length, and also the chemistry and physical testing of rubber. Hot and cold vulcanization are mentioned briefly, and the manufacture of a few typical articles briefly described.

Gutta percha is referred to and the subject of rubber substitutes touched upon. Rubber-seed oils, as yet undeveloped industrially, are destined to have well-merited industrial importance, and receive in this book a condensed account of yield, composition and uses. The important matter of diseases and pests has been carefully studied, both in Ceylon and in Malaya, and the most important ones are summarized. The rubber section closes with a discussion of synthetic rubber and a bibliography.

The section on resins and pitches will have interest for the rubber chemist in connection with their use in rubber compounding, and the same is true of the section on paints and pigments.

"THE FINANCIER RUBBER SHARE HANDBOOK." SEVENTEENTH edition, January, 1921. The Financier and Bullionist, Limited, 49 Wool Exchange, London, E. C. 2. Cloth, 928 pages, 4¾ by 7¼ inches.

"The Financier Rubber Share Handbook" has long been the authoritative source of information on the financial affairs of British rubber plantation companies. It is of interest to note in the preface to the present edition that the present crisis in the plantation industry may yet prove a blessing by bringing about closer unity in the industry for control over further planting whereby production can be held in adjustment to the world's requirements as a safeguard against the recurrence of crises. More economical methods will be evolved and prohibitive labor costs be modified Estates operating under undue disadvantages of soil, climate, etc., will go out of cultivation under the law of survival of the fittest, which will operate to an extent limited only by the duration of the crisis.

"GENERAL COMMODITY SALES TAX." BY DR. HENRY A. E. Chandler. *Commerce Monthly*, March, 1921, issued by the National Bank of Commerce, New York.

A timely and comprehensive dissertation on the proposition to impose a levy on the sales of all merchandise in order to augment the Federal revenue. The economist of the noted financial institution points out that the receipts of the Government, now insufficient to meet its immense war obligations, could be substantially increased and inequities in the present fiscal system largely corrected by the levying of an impost on sales to the extent of 3/10 of one per cent, and in no case in excess of ½ of one per cent, instead of at the rate of one per cent as some have urged. Dr. Chandler regards such new source of raising revenue as the least objectionable means of raising money indirectly, but he argues that as the effect of the tax would be to throw the larger part of the burden upon the masses who have the smaller incomes, such a levy should be minimized as far as possible so as not to cause undue hardship. Even at 3/10 of one per cent he estimates the yield would be about $516,000,000; and with such a moderate rate few could reasonably expect exemptions and the task of collection would accordingly be much simplified.

"A LIST OF THE FUNGI OF THE MALAY PENINSULA." BY T. F. Chipp. *Botanic Gardens' Bulletin*, Singapore, Straits Settlements. January 7, 1921, Nos. 9, 10, 11. Paper, 107 pages, 6 by 9¾ inches.

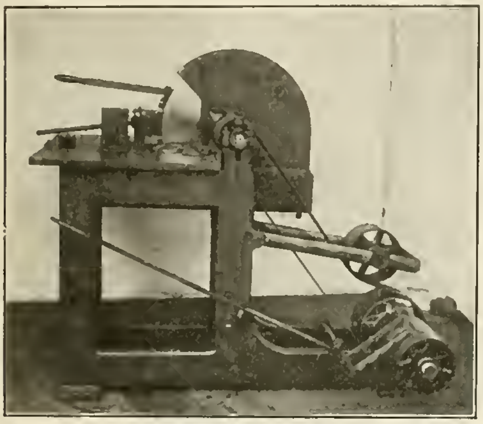
A work of much scientific interest and potential value to producers, shippers, dealers, and consumers of crude rubber, is this complete enumeration and description of the fungus growths of Malaya. The author amplifies the information he conveyed in his monograph, "The Fungus Flora of *Hevea brasiliensis*," and adds much to that imparted by other mycologists who have done notable research work in identifying the many moulds, mildews, rusts, smuts, and various forms of low plant growths which attack rubber trees and their product.

The work of the mycologists and those aiding them in finding the cause and cure of the various diseases which attack latex-bearing trees and cause the spotting on prepared rubber has assumed great importance. Hence it is gratifying to note this important contribution to the literature on this subject, which cannot fail to stimulate closer study of the most effective means for lessening the ravages of fungoid growths on rubber estates.

New Machines and Appliances

TIRE SECTION CUTTING MACHINE

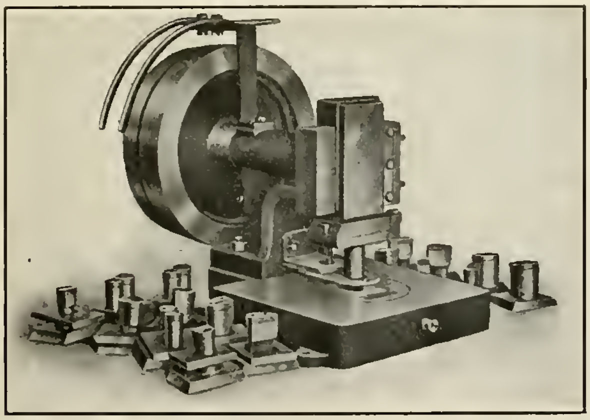
A very substantially built and simple machine designed for cutting sample sections of rubber goods such as hose, belting or tires and possibly crude rubber, is herewith illustrated. It consists of a circular knife of generous diameter well housed and mounted on a cast-iron frame. The machine is belt-driven and controlled by an idler. A movable table for supporting the stock to be sectioned is mounted on two side brackets and a lever-operated clamp is provided for holding the work.—The Banner Machine Co., Columbiana, Ohio.



Tire Sample Cutter.

RUBBER SOLE AND HEEL PUNCHING MACHINE

A quick-acting punch of English design for punching rubber blanks for heels and soles is shown in the accompanying illustration. The punches are mounted to fit into a dove-tailed slot so that they cannot be set incorrectly and do not require adjustment of setting. When the die is fixed to the machine, it is flush with the surface of the base. Circular punches range from 1¼-inch to 2¾-inch, the sizes below 1¾-inch are made as twin cutters. For the larger sizes, the speed is 120 revolutions per minute, turning out 120 disks per minute, or 240 disks when using the twin cutters.—C. A. Harnden, Limited, Hyde, Manchester, England.

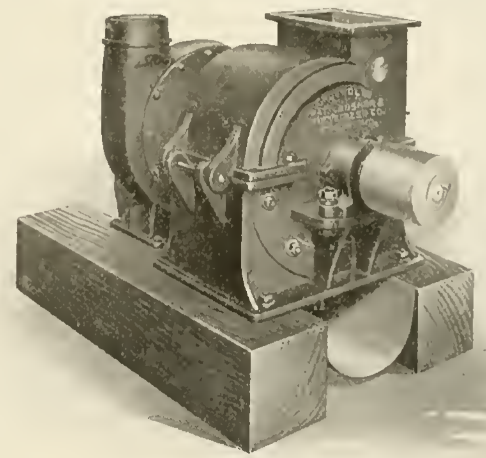


Sole and Heel Punch

RUBBER SCRAP PULVERIZER

Hard rubber scrap and broken phonograph records may be pulverized to the fineness of 20-mesh or under in one operation by the machine here illustrated. The machine is simple in construction, durably made, and adapted for hard continuous service. The pulverizing is done by a set of revolving hammers of which there are 500 or more in each machine. The material is held in place by perforated screens or grate bars which do not allow anything to pass out until it is fine enough to go through the openings. Either coarse or fine grinding may be done by changing the screen or grates—an operation requiring but a few minutes. A metal pocket prevents foreign material, such as stones, bolts, iron or steel from getting into the machine. Such extraneous matter is thrown out before it enters the hopper by an air-regulated device.

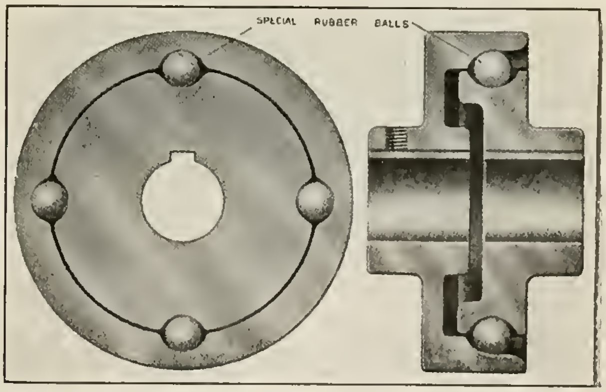
The encasement of the machine is heavy cast iron. The pulverizer shaft revolves at high speed and is furnished with disks of highly tempered steel. The grate bars and plates are made with perforations and openings ranging in size from one inch to 1/64-inch in diameter. The grates are interchangeable and constructed in individual units of various sizes. Oversize ball bearings assure quick, easy starting and smooth running. The pulverizers are made in sizes ranging from 3 to 300-ton capacity daily and require from 5 to 200 h.p., depending upon their size. It is claimed that in view of the great capacity of the machine, the production per unit requires from thirty to forty per cent less power. A two years' guaranty against defects in material or workmanship is given with each outfit.—Gruendler Patent Crusher & Pulverizer Co., St. Louis, Missouri.



The Gruendler Pulverizer

A BRITISH FLEXIBLE COUPLING

The illustration shows sectional views of a patent flexible coupling featured by a Scottish firm of rubber machinery specialists. Flexibility and insulating effect is due to four special grade rubber balls set in special cavities arranged at

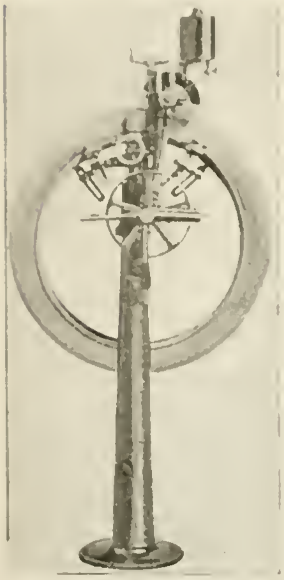


Flexible Insulating Coupling

90-degree intervals in either half of the coupling.—R. Fauset Gillespie & Co., Edinburgh, Scotland.

TIRE-SKIVING MACHINE

Worn out or cut tires that can no longer be used, represent an enormous outlay of money that apparently is lost. However, the advent of a tire-skiving machine of the type shown in the accompanying illustration, offers a means of utilizing old automobile or motorcycle tires, as reliners, retreads, inner liners, side-wall support molds, vulcanizing and blow-out patches.

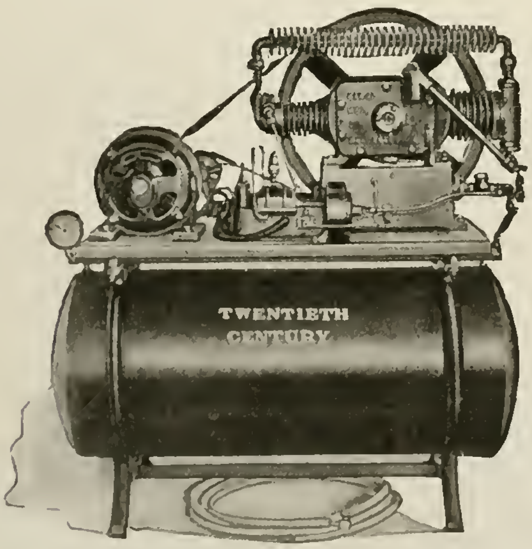


The Maxwell Tire Skiver

The machine has a heavy cast-iron cylindrical pedestal that is bolted permanently in place. Power for operation is derived from a belt pulley connected with the main shaft. The revolving rollers, which carry the tire, are adjustable for the different sizes and styles of tires. The skiving knife is also adjustable to slice off the bead to a feather edge, or to skive any distance from the toe of the bead. The cutting operation is facilitated by water dropped at regular intervals on the knife from the little water tank mounted on the protective guard of the knife. The tire is placed on rollers, the knife set, then the power turned on. The tire will be skived with a clean cut, completely through the material.—Maxwell Manufacturing Co., Wichita, Kansas.

AIR COMPRESSOR FOR GARAGES AND VULCANIZING SHOPS

In this compressor the air is forced from the larger cylinder through the cooler into the smaller cylinder, giving a relative capacity of the two cylinders of 4 to 1, which is claimed to be greater than a single-cylinder compressor of its size.

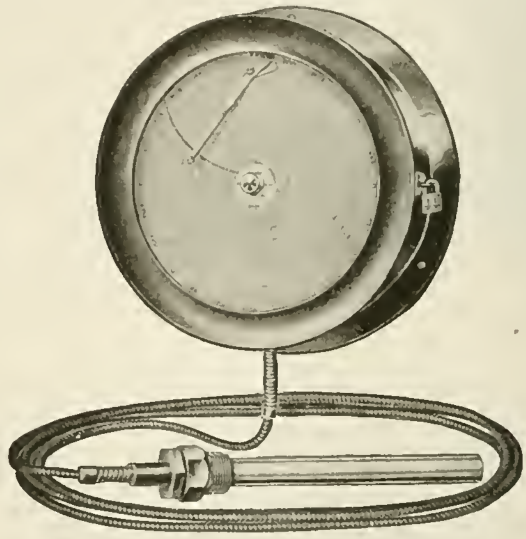


Gasco Two-Stage Air Compressor

Both cylinders and crank cases are cast in one and machined in one operation, insuring perfect alinement. The crank shaft is drop-forged 1⅛-inch diameter, machined and ground. The main bearing is of phosphor bronze, 2⅛ by 2 inches, and is interchangeable. The compressor is so designed that the hole through which the piston enters may be opened at any time without removing the belts. The cylinders are 3 inches and 1½ inches, cast in block, with 3-inch piston stroke—speed 200 to 250 r. p. m. The maximum pressure is 200 pounds. The ½-h.p. motor is either for direct or alternating current. The air tank is guaranteed 150 pounds working pressure. All the fittings are of the best material. The height of the compressor over all is 43 inches and the floor space 19 by 40 inches.—Gasco Manufacturing Co., Lancaster, Pennsylvania.

RECORDING THERMOMETER

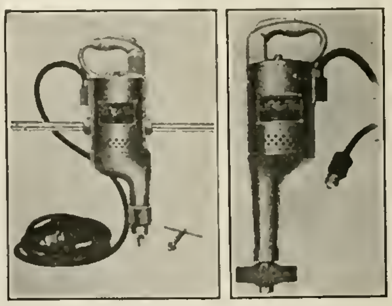
A new recording thermometer is here illustrated, combining many new features and constructional advantages. For instance, a rubber gasket fits tightly in the door and is squeezed together when the door is fastened down, making the instrument dust and moisture proof. An automatic pen release lifts the pen from the paper automatically when the chart is being changed, and replaces it when the door is closed. A special designed chart knob with a few turns grips the chart tightly. The chart clips are mounted on the door and swing aside automatically when the door is opened, without the necessity of slipping the chart under each clip.—The Brown Instrument Co., Philadelphia, Pennsylvania.



The Brown Thermometer

SMALL ELECTRIC TOOLS FOR RUBBER FACTORIES

Both the portable electric drill and electric grinder shown in the picture herewith are motor driven, using direct or alternating current, and automatically stop when not in use. This is due to the fact that the current contact functions through a spring lever in the handle which is released as soon as the pressure of the operator's grip is removed, much on the same order as the valve on a pneumatic hammer. The switch is a quick make and break, located in the top handle and operated by the palm of the hand. The casings of the motors are of high-grade aluminum. Self-oiling ball bearings are used throughout. Motor windings are protected from any possible injury by the liquid tight grease compartments for the gears. The motors will stand severe usage and overloading. Ten feet of extra heavy flexible cord is furnished with each equipment.

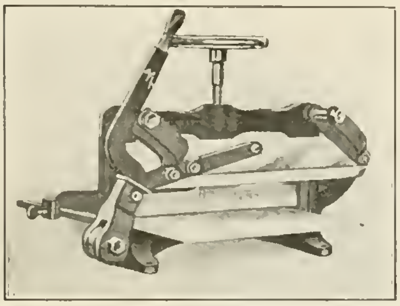


Wodack Electric Drill and Grinder

The electric drill is a handy tool for the machine shop. The electric grinder is designed for buffing, polishing, removing brands or imperfections from finished tires.—Wodack Electric Tool Corporation, 23-27 South Jefferson street, Chicago, Illinois.

RUBBER STOCK CUTTER

The accompanying illustration shows a very strongly built hand-operated stock cutting knife adapted for cutting tubed rubber stock for mold work or plied up rubberized fabric to be crosscut into strips. It is made by a firm that specializes in machinery for cutting fabrics, paper, silk and leather substitutes.—C. A. Harnden & Co., Hyde, near Manchester, England.



GUILLOTINE CUTTER

MACHINERY PATENTS

MACHINES FOR COMPACTING CARBON BLACK

How to suppress the excessive dust resulting from the extensive use of carbon black in tire stocks has taxed the inventive skill of rubber engineers. The special machines described below are designed to simplify the black mixing problem by the elimination of most of the contained air and the delivery of the black in a compact condition.

Fig. 1 shows the hydraulic press in vertical cross-section. It consists of a base *A* containing a fluid pressure chamber *B* carrying lugs *C* through which bolts connect similar lugs *D* of an upper chambered member *E*. The latter is closed by a cap *F* hinged at *G* and latched at *H*. Through the top of *F* are ducts *I* for the escape of the air entrapped in the carbon black confined in the chamber *E* as pressure is brought to bear upon the material by the upward movement of the ram *J*. The escape of carbon black is prevented by a cloth screen *K* held between the top of the chamber *L* and the cover cap *F*.—William W. McMahan, assignor to Morgan & Wright, Detroit, Michigan. United States patent No. 1,372,181.

In the machine shown in Fig. 2, an outer vessel *A* has a cover *B* arranged for being tightly bolted on; a gasket clamped by a suitable ring device; a rubberized bag *C* forming a collapsible lining to *A* and a receptacle for the cloth bag *D* containing the carbon black to be compressed. An interconnecting system of piping communicates with the interior and exterior of the rubberized bag *C*. In operation the air is exhausted from the inside of the bag *C*, causing the air in the material in the bag *D* to escape through the bag walls by way of the upper pipe passages. After the air has been exhausted, fluid under pressure is admitted to the outside of the bag *C*, which is accordingly compressed around the bag *D* and thus compacts the material in *D* to a much reduced bulk.—Chester J. Randall and Richard R. Taylor, assignors to Goodyear's Metallic Rubber Shoe Co., all of Naugatuck, Connecticut. United States patent No. 1,372,190.

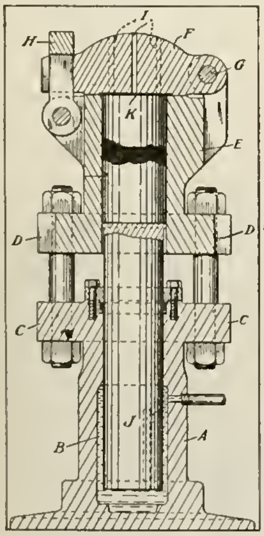


FIG. 1. CARBON BLACK PRESS

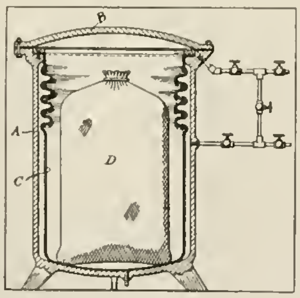
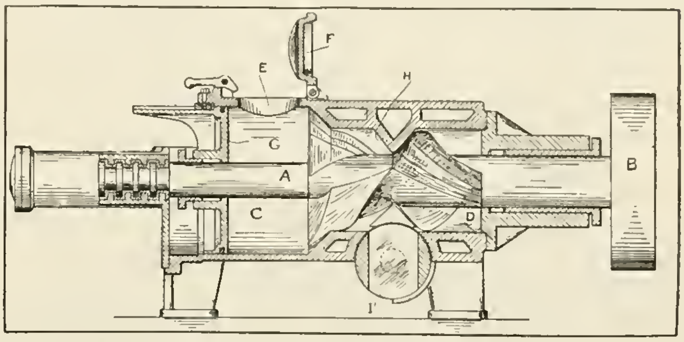


FIG. 2. APPARATUS FOR COMPACTING CARBON BLACK

RUBBER MASTICATOR AND MIXER

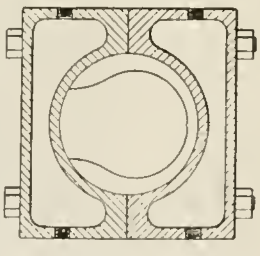
The enclosed masticator and mixer shown in longitudinal section in the illustration, comprises a rotor *A* driven by a gear *B* in a two-chambered casing *C* and *D*. The rubber and ingredients to be mixed are placed in *C* through an opening *E*, which may be closed by the door *F*. In chamber *C* is a hydraulic piston *G*, which forces the contents of the chamber into the working chamber *D* when it is extruded by the rotor *A*, forward and back through a limited opening between the rib *H* and the rotor. The effect is to plasticize and smear the mixture against the interior surfaces of chamber *D* and combine the ingredients in intimate mixture. The chamber *D* is provided with hollow walls for the circulation of water for cooling the materials below the heat of vulcanization. At the end of the mixing operation the contents of the working chamber are emptied by gravity through a special valve *I* on the lower side of the working chamber *D*.—D. R. Bowen and C. F. Schnuck, assignors to Farrel Foundry & Machine Co., Ansonia, Connecticut. United States patents Nos. 1,354,452, 1,355,305 and 1,356,691.



FARREL ENCLOSED MIXER

COVERING TENNIS BALLS

An improvement in covering tennis balls which consists in wrapping pieces of a multipiece fabric cover around a rubber ball and abutting the edges of the cover without distorting pressure upon the ball, the cover pieces being of larger total area than the surface area of the rubber center. The oversize cover is then compacted into a smooth, snug fit upon the rubber ball by heating the molds and cooling the ball before removing from the molds.—A. G. Spalding & Brothers, Chicopee, assignee of Frank J. Faulkner, Lynn, both in Massachusetts, U. S. A., Canadian patent No. 208,269.



TENNIS BALL MOLD

OTHER MACHINERY PATENTS

THE UNITED STATES

No. 1,372,799 Tire repair vulcanizing device. J. J. Cotter, Philadelphia, Pa.

1,373,212 Fabric cutting and winding apparatus. W. C. Tyler, Racine, Wis., and A. H. Koza, Akron, O., assignors to The Goodyear Tire & Rubber Co., Akron, O.

1,373,228 Expansible collapsible tire core. W. G. Fording, Cleveland, O.

1,373,229 Expansible and collapsible tire core. W. G. Fording, Lakewood, O.
1,373,389 Tire mold. G. H. Witsaman, assignor of one-half to W. B. Ruston—both of Dayton, O.
1,373,807 Tire repair vulcanizer. O. M. Fredd, Hancock, Mich.
1,374,371 Footwear repair vulcanizer. W. H. Foster, Bad Axe, Mich.
1,374,449 Tire stitcher and stitcher mounting. W. B. Harsel, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.
1,374,463 Machine for manufacturing asbestos gaskets. E. Nall, deceased, by E. A. Nall, executrix, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O. Original application divided.
1,374,584 Apparatus for making inner tubes. H. C. Knecht, Akron, O.
1,374,805 Mold and process for rebuilding tires. H. G. Ballou, Los Angeles, Calif.
1,375,214 Expansible core and tire mold. B. Darrow, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.
1,375,468 Apparatus and method for treating selvage. M. A. Replogle, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.
1,375,473 Mold for vulcanizing endless belts. C. L. Smith and E. S. Webster—both of South Bend, Ind.
1,375,528 Apparatus and method for tire retreading. J. H. Miller, San Luis Obispo, Calif.
1,375,542 Equipment for vulcanizing tire casings. J. Tramm, Coshocton, O.
1,375,543 Tire mold. E. H. Trump, Barberton, O.
1,375,655 Insulated wire covering machine. J. A. Heany, New York, N. Y., assignor by mesne assignments to Rockbestos Products Corporation, a Delaware corporation.
1,375,669 Interlocking tire mold. K. B. Kilborn, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.
1,375,989 Cutting machine, suitable for cloth, sheet rubber, etc. J. E. Williams, Chicago, Ill., assignor to Eastman Machine Co., Buffalo, N. Y.
1,376,018 Machine for trimming overflow from rubber heels. T. E. Kane, assignor of one-half to A. Sydeman—both of Boston, Mass.
1,376,123 Apparatus for molding tires. C. W. Stickel, Rochester, assignor to Good Luck Tire & Rubber Co., Buffalo—both in N. Y.
1,376,149 Tire repair vulcanizer. F. O. Melin, assignor of one-half to L. H. Peterson—both of Omaha, Neb.
1,376,196 Tire repair vulcanizing mold. O. M. Fredd, Hancock, Mich.

REISSUES

15,076 Vulcanizing apparatus and process. E. Fetter, assignor to The Pneumatic Tube Steam Splicer Co.—both of Baltimore, Md. Original No. 1,312,029, dated August 5, 1919.

THE DOMINION OF CANADA

209,865 Tire press. W. E. Hardeman, Birmingham, Eng.
210,425 Tire-making machine. The Goodyear Tire & Rubber Co., Akron, O., assignee of W. C. Tyler, Racine, Wis.—both in U. S. A.
210,426 Apparatus for attaching tire bases to rims. The Goodyear Tire & Rubber Co., assignee of E. A. Nall, administratrix of E. Nall, deceased—both of Akron, Ohio, U. S. A.
210,427 Tire treading machine. The Goodyear Tire & Rubber Co., assignee of K. B. Kilborn—both of Akron, Ohio, U. S. A.
210,428 Stitching unit of tire-making machinery. The Goodyear Tire & Rubber Co., assignee of W. B. Harsel—both of Akron, Ohio, U. S. A.
210,429 Machine for making tires. The Goodyear Tire & Rubber Co., assignee of W. B. Harsel—both of Akron, Ohio, U. S. A.
210,431 Marker for tires. The Goodyear Tire & Rubber Co., assignee of W. B. Harsel—both of Akron, Ohio, U. S. A.
210,729 Tire-treading machine. The Dunlop Rubber Co., Limited, London, assignee of C. Macbeth, Birmingham, Warwick—both in Eng.
210,731 Tire-building machine. The Goodyear Tire & Rubber Co., assignee of E. G. Templeton—both of Akron, Ohio, U. S. A.
210,732 Apparatus for producing cord tire fabric. The Goodyear Tire & Rubber Co., assignee of F. A. Seiherling—both of Akron, Ohio, U. S. A.
210,816 Mold for pneumatic tires. S. J. Glenn and S. H. Moore, coinventers—both of Brampton, Ont.
211,050 Mandrel for marking inner tubes, and method of manufacture. The Republic Tool & Manufacturing Co., assignee of C. E. Lewe—both of Cleveland, Ohio, U. S. A.

THE UNITED KINGDOM

157,112 Machine for making studded tire covers. E. Janik, 1 E, Karl Ludwigstrasse, Vienna. (Not yet accepted.)
157,113 Apparatus for making studded tire covers. E. Janik, 1 E. Karl Ludwigstrasse, Vienna. (Not yet accepted.)
157,114 Machine for making studded tire covers. E. Janik, 1 E. Karl Ludwigstrasse, Vienna. (Not yet accepted.)
157,115 Machine for making studded tire covers. E. Janik, 1 E. Karl Ludwigstrasse, Vienna. (Not yet accepted.)
157,150 Tire core provided with spacing members to insure adequate transverse stretching during vulcanization. Federal Rubber Co., Cudahy, assignee of A. A. Frank, Milwaukee, both in Wis., U. S. A. (Not yet accepted.)
157,317 Mechanism for making studded tire covers. E. Janik, 1 E. Karl Ludwigstrasse, Vienna. (Not yet accepted.)
157,412 Apparatus for vulcanizing tires. F. T. Roberts, Cleveland, Ohio, U. S. A. (Not yet accepted.)
157,413 Mold for vulcanizing rubber, composed of 97 per cent aluminum and 3 per cent magnesium. F. T. Roberts, Cleveland, Ohio, U. S. A. (Not yet accepted.)
157,479 Apparatus for reducing or extinguishing the burner flame of a vulcanizer. W. Frost and H. Frost & Co., Limited.
157,829 Machine for mixing and masticating rubber. Farrel Foundry & Machine Co., 30 Main street, assignee of D. R. Bowen, 5 Clover street, and C. F. Schnuck, 80 North State street—all in Ansonia, Conn., U. S. A. (Not yet accepted.)
158,054 Device for testing physical qualities of materials. H. L. Scott, 45 Mawney street, Providence, Rhode Island, U. S. A.
158,279 Machine for mixing or masticating rubber. Farrel Foundry & Machine Co., 30 Main street, assignee of D. R. Bowen, 5 Clover street, and C. F. Schnuck, 80 North State street—all in Ansonia, Conn., U. S. A. (Not yet accepted.)
159,015 Apparatus for cutting rubber, slicing uncured rubber for boot heels, etc. Wood-Milne, Limited, 42 Wigmore street, London, and B. C. Barton, 13 Park street, Lytham, Lancashire.
159,106 Apparatus for treating rubber. S. C. Davidson, Sirocco Engineering Works, Belfast.

GERMANY

DESIGN PATENTS ISSUED, WITH DATES OF ISSUE

769,608 (January 22, 1921.) Attacher for rubber soles and heels. Ernst Block, Benderstrasse 93, Düsseldorf-Gerresheim.
770,878 (January 6, 1921.) Arrangement for attaching soles and heels of rubber or other material to footwear by means of cements. Karl Ehmann, Neckarsteinach.
770,922 (February 22, 1921.) Tin vulcanizing mold composed of two parts. Fleming & Cie., G. m. b. H., Charlottenburg.
770,925 (February 22, 1921.) Tin vulcanizing mold composed of two parts. Fleming & Cie., G. m. b. H., Charlottenburg.
770,926 (February 22, 1921.) Vulcanizing molds. Fleming & Cie., G. m. b. H., Charlottenburg.
772,192 (March 4, 1921.) Container for vulcanizing masses of rubber. Alexander Herzog, Karlsbad; represented by A. Elliot, Berlin, S. W. 48.
772,877 (March 14, 1921.) Sawing-machine for hair combs. Firma Eduard Mech, P. Sorzheim.
773,405 (March 15, 1921.) Vulcanizing mold. Fleming & Cie., G. m. b. H., Charlottenburg.
773,898 (February 22, 1921.) Vulcanizing mold composed of two parts. Fleming & Cie., G. m. b. H., Charlottenburg.

PROCESS PATENTS

THE UNITED STATES

No. 1,373,094 Construction of tire carcasses from tubular fabric. A. E. Preyer, New York, N. Y.
1,374,505 Manufacture of fabric tires. E. Hopkinson, New York, N. Y.
1,374,846 Repairing tire casings. F. D. Goodlake, West Palm Beach, Fla.

THE UNITED KINGDOM

157,742 Coating tire valves, etc., to prevent rusting. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of M. C. Schweinert, 42 Riverside Drive, New York, and H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—all in U. S. A. (Not yet accepted.)
157,783 Manufacturing boot soles from old tires. U. Chandeysson, 44 rue Lamartine, Nice, France. (Not yet accepted.)
157,792 Utilizing waste rubber tires in manufacture of boots, gaiters, belts, etc. U. Chandeysson, 44 rue Lamartine, Nice, France. (Not yet accepted.)
157,978 Coagulating latex. E. Hopkinson, 1790 Broadway, New York, U. S. A. (Not yet accepted.)

GERMANY

PATENTS ISSUED WITH DATES OF ISSUE

336,363 (January 30, 1920.) Cutting garment protectors. Deutsche Kabelwerke A. G., Berlin.
336,518 (October 24, 1919.) Manufacture of non-scratching brushes and combs. Bohumil Jirotka, Bellealliance strasse 13, and Heinrich Küchenmeister, Fürtherstrasse 1—both in Berlin.
336,918 (June 9, 1914.) Repairing tire covers. F. W. Farr, Northampton, England represented by R. Geissler, Berlin, S. W. 11.

DESIGN PATENTS ISSUED WITH DATES OF ISSUE

765,467 (April 6, 1920.) Method of vulcanizing rubber tires. L. Schetter & Co., Cologne.
772,213 (January 13, 1920.) Method for pumping automobile tubes next to the motor. Johann Peter No, Bendorf on the Rhine.
772,271 (March 4, 1921.) Mounting tires and tubes on bicycles. Anton Kreidler, Trossingen.

TIRE CONTAINER TAKING FIRST-CLASS FREIGHT RATE

The "Handy" tire shipping case is made in five sizes. The three most common will hold 14, 9 and 8 tires, respectively. Two special containers are provided for large-sized tires. The center wires and a closing machine are furnished by the manufacturer. Tires packed in these containers take the first-class freight rates in almost every part of the United States. The maximum weight limit of the container is 225 pounds, and the weight of the package is approximately 11 pounds. The "Handy" comes in collapsed condition, and to fill it with tires, open the container and stand it on one end, inserting a tire, fold down the end and bring the wires to center, then reverse the case and fill, folding in the end and thread the center rod through the wire loop ends, fastening securely with the closing machine.—The Ohio Boxboard Co., Rittman, Ohio.

Ten Tires Ready for Shipment

New Goods and Specialties

BALL WITH FEATURES AND PROJECTIVE TONGUE

This toy is formed of a hollow spherical rubber body, which is molded to represent a human head with nose, eyes, ears, and hair either stamped, painted or molded thereon; and an elliptical-shaped opening to provide a mouth. The tongue is of thinner rubber than the ball, colored red, tapering on one end, and the open end is secured to the ball inside the mouth-opening by vulcanizing or other suitable method.

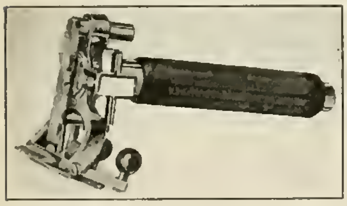

"Tongue-Ball"

Upon squeezing or depressing the sides of the ball with the fingers, the tongue is forced outward by the air compressed therein; while, when the pressure is released, air suction withdraws the tongue into the ball. The "tongue-ball," when depressed, simulates the appearance of a head sticking out the tongue.

It is, of course, possible to mold any desired face, from that of an attractive child to one of a grotesque clown. In this way a line of distinctly amusing and entertaining toys may be put out, all employing some application of the darting tongue.—United States patent No. 1,352,047. Rudolf W. Boje, Jr., 106 Goembel avenue, Buffalo, New York.

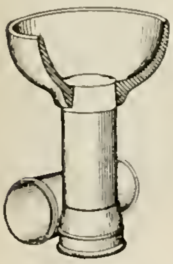
ELECTRICAL CLIPPER WITH HARD RUBBER HANDLE AND KNOBS

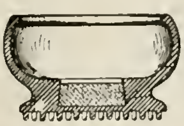
Of interest to the artist of shears and razors is a new electric hair clipper which is driven by a flexible shaft connecting at the end of one handle. The mechanism for oscillating the upper cutting plate is of novel construction. A vertical lever, pinned at its top, swings the plate back and forth. The blade angle is adjusted by pressure of the hand against a spring. As with many electrical devices in practical use, the handle and the two large thumb knobs are of hard rubber.—The Barbers' Electric Specialty Co., 4204 Troost avenue, Kansas City, Missouri.


Coffman Electric Hair Cutter

RUBBER SHAVING AND LATHER CUPS

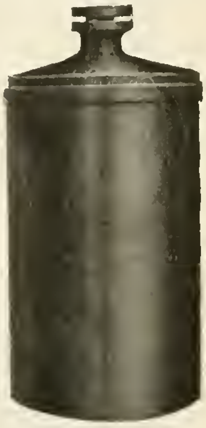
A rubber bowl-shaped shaving-cup having a circular opening in the bottom of the cup, into which a stick of shaving soap is inserted, will be of interest to the clumsy man who is continually chipping and cracking the highly ornamented china shaving cup with which women so delight in supplying him. The soap can be removed after using, and returned to the metal container in which it is purchased, while the cup is easily washed and, being flexible, occupies little space. The lather-cup differs from the shaving-cup in that it has a large base on which are small rubber massage projections, and into the circular recess in the inside bottom of the cup may be fitted a small piece of soap.—United States patents Nos. 1,369,766 and 1,369,767. Lewis A. Amis, Muskogee, Oklahoma.


Shaving-Cup


Lather-Cup

HARD RUBBER CARBOY FOR ACIDS

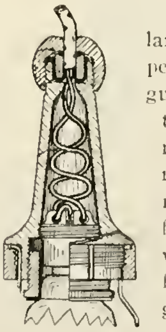
The illustration shows a 29-gallon carboy made of all hard rubber. This carboy is used for handling strong acids, strong alkalies and other corrosive liquids such as nitric acid, sulphuric acid, hydrochloric acid, hydrofluoric acid, sodium or potassium hydrate, and blue, white or green vitriol, etc. The carboy is fitted with a tapered stopper which prevents the acid fumes from escaping. The manufacturer claims that as far as known this is the largest one-piece closed article ever produced from hard rubber. The process employed in manufacturing requires the skill of an experienced worker.


Largest Rubber Carboy

As many violently active acids and corrosive liquids have absolutely no effect upon hard rubber this carboy is in great demand. In addition to the carboy this company manufactures pails, funnels, scoops, dippers, measures, tanks, etc.

This equipment is used for the handling and conveying of fruit juices, preserves, mustard, near beer and many other products in addition to acids and alkalies.—American Hard Rubber Co., 10 Mercer street, New York, New York.

IMPROVED PORTABLE HAND LAMP


Portable Hand Lamp

A new corrosion-proof type of portable hand lamp for use in damp and corrosive situations, especially in chemical works, boiler houses, etc., is guaranteed to have no screws or wing nuts to affix the guard, no screws to secure the leather hanger, no porcelain parts to get broken, no broken connections, no special tools or keys required, no corroded terminals and no shocks. All parts are fireproof, heat resisting and interchangeable. It will take carbon lamps up to 50 c.p. and metal filament up to 60 watts. The lamp has a rubber gasket and a rubber cushion. The illustration shows a cross-sectional view.—J. C. White, 1 Cumberland street, Manchester, England.

AN ATTRACTIVE BROGUE RUBBER

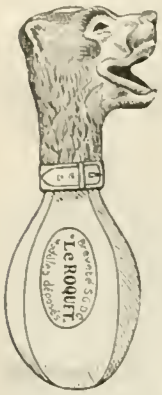
Distinctly in line with the movement to induce Canadians to buy goods made in Canada is the apparent effort on the part of Canadian manufacturers to see that their products are in every respect as good as those made in the States.


The "Brogue" Rubber

The accompanying illustration gives an idea of how closely the popularity of the leather brogue has been followed by footwear manufacturers. It shows a new-style rubber, a light-brown croquet with a lavender lining and the wing tip and heel foxing perforated and pinked in exact imitation of the much-favored brogue. This rubber, worn with a low-heeled walking boot having a medium-weight sole, produces almost exactly the effect of wearing a real brogue, and at considerably less cost.—Ames Holden McCready Limited, Montreal, Quebec, Canada.

A BARKING DOG THAT DOES NOT BITE

An ingenious Frenchman is the originator and patentee of another newcomer to Happyland in the Country of Children. "Le Roquet" is a barky dog. The dog is a sure enough "hound dawg" with a bright green collar and is bound to delight the heart of any youngster. The metal dog head with a wide-open red mouth, is attached to an unusual-shaped rubber bulb. The bulb is made up in four sections and cemented together. From the neck of the bulb upward almost to the top of the head extends a metal tube. Across the bottom is fastened a narrow bit of rubber band. The compressed air from the bulb is forced outward through the pipe or tube against the head and causes a most lifelike yap.



"Le Roquet"

HOME DOCTORING FOR WEAK DOLLS

No longer is it necessary for Little Mamma, when Dolly is wobbly and no longer able to stand alone, to send her to the hospital and spend many days in sad waiting for her return, with strength adequate to stand the strain of youthful devotion. A kind and thoughtful inventor has perfected an improved "Dolly Dimples" rubber elastic in two pieces that fit dolls from 10 to 14 inches up to 36 to 48 inches in height, which are packed not only for hospital use, but for retailing. Special elastics for character infant dolls are also manufactured for both retail and hospital trade. The insertion of the elastics is very simple. The arms and legs move freely and retain the position in which they are placed.—Fred K. Braitling, Bridgeport, Connecticut.

Doll Repair Elastics

NOVELTIES IN COMPLETE RUBBER BATHING COSTUMES

Talented modistes on the Pacific Coast have been vying with one another in designing beach costumes of rubber, and several of the "creations" have made a decided hit at the pre-view exhibits given at some of the fashionable hotels. The only complaint made about the rubber garments was that they tore easily. The makers investigated and found that some of the young women who posed in the costumes used pins recklessly, thus causing the rents in the garments.

Rubber Bathing Costumes Designed for the United States Rubber Co.

The chief novelty displayed was a so-called "wrappy" cape, full and long enough to merit the term cloak, and much more artistic and stylish than the capes of last season. One model had broad blue and yellow stripes extending lengthwise, and a short blue shoulder cape; another had very broad diagonal stripes of white and blue, the lining being solid black. Another combination was a scarlet cape worn over a blue blouse and skirt suit trimmed with red, coupled with a red sash; one was a sailor-like suit in dark red with green trimming, and a broad white collar; while another costume in black had harem trousers, a white and green checked yoke, and a red and white striped sash.

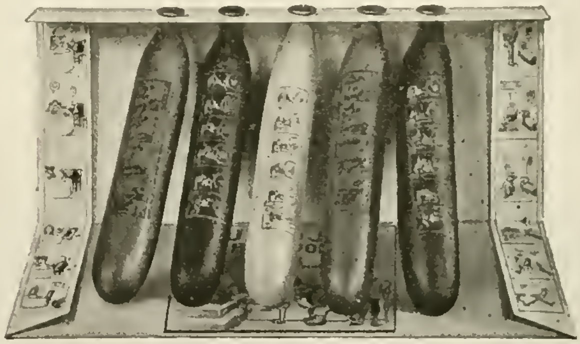
The effectiveness of the costumes was enhanced by rubber caps and hats to match the capes and suits, and bedecked with trimming in complementary colors, bows, rosettes, medallions, and conventional floral designs. The makers avoid what are known as the pastel shades, realizing that the only colors that will stand the intense sunlight are the mineral pigments.

"SEALTYTE" SELF-HEALING INNER TUBE

This leak-proof tube is made of red rubber with the tread portion separated into two layers with plastic rubber inserted between. It is guaranteed to self-heal punctures and give greater service than regular inner tubes. Continual road tests and the most severe laboratory tests have shown that the plastic rubber instantly fills any puncture made in the tube.—Victory Rubber Manufacturing Co., 229 Peachtree street, Atlanta, Georgia.

"MUTT AND JEFF" MAKE ANOTHER PUBLIC APPEARANCE

Mutt and Jeff, of newspaper and movie popularity, are now appearing among the novelties for children in the form of picture balloons. Each balloon has printed upon it six pictures of some of the exploits of the famous long and short comedians. These

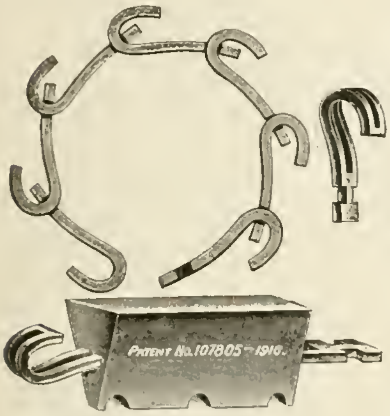


Mutt and Jeff Picture Balloons

sausage balloons are packed in two types of packages which are lithographed in three colors and carry a series of pictures also. The packages containing two balloons are 3½ by 6¾ inches while those containing five are 4 by 10 inches. The five-balloon packages are put up in various assortments containing balloons of different sizes. The illustration shows five Mutt and Jeff picture balloons in their attractive holder.—The Eagle Rubber Co., Ashland, Ohio.

BRITISH MOTORCYCLE LINK BELT

Motorcyclists who have had the experience of shortening, repunching and refitting fasteners owing to the belt slipping will be interested in the Lee Ellis link belt. It is claimed that once adjusted to the V-shaped pulleys which it fits, there is no stretching; that no fasteners or punchers are required, and that the grip, flexibility and transmission of power are perfect. The belt is made in ¾-inch, ⅞-inch, 1-inch and 1⅛-inch sizes. The illustration shows the links joined up as in the belt, a single steel link and a section of link rubber-covered belt showing the protruding ends of the links. When fitting, the T-shaped end is hooked onto the hook end and when removing, it is simply unhooked.—The Midland Rubber Co., Limited, Ryland street, Birmingham, England.



PARTS OF LEE ELLIS LINK BELT

TO MEET THE NEW GOLF REQUIREMENTS

In these days of regulating everything, from moving pictures to the accessories of sports, the United States Golf Association has not been idle. Consequently, he who would spend his happy week-ends "driving little white pellets over the grass" must see to it that the pellets weigh no more than 1.62 ounces avoirdupois and are not less than 1.62 inches in diameter. The newest golf balls are shown here.

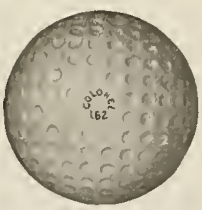
The "Black Diamond," with recessed marking, is a hard wound ball, and meets in size and weight the requirements of the new ruling. This ball is made for the hard hitter, who desires extreme distance. Its cover is said to be particularly durable and its flight approximately perfect.—The Worthington Ball Co., Elyria, Ohio.

The "U. S. Royal 30-X" weighs just under 30 dwt., which is approximately the equivalent of 1.62 avoirdupois ounces. It is distinguished particularly by the fact that its cover is unusually tough and not easily cut. This cover is made in what is known as the six-pole recessed marking. Expert golf players pronounce this ball to be long-driving, controllable on approach shots, and practically perfect in putting qualities.—United States Rubber Co., 1790 Broadway, New York, N. Y.

Another new ball of the long-flying, non-floater type is the "Colonel 1.62," in dimpled and meshed marking, made in the same size as the "Colonel 31." The "Colonel 30," a dimpled ball featured by the same manufacturer, is said to be about equal in popularity, while the "Colonel 27," a floater, in both meshed and dimpled marking, is larger and has great distance.—St. Mungo Manufacturing Co. of America, 121 Sylvan avenue, Newark, New Jersey.

"BLACK DIAMOND"

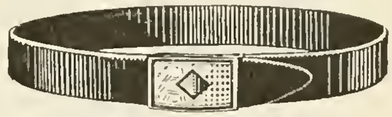
"U. S. ROYAL 30-X"



"COLONEL 1.62"

"FLEXYDE" BODY BELTS FOR EVERYBODY

"Flexyde," a rubberized fabric, is used as a substitute for leather or elastic webbing in the making of belts which hold their shape, will not fray, curl, crack or discolor and are pliable. These belts can be washed with soap and water without the slightest injury, this sanitary feature enhancing their value. Marathon "Flexyde" belts are made in two styles, those having the characteristics of fine calf skin, in black, cordovan, gray and white; and those which have the walrus grain, in black and natural finish. Belts are made for men, women, boys and girls.—The Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio.



MARATHON WASHABLE "FLEXYDE" BELT

RUBBER REDUCING SUIT FOR JOCKEYS

The life of the jockey is not only happy association and training with his much-loved horse, but a severe training to reduce and maintain light weight. Alfred Johnson, said to be the world's greatest post rider, has devised a rubber suit to aid in weight reduction. It is of very thin rubber, in two pieces, the coat lacing all the way down the front, and the pants, slipping over the coat, lace up the front. The suit is tied at the ankles and the wrists. This suit induces perspiration when the wearer is exercising strenuously, and proves a great aid to the reduction of weight.

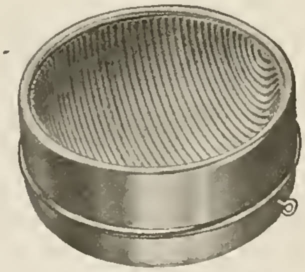
Central Photo News Service, N. Y.

MANAGER GROH ADJUSTING JOHNSON'S RUBBER SUIT

MUNRO GOLF BALL CLEANERS

The Munro and Junior Munro golf-ball cleaners are composed of two cups set in an aluminum holder. One cup contains a rubber sponge, the other a corrugated rubber mat, supported by an aluminum cup. The wet sponge is rubbed on the golf ball, then the ball is cleaned by a few turns upon the rubber mat, and lastly the ball is rinsed. The rubber mat can be removed and cleaned without difficulty. Each part can be renewed. This is a very small and handy cleaner whose simplicity makes it desirable and serviceable.—The Ellsworth Co., East Orange, New Jersey.

BOTTOM CUP AND SPONGE



TOP CUP AND CLEANER

ACTIVITIES OF THE RUBBER ASSOCIATION OF AMERICA, INC.

CARBON BLACK LEGISLATION

The Association has adopted the following resolution respecting adverse legislation introduced into various states and affecting the carbon black industry:

Resolution

Whereas, The Board of Directors of The Rubber Association of America, Inc., has learned that carbon black manufacturers, as represented by the National Gas Products Association, are meeting with severe difficulties in the form of adverse legislation in various states affecting the manufacture of carbon black, and

Whereas, Carbon black is a very necessary material in the manufacture of rubber goods in its many forms, the Board of Directors do hereby,

Resolve, That this matter be directed to the attention of the U. S. Bureau of Mines, Washington, D. C.

CHANGES IN CONSOLIDATED FREIGHT CLASSIFICATION NO. 2

Supplement No. 2 to Consolidated Freight Classification No. 2 has been published, effective May 25, 1921, changing ratings on the following rubber products:

The rating on artificial leather or auto top material shipments in any quantity will be fourth class in carloads.

Shipments of crude rubber to points in the South have been changed to second class in less carload and fourth class in carloads.

The rating on fruit-jar rings to points in the South is second class less than carloads and fourth class carloads.

Pneumatic tire valve carload rating of third class with a minimum carload weight of 40,000 pounds has been established to points in official and western classification territories. The rating under the southern classification is unchanged.

Pneumatic tires in wire bound bundles are rated first class in less than carloads to and between points in the South.

Pneumatic tires in paper-wrapped bundles or bales are rated first class in less than carloads, and applicable in official and western classification territories. The effective date will be published later.

CLASSIFICATION OF TIRES IN MISSISSIPPI

The Mississippi Railroad Commission has granted the application and has authorized the publication of the same packing specifications and ratings on pneumatic and solid tires as are now contained in the Southern Classification. This will enable tire manufacturers to follow the same method of packing shipments from branches in Mississippi for movement within that State as now used on shipments on interstate traffic in the South.

FREE STORAGE PERIOD EXTENDED

According to a new ruling the Trunk Line Association will extend the time of free storage at New York railroad piers on less carload shipments for export from two to five days, exclusive of Sundays and holidays, and will not include the day of arrival. Bills of lading and cases should be marked "For Export" and after two days of the period have elapsed, payment for storage can be avoided only through the presentation of a bonafide vessel permit when calling for the goods.

RUBBER TRADE INQUIRIES

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

(867) The address is desired of the manufacturer of or dealer in a fish-scale composition used in compounding rubber.

(868) A concern dealing in bank supplies desires the addresses of manufacturers of rubber bands.

(869) A reader requests the addresses of manufacturers of dipped goods forms.

(870) Inquiry is made for the addresses of manufacturers of playing-ball machinery.

(871) A manufacturer asks where steam tube splicers can be obtained.

(872) A request has been received for the addresses of manufacturers of sponge rubber in molded form.

(873) A reader desires the address of a manufacturer of machinery for filling tubes with rubber cement.

(874) A manufacturer requests the address of the manufacturer of a machine for uniting rubber sheets.

(875) A reader inquires where he can obtain hard rubber combs.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS

Addresses may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or from the following district or cooperative offices. Requests for each address should be on a separate sheet, and state number.

District Offices.	Cooperative Offices.
New York: 734 Customhouse.	Cleveland: Chamber of Commerce.
Boston: 1801 Customhouse.	Cincinnati: Chamber of Commerce; General Freight Agent, Southern Railway, 96 Ingalls Building.
Chicago: 504 Federal Building.	Dayton, Ohio: Dayton Chamber of Commerce.
St. Louis: 402 Third National Bank Building.	Los Angeles: Chamber of Commerce.
New Orleans: 1020 Hibernia Bank Building.	Philadelphia: Chamber of Commerce.
San Francisco: 307 Customhouse.	Portland, Oregon: Chamber of Commerce.
Seattle: 848 Henry Building.	

(34,786) An American citizen, vice-president and manager of a corporation in China, desires to secure representation of manufacturers of automobile accessories suitable for Chinese, Manchurian and Siberian markets.

(34,828) Merchant in Czecho-Slovakia desires to purchase and secure agency for all kinds of rubber goods, rubber coats and dresses, rubber shoes and heels.

(34,877) A firm of commercial representatives in Spain desire to secure the exclusive agency for the sale of automobile tires.

(34,888) A commercial agency firm in India desires to receive manufacturers quotations only on rubber tires for carts and carriages.

(34,896) A trading corporation in Mexico desires to secure prices for new and second-hand tires and tubes.

SAFETY WITH VULCANIZATION APPARATUS

Fourteen points to promote the peace of mind of owners, insurers, and operators of vulcanizing apparatus were ably set forth by Frank Scott, supervisor of inspections for the safety department of Hamlin & Co., New York, at the meeting of the Rubber Division of the Ninth Annual Safety Congress held in Milwaukee, Wisconsin. Old apparatus, with various attachments and clumsily insulated, making internal and external examination difficult, should be banned, he said. Laws were urged to require the removal of all vessels condemned as unsafe to operate at required pressure. The utmost care should be exercised in moving vulcanizers, not only because of danger to men, but of injury to the vulcanizer itself, if it has been long subjected to metal fatigue. Cast iron should be forbidden on large vulcanizers and all should be built according to the American Society of Mechanical Engineers' Boiler Code, namely, of tested material, and subjected to a strain of 1½ times their working pressure before being used.

Regular inspection by boiler specialists should be insisted upon; setting should allow contraction and expansion to eliminate undue wear and strain; safety valves should be provided for all vulcanizers, including belt presses and platen presses, between the reducing valve and connections; employes should be advised of hazards as well as operation; proper drainage should be provided and pipes covered to avert injury from burns; doors should be bolted thoroughly and none opened until the steam gage shows no pressure; no pipes should be used on wrenches, thus avoiding strain on bolts; cars should not be allowed to

bump and perhaps damage the heads; loading tracks should be well fastened to avoid upsetting loads; track bridges should be counterweighted if used to run cars from the floor level to the heater.

Wherever CO_2 vulcanizing apparatus is used care must be taken not to let the CO_2 drums drop; not to remove the top caps of the drums when not charging; the valves between CO_2 drums and tank should be opened, in charging the tank, before the valve on top of the CO_2 drum is opened; care should be taken to see that there are no leaks in the CO_2 tank or piping; to bring pump vulcanizer to zero pressure before opening door; to set all safety valves daily or during each heat; to guard against all leaks and to see that all old gas is discharged outdoors where it cannot harm employes; and to avoid letting the full drum pressure extend to any connection, as the CO_2 drums stand a much higher pressure than any pipe, tank, or fitting connected with them.

THE OBITUARY RECORD

FORMER DIRECTOR, UNITED STATES RUBBER CO.

Charles Augustus Hunter, who retired from the directorate of the United States Rubber Co. about five years ago, died suddenly on May 3 at his home in North Bergen, New Jersey, at the age of 56.

Charles A. Hunter

Mr. Hunter was born in Monroe, New York, in 1865, and was educated in the public schools of that town and of Paterson, New Jersey. He first engaged in the grocery business in Paterson, his brother joining him a few years later and continuing with him until, in 1891, Mr. Hunter entered the employ of the Peerless Rubber Co., of North Bergen, New Jersey, as shipping clerk.

Within a few years he had worked his way up to superintendent of the plant, and was later made vice-president. Upon the death of Charles H. Dale, in 1908, he was elected president, a position which he held until his retirement from the rubber business. He was also vice-president of the Rubber Goods Manufacturing Co., Mechanical Rubber Co., New York Belting & Packing Co., Fabric Fire Hose Co., Sawyer Belting Co., Stoughton Rubber Co., Chicago Rubber Works, Hartford Rubber Works, Morgan & Wright, Indianapolis Rubber Co., G. & J. Tire Co., Cleveland Rubber Co., Mechanical Fabric Co., Sandy Hook Reclaiming Works and the India Rubber Co.

Following his retirement from the rubber trade he held the positions of secretary and treasurer of the Herfort Co., manufacturers of hardware specialties, until his death.

Mr. Hunter was well known in rubber circles throughout the United States and his untimely passing is widely mourned. He is survived by his widow and two sons.

WELL-KNOWN MID-WEST SALESMAN AND MANAGER

David Shattuck, late manager of the Kansas City branch of the Federal Rubber Co., Cudahy, Wisconsin, died in Kansas City on March 3. He was born in Washington, Maine, December 2, 1869. In 1890 he went to work for the Pope Manufacturing Co., Boston, rising to branch manager of the Chicago headquarters in the thirteen years of his connection with them. In 1903 he became sales representative for the Hartford Rubber Works, Hartford, as the missionary salesman in the bicycle tire line throughout the Middle West. In 1911 Shattuck became sole agent in Kansas City and surrounding territory for the Federal Rubber Co., and in 1916 was appointed manager of the new Kansas City warehouse and sales offices, which position he held at the time of his death.

INVENTOR AND RUBBER PIONEER

Elisha Stout, formerly associated with the Lambertville Rubber Co., died at his home at Asbury Park, New Jersey, May 8, at the age of 83 years. The deceased was a pioneer rubber man and was connected with the Lambertville company for a number of years, having been patentee of the famous "Snag-Proof" rubber boot. During the Civil War he served in the Navy. He is survived by five daughters. Mr. Stout retired from the rubber business some years ago.

READJUSTMENT POLICIES OF THE NATIONAL CHAMBER OF COMMERCE

American business, as represented in the membership of the Chamber of Commerce of the United States, gets a clearer view of its problems as a result of the ninth annual meeting of the Chamber, held at Atlantic City, New Jersey, April 26 to 29.

The most pressing questions facing business were taken up earnestly by the delegates attending and out of the presentation of views and the discussions there came a series of declarations intended to point the way to means by which a termination of the present period of business uncertainty may be facilitated.

Because of the importance of the relationships of government and business a general theme for the meeting was chosen in the following phrase: "In the public interest—more business methods in government; less government management of business."

Much of the work of the meeting was done in group sessions, addressed by prominent speakers, where frank discussions took place on the major phases of business problems. The groups were formed to follow the main divisions of business, each group representing a department of the Chamber. The groups were: civic development, domestic distribution, fabricated production, finance, foreign commerce, insurance, natural resources production, railroads and shipping.

DECLARATIONS OF THE CONVENTION

Taxation was one of the principal topics taken up by the meeting. Each division was given an opportunity to express views regarding the sales tax, income taxes and further government loans. The outcome was a resolution to submit the subject again to referendum. The Chamber declared in favor of a court or courts of tax appeals to be appointed by the President, independent of the Treasury Department, to adjudicate disputes between taxpayers and the Bureau of Internal Revenue. Through referendum the Chamber is formally committed to a distinction, for purposes of Federal income tax, between gains realized from the sale of capital assets and income derived from business or other current activities, and it advocates less burdensome rates when properly defined than upon the latter.

The report of progress of the Tariff Committee, suggesting a tariff adjustment board to fix tariff rates within limitations to be defined by statute, thus permitting limited changes in tariff rates without a general revision of the tariff by Congress, will undoubtedly become the basis of an early referendum.

Manufacturers' problems taken up by the fabricated production group included wages and their relation to production and sales; treatment of overhead, in stabilizing prices, and the need of statistics in industry. In this connection the Chamber declared for individual initiative, equality of opportunity for all and a wholesome standard of living. It condemned avoidable strikes, lockouts, and all combinations that needlessly limit output or

curtail distribution on the part of workers, owners, or managers of industry. Laws in the various states were urged to promote arbitration as the most economic method of adjusting commercial disputes.

Foreign commerce and trade finance received their due share of consideration, and the Chamber advocated early settlement of the relationship of the United States to the nations of Europe, and of its policy in the maintenance of world peace and commercial intercourse. The importance of determining foreign war debts to the United States in restoring exchanges and advancing export trade was recognized, also communications abroad and American participation in the Brazilian Centennial in 1922.

Transportation was gone into in two group meetings, one dealing with railroads and the other with shipping. The Chamber reiterated its opposition to government ownership or operation of railroads and the belief that regulation should not cripple initiative nor prevent prompt action by those responsible for results. Safe and adequate rail transportation, at the lowest rates consistent with fair wages to employes, and with just returns to the owners sufficient to insure constant growth and improvement in facilities, is essential, but rates and the relation of rates between various commodities should be established with great care.

The development of waterways by the Government for navigation and the generation of electric power was advocated, also the extension of improved highways under restrictions which will permit Federal aid only for roads which will be reasonably enduring, part of an interstate system and adequately maintained.

The Government's fiscal policy and reorganization of its activities was discussed by the finance group. The Chamber urged a national budget with legislation placing upon the President the responsibility for initiating the program of expenditures and revenues which is placed before Congress. Reorganization and coordination of departments and bureaus in the interests of greater efficiency and economy was advocated in the belief that the savings effected will warrant merited salary increases and new services urgently needed, notably obtaining and preparing for American business basic world-wide data on commerce and industry.

The Chamber deplored any tardiness in generous treatment for veterans of the world war who were disabled or became sick in consequence of their service, and for widows and orphans of those who lost their lives in service. It favors forms of assistance which will enable ex-service men to cultivate the soil, build homes, or obtain vocational education, rather than a cash bonus, and advocates consolidation in one department of all government agencies concerned.

Other matters considered by various groups were government relation to national resources, notably coal, oil and timber; domestic distribution; insurance; education; and a celebration of the one hundred fiftieth anniversary of the Declaration of Independence at Philadelphia, Pennsylvania, in 1926.

TREASURY DECISIONS

No. 38689—Gums.—Rubber Association of America *et al.* vs. United States (No. 2035); United States vs. Amsinck & Co. (No. 2038); United States vs. Rubber Association of America (No. 2039); United States vs. Rubber Association of America *et al.* (No. 2040); Rubber Association of America *et al.* vs. United States (No. 2042); Capen's Sons vs. United States (No. 2043); United States vs. Amsinck & Co. (No. 2049).

Cauchillo Gum is not practically usable in the manufacture of chewing gum or as a substitute for chicle, and therefore not dutiable under paragraphs 477, 552, 36, 386, Tariff Act of 1913. Importers claimed free entry under either paragraph 477 or 552 of the Act with an alternate claim that if dutiable it is under the provisions of paragraph 385. The Government contended that all the merchandise is dutiable at 15 cents a pound as crude chicle under paragraphs 36 and 386. Under paragraph 385 of the Tariff Act of 1913, the Board of General Appraisers held the merchandise dutiable at 10 per cent ad valorem as raw or unmanufactured articles not enumerated in paragraph 385.

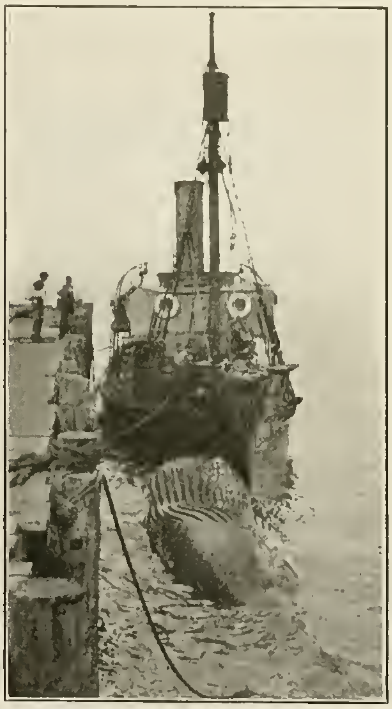
No. 44209.—Protests 935232, etc., of A. M. Capen's Sons, New York.

Gums: Chicle.—It is claimed here that certain gums are dutiable as non-enumerated unmanufactured articles at 10 per cent ad valorem under paragraph 385, Tariff Act of 1913.

Opinion by Hay, G. A.: Upon stipulation of counsel that the gums in question are similar to those passed on in G. A. 8334 (T. D. 38382), they were held dutiable under paragraph 385 as claimed.—*Treasury Decisions*, Volume 39, No. 19, page 11.

WHALE INFLATION HOSE

Special rubber hose plays an indispensable rôle in modern whale hunting. Whale oil is important in the making of costly toilet soaps, lard substitutes, salves, etc., and whalebone is utilized in making buttons, combs, brush backs, umbrella handles, and numerous novelties. The modern methods adopted in whale hunting and in the conversion of the products have built up again a great industry, which at one time had almost ceased to exist.

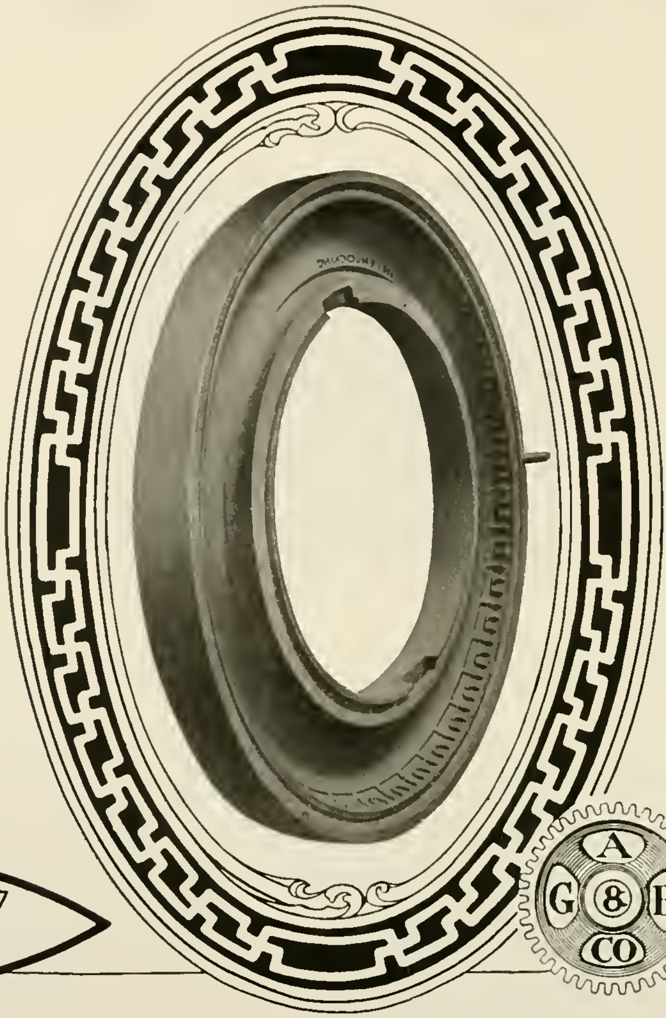


A "Ballooned" Whale

Two of the largest and best equipped whaling plants in the world are located on the coast of California, one at Moss Landing, in Monterey County, and the other at Trinidad, in Humboldt County; and there are several others doing well on the Pacific coast.

Seaplanes are used to scout for whales, and when one is "spotted" a signal is given to men on powerful craft built much like submarine chasers, and on the bows of which are mounted harpoon guns resembling pieces of naval artillery. On the head of each harpoon is a time bomb which explodes within the whale; and fastened to the shank of the harpoon is a heavy chain attached to a half mile of heavy rope, the other end of which is fastened to a steam winch on the boat.

As nearly all whales when killed sink at once if not well secured, a way has been devised to keep the dead whales afloat by inflating them with air pumped into their bodies by means of a high-pressure rubber air-hose terminating in a hollow lance. When the body has been ballooned, which takes but a few moments, the air lance is withdrawn and in the opening made by it a bunch of oakum is thrust, effectively sealing the air hole. Such inflation makes it possible to bring in three and four whales as easily as so many light barges, instead of being so much dead weight in tow as in former days.



News of the American Rubber Industry

FINANCIAL NOTES

The gross earnings of the Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pennsylvania, from sales billed for the year ended March 31, 1921, were $150,980,000, which is an increase of $15,000,000 over the gross earnings of the previous year. The manufacturing and selling cost was $138,774,000, and the net income available for dividends was $12,618,000, or 16.8 per cent on the company's capital stock. Dividends at the rate of 8 per cent per annum were paid during the year on both the preferred and common stock. Property and plant account shows an increase over the previous year of $9,361,000. The amount of unfilled orders on hand April 1, 1921, was $65,621,000.

A syndicate of bankers composed of Goldman, Sachs & Co., H. P. Goldschmidt & Co., Lehman Bros. and Halsey, Stuart & Co. has offered an issue of $10,000,000 ten-year 8 per cent. sinking fund gold notes of the Kelly-Springfield Tire Co. at 99½ and interest. The notes are a direct obligation of the corporation, constitute its only funded debt, and the proceeds will be used for the funding of its floating indebtedness and to furnish additional capital.

On May 16, the plan and agreement of readjustment of debt and capitalization of The Goodyear Tire & Rubber Co., dated February 1, 1921, was declared operative, and pursuant thereto the company has created and sold the first mortgage bonds, debentures and prior preference stock, as contemplated by the plan, and has been reorganized under the Ohio No Par Value Law. The committees under the plan have caused the preferred stock and common stock represented by them to be transferred to the voting trustees under a preferred stock voting trust agreement under which E. G. Wilmer, A. H. Scoville and W. A. Phillips are voting trustees and the Union Trust Co., of Cleveland, Ohio, is depositary, and under a common stockholders' voting trust agreement under which Fred S. Borton, C. R. Erwin, E. E. Mack, Russel L. Robinson and F. A. Seiberling are voting trustees and The Union Trust Co., of Cleveland, Ohio, is depositary.

DIVIDENDS DECLARED

The B. F. Goodrich Co., Akron, Ohio, has declared its quarterly dividend of one and three-quarters per cent, payable July 1 on preferred stock of record June 21, 1921.

The Fisk Rubber Co., Chicopee Falls, Massachusetts, has declared its quarterly dividend of one and three-quarters per cent on second preferred stock of record June 1, payable June 15, 1921.

The Lee Rubber & Tire Corporation, Conshohocken, Pennsylvania, has declared a quarterly dividend of fifty cents per share, payable June 1 on common stock of record May 16, 1921.

The New Jersey Zinc Co., Inc., New York, has declared its quarterly dividend of two per cent, payable August 10 on common stock of record July 30, 1921.

NEW YORK STOCK EXCHANGE QUOTATIONS

MAY 23, 1921

	High	Low	Last
Ajax Rubber Co., Inc	31½	31½	31½
The Fisk Rubber Co	15¾	15¼	15¼
The B. F. Goodrich Co	37½	36⅝	37⅞
The B. F. Goodrich Co., pfd	....	....	....
Kelly-Springfield Tire Co	45½	43½	43⅝
Kelly-Springfield Tire Co., pfd	....	....	....
Keystone T. & R. Co., Inc., The	....	....	....
Lee R. & T. Corporation	26¼	26¼	26¼
United States Rubber Co	72⅝	71⅛	72¼
United States Rubber Co., 1st pfd	....	....	....

AKRON RUBBER STOCK QUOTATIONS

The following are closing quotations of May 20, supplied by Otis & Co., Cleveland, Ohio:

	Bid	Asked
Firestone T. & R. Co., com	70½	74
Firestone T. & R. Co., 6% pfd	..	88
Firestone T. & R. Co., 7% pfd	..	80
General T. & R. Co., The, com	..	..
General T. & R. Co., The, 7% pfd	75	85
Goodyear T. & R. Co., The com	9⅝	10
Goodyear T. & R. Co., The, 7% pfd	28	29¼
McGraw T. & R. Co., The	..	5
McGraw T. & R. Co., The	7½	12
Mason T. & R. Co., The, com	15	18
Mason T. & R. Co., The, 7% pfd	55	60
Marathon T. & R. Co., com	3	4
Miller Rubber Co., The, com	..	70
Miller Rubber Co., The, 8% pfd	68	70
Portage Rubber Co., The, com	17	18
Portage Rubber Co., The, 7% pfd	33	35
Victor Rubber Co., The	16	20

NEW INCORPORATIONS

Allied Golf Co., March 23 (Illinois), $100,000. A. J. Musselman, president; C. L. West, vice-president; J. S. White, secretary and treasurer. Principal office, 804 Washington Boulevard, Chicago, Illinois. To manufacture and sell golf equipment.

Allbestos Corporation, April 6 (Pennsylvania), $250,000. W. G. Kitchen, president and treasurer; J. F. Bolger, vice-president and general manager; and J. S. Barr, assistant treasurer. Principal office, Philadelphia, Pennsylvania. To manufacture asbestos yarns for insulating electrical apparatus, etc.

Ambassador Tire Corporation, April 28 (New York), $30,000. M. Mayer, 9 West 91st street; J. S. Heimann and S. M. Heimann, both of 51 East 96th street—both in New York, N. Y. To manufacture tires, etc.

Beaver Rubber Manufacturing Co., Inc., April 25 (New York), $250,000. F. L. Minnigerode, C. M. Coryell and R. Czajkowski—all of 30 Church street, New York, N. Y. To manufacture mechanical rubber goods.

Chalfin Crude Rubber Corporation, April 30 (New York), $2,000. C. Prinn, I. C. Maxwell and S. E. Alpert—all of 35 Nassau street, New York, N. Y.

Congress Rubber Products, Inc., April 26 (New York), $1,000. G. A. Malla, 8729—119th street, and C. Schaembs, 10414—89th avenue, both in Richmond Hill; and J. O'Brien, 834 Park Place, Brooklyn—both in New York. Rubber goods and novelties.

Converse Tire Co., April 28 (Massachusetts), $100,000. M. M. Converse and H. Bullock, both in Andover, and H. Endicott, Weston—both in Massachusetts. Principal office, Malden, Massachusetts. To manufacture and deal in tires and accessories, rubber goods and crude rubber.

Eureka Rubber Preserving Co., March 11 (West Virginia), $400,000. H. H. Wightman, Hinton, and H. E. Haskell and A. E. Kelly, both in Huntington—both in West Virginia. Principal office, Huntington, West Virginia. To manufacture and sell rubber inner tubes.

Framingham Iron & Metal Co., April 15 (Massachusetts), $50,000. L. D. Covich, 7 Esmond street, Dorchester; S. Bean, 52 Waverley street, Framingham—both in Massachusetts; and M. Siben, 127 Hester street, New York, N. Y. Principal office, Framingham, Massachusetts. To buy and deal in rubber, metals and waste materials.

Gleasonite Co., April 21 (Massachusetts), $75,000. M. Brown and L. Brown—both of 11 Gibbs street, Brookline, and F. J. Gleason, 22 Prescott street, Cambridge—both in Massachusetts. Principal office, Boston, Massachusetts. To buy and deal in rubber and machinery.

Holyoke Cord Tire Co., Inc., May 2 (New York), $2,000. J. S. Bernstein, 233 Broadway, and S. R. and C. S. Huntley, both of 41 East 47th street—both in New York, N. Y. To manufacture cord tires.

Insulite Co., March 7 (West Virginia), $50,000. A. G. Strickler, G. W. Moore and C. B. Morris—all of Ellenboro, West Virginia. Principal office, Ellensboro, West Virginia. To manufacture, buy and sell hard rubber substitutes for electrical insulations, etc.

Larkide Co., The, April 14 (Massachusetts), $75,000. H. V. Tillson, 23 Mellen street, Cambridge; Charles E. Fay, 46 Rossmore Road, Jamaica Plain; and David J. Donahue, 46 Huntington avenue, Boston—all of Massachusetts. Principal office, Boston, Massachusetts. To buy, sell, deal in and manufacture cottons, rubbers, rubber substitutes, chemicals, dyes, etc.

Le Boeuf Fountain Pen Co., Inc., April 20 (Massachusetts), $100,000. F. Le Boeuf, 51 Arch street; E. E. Le Boeuf, 755 White street; L. J. Learned, and J. H. Williams—both in Round Hill; and E. Le Boeuf—all in Springfield, Massachusetts. Principal office, Springfield, Massachusetts. To manufacture fountain pens.

Liberty Druggists' Sundries Co., April 30 (Delaware), $25,000. Incorporator, Corporation Guarantee & Trust Co., 323 Land Title Building, Philadelphia, Pennsylvania; attorney, M. D. Canter, 597 Union Arcade, Pittsburgh, Pennsylvania.

Lincoln Vulcanizing Co., Inc., May 19 (New York), $5,000. D. Klein, 963 Kelly street, Bronx; R. Thalwitzer, and T. Reinhardt, both of 218 Elbertson street, Elmhurst—both in New York. Tire repairs.

McDonald-Harker Co., The, January 28 (Iowa), $25,000. C. F. McDonald, president, Marinette, Wisconsin; D. A. McDonald, secretary and treasurer, and G. W. Harker, vice-president—both of Des Moines, Iowa. Principal office, 1206 Grand avenue, Des Moines, Iowa. To sell pneumatic and solid tires and cushion wheels, do vulcanizing and automobile repairing, etc.

Merritt Rubber Co., Inc., May 16 (New York), $10,000. J. H. Horne, 123 Chester avenue, Brooklyn, and S. M. Post, 414 East 4th street, New York—both in New York; and M. J. Kates, 1258 East 2nd street, Plainfield, New Jersey.

National Tire Stores, Inc., April 25 (Delaware), $1,000,000. Incorporators, A. E. Manheimer, T. J. Kelly and P. Zack—all of Chicago, Illinois; attorney, Corporation Maintenance & Service Co. To manufacture tire tubes.

Pacific Rubber Ace Co., April 13 (California), $250,000. Directors: F. J. Bole, C. Ploeser, B. W. Cunningham, B. F. Jacobs, president, and S. L. Ploeser, vice-president and general manager. Principal office, 281 I. W. Hellman Building, Los Angeles, California. To manufacture inner tire known as "Rubber Ace," and other rubber articles.

Pittsburgh Cotter Co., April 21 (Delaware), $225,000. Corporation Guarantee & Trust Co., 323 Land Title Building, Philadelphia, Pennsylvania. Principal office, 401 Standard Life Building, Pittsburgh, Pennsylvania. To manufacture tires.

Renard Rubber Co., May 2 (Delaware), $3,000,000. Incorporator, The Corporation Trust Co. of America, Du Pont Building, Wilmington, Delaware; attorneys, Goldsmith & Rosenthal, 1476 Broadway, New York, N. Y. To manufacture tires.

Standard Tire Protector Co., The, April 27 (Delaware), $100,000. Incorporator, The Corporation Trust Co. of America, Du Pont Building, Wilmington, Delaware; attorneys, Smith, Olds & Smith, Marsball Building, Cleveland, Ohio. To manufacture tires and protectors.

Tracey-Russell Tire Corporation, May 2 (New York), $15,000. W. H. Tracey, Kirk Hotel, and N. C. Russell, 1610 Lodi street—both of Syracuse; and J. W. Brennan, Geneva—both in New York. Principal office, Syracuse, New York. To repair tires.

TIRE PRICE REDUCTIONS

The B. F. Goodrich Co., Akron, Ohio, has announced a 20 per cent flat decrease in prices of cord and fabric pneumatic tires.

The United States Rubber Co., New York, N. Y., has reduced prices on "Royal" cord tires, all chain and "Nobby" tread tires 17½ per cent, "Usco" fabric tires and red and gray tubes.

The Firestone Tire & Rubber Co., Akron, Ohio, has made tire price reductions as follows: cord tires 20 per cent, fabric tires 17 per cent and tubes 20 per cent.

The Miller Rubber Co., Akron, Ohio, announces a 17½ per cent reduction on fabric tires, 12½ per cent on cord tires and 20 per cent on all tubes.

The Goodyear Tire & Rubber Co., Akron, Ohio, cut prices 12 per cent on cord tires; 15 per cent on the general run of fabrics and 15.8 per cent on some fabric sizes. Tubes were reduced 20 per cent.

The Fisk Rubber Co., Chicopee Falls, Massachusetts has reduced prices from 12½ to 20 per cent.

The Thermoid Rubber Co., Trenton, New Jersey, made a 28 per cent cut on all Ford size tires; 23 per cent on 4½-inch sizes, and 20 per cent on all other sizes.

The Mason Tire & Rubber Co., Kent, Ohio, reduced the prices of heavy duty cord tires 20 per cent and other prices in proportion.

The Parker Tire & Rubber Co., Indianapolis, Indiana, advises that its new price list shows a discount of approximately 20 per cent.

The Inland Rubber Co., Chicago, Illinois, is now offering 30 by 3½ fabric tires at $18 and cord at $26.50. Tubes are being offered at $2.55 for gray and $3.10 for red.

The Lee Rubber & Tire Corporation, Conshohocken, Pennsylvania, announces the following reductions: fabric and cord tires, 20 per cent; fabric puncture-proof tires 20 per cent; and puncture-proof cord tires about 17 per cent.

A 20 per cent reduction is made on all pneumatic tires with the exception of Ford sizes, which are cut 22 per cent, by the Kelly-Springfield Tire Co., New York, N. Y. Tubes are reduced 30 per cent.

The Pennsylvania Rubber Co., Jeannette, Pennsylvania, has made an approximate 20 per cent reduction on all tires.

The Michelin Tire Co., Milltown, New Jersey, has reduced the price of their 30 by 3½ soft bead clincher fabric tire 15½ per cent.

The Hewitt Rubber Co., Buffalo, New York, announces reduction on casings from 20 to 22½ per cent and on tubes 20 per cent.

The Denman-Myers Cord Tire Co., Cleveland, Ohio, has made a 17½ per cent reduction on 30 by 3½ non-skid clincher tires and 12½ per cent on all larger sizes.

PRESIDENT, KELLY-SPRINGFIELD TIRE CO.

Alfred B. Jones, the newly elected president of the Kelly-Springfield Tire Co., New York City, brings to his new position a varied and interesting experience that fits him well for its duties and responsibilities.

Born at Mt. Holly, New Jersey, in 1874, he was graduated from Princeton University in 1896 and entered the service of the Pennsylvania Railroad Co., where he worked up from rodman to divisional superintendent. In 1902, he went to Akron, Ohio, as division engineer of the Cleveland, Akron and Columbus Railway, which position he held until his resignation in 1908 to accept the superintendency of the Kenmore plant of the Diamond Rubber Co.

A. B. Jones

When the Diamond company was consolidated with The B. F. Goodrich Co., Mr. Jones was made assistant to the manager of the works and later, director of plant administration. In the latter part of 1917 he was made a member of the Akron Board of Health, and in March, 1918, was elected second vice-president of The B. F. Goodrich Co. For seven months of 1918 he was in the service of the American Red Cross overseas as deputy commissioner for France, his work being that of director of transportation and distribution of supplies.

In 1920 he was again elected vice-president of The B. F. Goodrich Co., which position he resigned in February, 1921, to accept the presidency of the Kelly-Springfield Tire Co.

Mr. Jones is a member of the arbitration committee of The Rubber Association of America, Inc., and of the advisory board of the Ohio Transportation Association. His clubs include the Portage Country Club, Akron University Club, Akron City Club and the Princeton Club of New York City.

FRISWELL NOW RUBBER FACTORY CONSULTANT

Arthur E. Friswell, well-known in the United States and England as a rubber expert, has established himself in Jersey City, New Jersey, as rubber factory consultant, giving practical assistance in all problems relating to rubber goods, specializing in tires and mechanical goods.

A PROMINENT COLOR MANUFACTURER

Edward Molineux Waldo, senior partner of E. M. & F. Waldo, color manufacturers and importers, 11 Broadway, New York, N. Y., is a notable instance of the achievements of perseverance when attended by an aptitude for business. He was born in Brooklyn, New York, in 1884 and attended the Trinity Church School and Staten Island Academy, but left school in 1900 to begin his business career.

E. M. Waldo

His first employment was addressing envelopes for Elms & Johnson, dry goods, New York City. Later he worked as a messenger for the Western Electric Co., as office boy and then exchange clerk for Baring, Morgan & Co., New York, N. Y., bankers; and as stenographer and office assistant to the advisory committee of the United States Steel Corporation, New York, N. Y.

Selling then attracted him, and he became a salesman for J. F. Hitchcock, paper merchant, New York, N. Y. Later he went in the same capacity to the G. Siegle Co., color manufacturers, New York, N. Y., in which position he acquired the experience which enabled him to engage in business for himself and organize the firm of which he is senior partner.

Mr. Waldo has found himself too busy with the conduct of his own multiplying affairs to seek or accept office in outside organizations. He is, however, a member of the Drug and Chemical Club, Paint, Oil and Varnish Club of New York, The Rubber Association of America, Inc., New York Board of Trade and Transportation and the New York Credit Men's Association.

THE RUBBER TRADE IN THE EAST AND SOUTH

By Our Regular Correspondent

NEW YORK

Charles F. U. Kelly, formerly with the Pennsylvania Rubber Co., Jeannette, Pennsylvania, and the Dreadnaught Tire & Rubber Co. of Maryland, Baltimore, is now in charge of the Quaker City Rubber Co.'s tire sales division, just opened at 1664 Broadway, New York.

Greenstein & Pelz, 30 Irving Place, New York, have been appointed sole agents for the "Rubbadubdub" floating toys described in The India Rubber World, April 1, 1921, and manufactured by J. G. Franklin & Sons, Limited, 17 Colvestone Crescent, Dalston, London, E. 8, England.

R. Westaway has been designated by A. D. Julliard & Co., mill agents for cotton yarns, etc., as its representative in the state of New York, at 70 Worth street, New York.

L. A. Duffy, Inc., successor to Duffy & Sears, has removed from 133 Front street to 15 William street, New York.

The Liberty Paper Co. advises of change of address from 52 Vanderbilt avenue to 203 Lafayette street, New York.

The executive offices of the Martin Tire Corporation have moved from 130 West 52nd street to a completely remodeled building immediately in the rear of its present quarters on 51st street, New York.

W. G. Ryckman Co., Inc., rubber and other crude products, 77 Broad street, New York, has been dissolved and C. B. Kaufmann is successor.

George E. Meurs is succeeding Victor Roth as manager of the New York export branch of The Miller Rubber Co., Akron, Ohio. He will be directly responsible to C. E. Wagner, in charge of the Akron export department. Mr. Meurs' export experience covers a period of thirteen years in Latin-America and New York.

J. A. Richardson has been appointed branch manager of the Philadelphia and New York territories of the Portage Tire & Rubber Co., Akron, Ohio. He joined the company eighteen months ago as a salesman.

The Rubber Trade Association of New York, formerly at 44 Broad street, and The Rubber Trade Association of New York, Clearing Department, formerly at 150 Nassau street, are now located at Room 810, 75 Maiden Lane, New York.

A new crude rubber brokerage firm has been formed under the name Horn & Leavitt at 50 Broad street, New York. Frederick J. Horn for several years was connected with the crude rubber department of W. R. Grace & Co., in New York and Akron, and also with Fred Stern & Co., Akron. Edward W. Leavitt was originally with The B. F. Goodrich Co., Akron, and later with Fred Stern & Co., in both the Akron and New York offices.

The Automatic Tire Machine Corporation, 197 Main street, Buffalo, maker of tire-building machines, is about to start production. W. A. Schaffer is president; Elmer H. Patterson, vice-president; Howard G. E. Smith, secretary and treasurer; and W. L. Huffman, purchasing agent.

Walter E. Palmer has been appointed secretary of the New York Rubber Co., 84-86 Reade street, New York, N. Y., succeeding Henry Montgomery who has resigned. Mr. Palmer has been connected with the plant at Beacon for 21 years and his advancement comes as a well-deserved recognition of fidelity and merit. He will have charge of manufacturing.

PENNSYLVANIA

The Link-Belt Co., Nicetown, Philadelphia, manufacturer of transmission machinery, has purchased the plant of the Dodge Steel Co. at Tacony, where electric steel castings will be made for the Link-Belt Co. The name of the Dodge Steel Co. will be retained and the company will be operated as a separate corporation. The officers are: Charles Piez, president; Staunton B. Peck, vice-president—both holding similar offices in the Link-Belt Co., and Chester S. Roberts, secretary, treasurer and manager.

The Hydro-United Tire Co., Philadelphia, Pennsylvania, manufacturer of automobile tires, are constructing a two-story warehouse of brick and steel 60 by 120 feet, which is expected to be completed within the next thirty days. This warehouse will be located in Pottstown where the factory is.

The Allbestos Corporation, Belford avenue and Fishers Lane, Philadelphia, Pennsylvania, is a newly incorporated concern which will manufacture asbestos yarns and products including electric insulating materials, brake linings, etc. The officers are: William G. Kitchen, president and treasurer; John F. Bolger, vice-president and general manager; J. Stuart Barr, assistant treasurer. Charles Elder and William H. Hall, Jr., have been engaged as asbestos experts.

SOUTHERN NOTES.

Eugene Wolfsheimer, manager of the Delta Tire & Rubber Co., Inc., New Orleans, Louisiana, was formerly connected with The Keystone Tire & Rubber Co., Inc., New York, New York, as southern district manager. His efforts will be to establish the Keystone cord tire and ultimately carry no other make.

UNITED STATES TIRE COMPANY PIONEERS NEW SIZE

The United States Tire Co. announces that, in keeping with the trend of automobile design toward lower center of gravity, it is preparing to market a 31 by 4 straight-side "Royal Cord" tire. This new size will give the smaller cars the same features of performance derived from the 33 by 5 on larger models, and is of particular interest as being an extension of the superior straight-side principle into those sizes of tires which have heretofore been exclusively of the clincher-bead type.

READ THE ARTICLE ON GLOVE REPAIRING IN THIS ISSUE.

THE RUBBER TRADE IN NEW JERSEY

By Our Regular Correspondent

TRENTON NOTES

All tire and tube manufacturers in Trenton have placed in effect a reduction on all tire products that varies at different plants and runs from 17 to 25 per cent, according to the grade of tires made.

The Thermoid Rubber Co. announces a reduction of 16 to 28 per cent, the former applying to cord and the latter to fabric tires. This places Trenton-made tires and tubes on a pre-war basis and will eventually result in increased business at the factories.

At the office of the United & Globe Rubber Co. it was said that the reduction in the prices of tires was made after the cut put into effect by the larger companies in the West and elsewhere. Summed up, the reduction in Trenton averages about 20 per cent. The reduction became effective the first week in May.

The entire situation has taken on a peculiar turn. The industry began to improve after the big slump of last winter and prospects were excellent for a big summer trade, when business began to drop off in certain sections of the country. All it needs is stormy weather to hurt the tire industry. While orders were coming in for many tires there was a long and severe storm in the West which had a telling effect upon the tire industry. Tire salesmen covering the territory along the Atlantic Seaboard, however, report business good.

The Thermoid Rubber Co. announces that orders have dropped off during the past few weeks, and the cause was undoubtedly the western storms. It is expected that business will pick up again shortly. About 350 men are at work. The Zee Zee Rubber Co. reports a revival in business and is now placing more men at work. The company's salesmen announce an increase in orders from all sections. The Bergougnan Rubber Corporation is now running 75 per cent capacity. Warren A. Clapp, treasurer of the company, says that the concern has experienced a steady improvement during the past few weeks. At the plant of the Empire Rubber & Tire Corporation business is picking up and a busy summer is anticipated.

The Ajax Rubber Co. is looking far ahead and making plans for anticipated revival in business. Operations have been curtailed to permit the installation of new machinery and improved equipment. Present plans contemplate a renewal of activities on a larger scale within a few weeks. The Essex Rubber Co. is operating on a full basis, while the Whitehead Brothers' Rubber Co. is operating but three days a week. Some of the departments of the Vulcanized Rubber Co. are working on part time only, with others on full time.

John S. Broughton, president of the United & Globe Rubber Co., has received a contract for 38,000 feet of fire hose for the Fire Department of the City of Philadelphia. The hose department of the company is now running at 100 per cent capacity.

One of the busiest rubber concerns in the East is the Acme Rubber Manufacturing Co., whose plant is running full time, fifty-five hours per week, in addition to a night force working fifty hours per week. This is the only concern in Trenton operating on full time and with a night crew. Business at the plant has increased to such an extent that the company recently completed a one-story addition, 90 by 300 feet, devoted exclusively to the manufacture of molded hose.

F. T. Austin and K. A. Ward have opened a tire establishment at 402 Market street, Camden, New Jersey, to equip automobiles in emergency cases, to aid motorists who have tire trouble along the road and who do not want to take the trouble to repair their tires. Mr. Austin has been engaged in the tire business for many years, and Mr. Ward was formerly supervisor of branches of the Ajax Rubber Co.

Owing to increased business the Trenton Zinc & Chemical Co., manufacturers of zinc oxide, will shortly erect additions to the plant at Trenton. The company last year produced 2,000,000 pounds of zinc oxide and contemplates turning out 12,000,000 pounds when the plant is enlarged. It has contracts for the output of the mines in Salem, Kentucky, and is operating 100 per cent capacity.

John O. Bigelow, trustee in bankruptcy for the Trenton Rubber Co., manufacturer of automobile tires, has filed an intermediate report in the United States District Court, showing that the company has earned profits of $6,545.32 by a partial operation of the plant. Judge Lynch has confirmed the report of the trustee.

The Times Square Auto Supply Co., with headquarters in Chicago, Illinois, has taken over the business of the Automotive Accessories Co., 128 East Hanover street, Trenton. The company has made a number of improvements to the store and has added bicycle tires to the tire department.

William H. Johnson & Son, who have been conducting a tire vulcanizing establishment at Broad Street Park, Trenton, have opened a business at 407 South Broad street.

Charles H. West has removed his tire establishment from 135 East Hanover street to larger quarters at 116 South Montgomery street, Trenton, where he is handling Bergougnan tires and tubes.

MISCELLANEOUS NEW JERSEY NOTES

The tire business of A. H. Brown & Sons, Red Bank, New Jersey, has been purchased by George H. Brush, Inc., tire dealer, of 30 Central avenue, Newark. The Brown concern is the oldest tire company in Red Bank.

George F. Armstrong, president of The Armstrong Rubber Co., Inc., Garfield, New Jersey, and New York, New York, states that the factory is running on a twenty-four hour basis, at maximum capacity, and that the increased labor efficiency and reasonable attitude of rubber workers will be great factors in meeting the demand for tires and tubes during the coming season.

AMERICAN SOCIETY FOR TESTING MATERIALS

The provisional program has been issued for the twenty-fourth annual meeting of the American Society for Testing Materials to be held at Asbury Park, New Jersey, June 20 to 24, 1921. Among the reports to be presented at this meeting, of special interest to rubber manufacturers, are those by Committee D-11 on Rubber Products, and by Committee D-13 on Textiles.

THE RUBBER TRADE IN RHODE ISLAND

By Our Regular Correspondent

While the National India Rubber Co. at Bristol and the Alice Mill of the Woonsocket Rubber Co. at Woonsocket, resumed operations May 9 on a limited and curtailed schedule, there is comparatively little change in the industrial situation among the manufacturing rubber plants of Rhode Island from what there was a month ago. A general spirit of caution and conservatism is apparent and with few orders coming to book there is a decided uncertainty as to how long even the limited schedule now in force may continue.

At the plant of the Davol Rubber Co. there is considerable more regularity from the fact that its staple lines are in general demand at all seasons of the year, especially its druggists' and medicinal supplies. The large five-story brick building that forms a portion of the Davol estate has been entirely vacated by former tenants in various lines of manufacturing business, and the entire building is being altered and prepared for purposes of the Davol company. It is understood that among the first departments that will be removed thereto will be the storage and shipping sections, which will afford greatly increased facilities at the factory plant for manufacturing purposes. The building is at the southwest corner of Point and Richmond streets, almost opposite the Point street frontage of the factory plant, and

contains a total floor space nearly equal to that of the factory proper.

The tire departments of the Revere Rubber Co. at Eagle street, Providence, are quiet, but in the other departments, especially in the commercial sections, there is a moderate activity that will probably continue for some months to come. There is no rush demand but a consistent run of regular orders.

On the same date that the National plant at Bristol began operations, the Alice Mill of the Woonsocket Rubber Co. resumed operations after being idle since February 19. The calender room reopened on May 9, and the other rooms followed in regular sequence so that by the end of the week the entire plant was in operation. The plant is to run on reduced production with only 60 to 70 per cent of the normal output. The Millville plant of the same company, which has been closed since last December, however, will remain closed.

The plant of the Mount Hope Spinning Co., at Warren, producing tire yarn, was opened Monday morning, May 16, and about 250 are now being employed there. This number is to be increased until the plant, both the old and the new mills, is running to capacity. There were more than 300 persons at the plant looking for work when operations were resumed, but preference was given to the former employes and the necessary number taken on to make up the desired number for starting. The plant, which was closed last September, after doing a rushing business since before the war, has been running only a few hands on small orders for several months. The new addition to the plant, which was erected when business was booming, but which was not used because of the sudden slump in business, is now to be put into operation. During the period when the mill was practically at a standstill the machinery of the entire plant was rearranged so that now there is a perfect continuity of operations from the raw cotton as it enters one end of the mill until it emerges, after a continuous performance from one machine to another, the finished product—tire yarn.

The United States Finishing Co., whose plants include the Silver Spring Bleachery and the Queen Dyeing Works in Providence and the big Dunnell works at Pawtucket, shows $10,600,000 gross, but only $172,059 net profits for the year ended December 31, 1920, according to the statement that was made public a few days ago. This net (after all charges and taxes) is equal on the $3,600,000 preferred stock, to $4.77 a share. Full seven per cent dividends on preferred, amounting to $252,000, were paid during the year; likewise three quarterly dividends of 1¾ per cent each on common stock, amounting to $143,937. Detailed income account for the year ended December 31, 1920, follows (no comparison with previous calendar year being possible): gross income, $10,616,128; cost of operation, $10,278,813; net, $337,315; other income, $144,939; general taxes, $143,858; bond interest, $99,142; loss on Liberty bonds, $57,637; Federal income tax of 1920, $9,558; net profit, $172,059. Balance sheet as of December 31, 1920, shows quick assets of $1,871,234 and quick liabilities of $313,596, leaving net working capital $1,557,638.

Francis Sage, of Hastings, Michigan, has been selected by the officials of the United States Rubber Co. to succeed M. J. Bowes as superintendent of the Lawrence Felting Co. at Millville and began his new duties early in the past month, Mr. Bowes' resignation taking effect May 1. Mr. Sage has been with the United States Rubber Co. for many years, and in charge of the Hastings Wool Boot Co. for the last several years in the capacity of factory manager. He will continue to serve in that capacity besides taking over the management of the Millville plant.

Don't throw away your valve caps. Screw them on firmly and prevent air leakage here. The valve plunger, a little mechanism inside the stem, serves as an air lock during inflation, but the valve cap is the secondary air seal during usage. Tire men advise using the valve to inflate the tire and using the cap to keep it inflated.—*Miller News Service.*

MECHANICAL RUBBER GOODS MANUFACTURER

Thomas G. Richards, a native of Boston, Massachusetts, was educated in the Boston public schools and at the Massachusetts Institute of Technology, from which school he was graduated in 1894. Immediately following this, Mr. Richards began his rubber manufacturing career in the engineering department of the Boston Woven Hose & Rubber Co., Cambridge, Massachusetts. He was chief of this department for two years in charge of plant development, and later he held both the positions of purchasing agent and assistant superintendent for a year, respectively. The essential element controlling his rapid advancement was conspicuous ability, which gained him the post of factory manager in 1899. His selection by the company management was amply justified by his record as a competent executive and plant engineer.

Thomas G. Richards

In 1906, jointly with Charles Beebe, then of the Boston Woven Hose & Rubber Co., Mr. Richards organized the B. & R. Rubber Co., North Brookfield, Massachusetts. Some years later he reorganized this concern as the Quabaug Rubber Co. He served both of these companies a combined period of fourteen years as president and manager, resigning in November, 1920.

Competition in the mechanical rubber goods manufactured at North Brookfield led Mr. Richards to specialize in factory costing and compounding and to develop an original system of factory operation for maintaining production at the rated maximum. His club connections are with the M. I. T. Chapter Delta Upsilon and the Engineers' Club of Boston, Massachusetts.

THE RUBBER TRADE IN MASSACHUSETTS

By Our Regular Correspondent

Following the reduction of 20 per cent in Goodrich tire prices on May 2, many other tire manufacturers throughout the country have readjusted their price schedules as a stimulant to larger retail sales, better stocking by dealers and increased production. These revisions bring tire costs to the consumer during the biggest buying months of the year down to or below the pre-war level as represented by the 1913 schedules. It practically means that a car owner may now buy five tires for the former price of four, or get his spare tire free of charge. Taking into consideration the fact that tires today give from 50 to 100 per cent greater mileage than they did eight years ago, the conclusion is obvious that, based on comparative service, they cost less than ever before.

Massachusetts tire manufacturers have for the most part responded to the downward trend in prices, but in certain instances their former price-lists were such that a 20 per cent reduction was unnecessary to bring schedules down to approximately the pre-war level for the class of goods being produced. Factory reports generally indicate a marked rise in the production curve to keep warehouse stocks ample since the new prices became effective.

Grow cord and fabric tires have been reduced 10 per cent, Fisk cord and fabric tires from 12½ to 20 per cent. Converse tire price reductions average 22 per cent on fabric tires, 15 per cent on cords and 20 per cent on tubes. Hood prices have been dropped 15 per cent on cord tires, 12½ per cent on fabric tires

and 20 per cent on tubes. New England cords have been reduced about 17 per cent, and Revere tires, 11½ per cent on cords, 15 to 17½ per cent on fabric tires and 20 per cent on tubes. Tyrian consumer's prices on fabric tires are reduced 20 per cent, cord tires 15 per cent and inner tubes 20 per cent.

MISCELLANEOUS MASSACHUSETTS NOTES

Evidence of marked improvement in the tire trade situation is shown by the resumption of work at the full capacity of three shifts on May 9 in the tire and tube plants of the Hood Rubber Co., Watertown, Massachusetts. Orders are sufficient to warrant maximum production for the remainder of the year, including a large quota for the new Ford size Hood tire, known as the "Yellow Arrow."

The rubber reclaimers of Massachusetts report that business conditions are considerably improved over the last quarter of 1920 and the early part of this year. They are optimistic about the future, although they do not look for boom business such as was ruling during the early part of 1920.

The work of reconstructing the reclaiming plant of the Monatiquot Rubber Works Co., South Braintree, Massachusetts, following the fire which in February destroyed five of the nine buildings of the plant, is about sixty per cent completed and the works will soon be restored to former capacity. Meanwhile there has been scarcely any interruption in the supply of the company's well-known reclaims to meet the needs of its many patrons.

The Needham Tire Co., Charles River Village, Massachusetts, which discontinued its tire business about a year ago, is now engaged in the manufacture of rubber heels and soles. Phil C. Stingel is president and general manager of the company.

Orders for rubber footwear are not being received by manufacturers in such volume or so early as in past years, indicating that retailers' stocks are considerable and will in most instances be replenished for the autumn trade as needed. There appears to be a marked tendency for retailers to reduce their inventories considerably, depending upon manufacturers to carry their stocks. Business in rubber-soled canvas footwear continues to be very gratifying. The Converse Rubber Shoe Co., Malden, Massachusetts, is still running a large daily ticket and finding a ready market for the product.

The Fells factory of the Boston Rubber Shoe Co., Malden, Massachusetts, will be shut down from May 27 until July 5.

BOSTON NOTES

The Pettingell-Andrews Co., 100 Brookline avenue, Boston, has been appointed New England distributer for Yale tires and tubes manufactured by the Yale Tire & Rubber Co., New Haven, Connecticut.

"Better Selling Methods" was the subject of a talk by John E. Magaw, of the Hood Rubber Products Co., Watertown, at a recent meeting of the New England Shoe Wholesalers' Association in Boston. From a carefully prepared chart of comparative quotas, sales and possibilities, as of July 1, 1920, he proved that the rubber shoe industry has not tried out intensive sales methods to the extent that the volume of the business justifies.

The Arco Tire Co., Inc., 27 School street, Boston, is the sole New England distributer for Achilles super cord tires manufactured by the Achilles Rubber & Tire Co., Binghamton, New York.

The first of the current year a new corporation, known as the Canton Rubber Works, was formed as a selling organization for the "Three C" inner tube, a product of the C. C. C. Fire Hose Co., which has for thirty years manufactured high-quality fire hose and mechanical rubber goods. The latter firm's experience in making rubber tubing led to the development of a department for automobile inner tubes, which have been well received by the jobbers and distributers being appointed throughout the country. The executive offices of both companies are located at 209 Washington street, Boston, and the factory is at Canton.

FRANK A. SEIBERLING RETIRES FROM GOODYEAR

The life of Frank A. Seiberling, which is almost entirely woven about the building of The Goodyear Tire & Rubber Co., is that of a man born and educated near Akron, who with $13,500 of borrowed capital, in 1898 started the Goodyear company in an old frame building in East Akron, and in twenty-three years built a $130,000,000 corporation with 80 buildings covering more than 100 acres of floor space and having subsidiaries and branches all over the world.

Frank A. Seiberling

In 1910 the company's sales were $9,000,000; in 1917 they were $111,450,000; while in 1920, the year before the downfall, they were $205,000,000. More than 66,000 men and women were employed at the peak of the company's prosperity, while there were subsidiary plants in California and Canada; cotton mills in Los Angeles, California, and Goodyear, Connecticut, cotton plantations in Arizona; and rubber plantations in Sumatra.

The immensity of the second largest rubber company in the world is shown by the production of more than $10,000,000 worth of balloons and dirigibles for the Government during the war, while figures for 1919 show the consumption of 26,000,000 tons of crude rubber, with manufactures of 7,500,000 tires; 5,000,000 feet of belting; 8,000,000 rubber soles and approximately 20,000,000 rubber heels; and a large amount of sundry products.

All this was the achievement of the restless genius whose goal was to make his firm the largest rubber company in the world. He conceived and carried out things on a large scale, not only in his commercial affairs, but in matters pertaining to the welfare of employes. He was one of the greatest benefactors in the community, building and selling, on small payments, more than 1,100 homes in the addition to Akron known as Goodyear Heights. For the men in the factory he built a $2,000,000 recreation hall, supplied a ten-acre park for recreation purposes, and instituted a welfare department probably unsurpassed by any industry in the world.

Mr. Seiberling gave no evidence of the burden which rested upon his shoulders during the long negotiations while he fought against receivership and its consequent calamity to Akron. The strain has shown in ever-whitening hair, but his smile and genial expression remain. Though sixty-one years of age, those who have been closest to him through his battle of 23 years believe he will be back in the rubber business and that it is only a question of time until he will again hold a predominating position in the rubber industry.

His parting statement, written in the solitude of his office to the Akron he helped to build, is typical of the man.

"My brother, Charles W. Seiberling, and myself sever all official relations with the company, and the control passes into the hands of the bankers as provided for in the reorganization plan. For 22 years we have labored together, with a loyal staff

of as able men as can be found in any organization in this country. What has been achieved the world knows. The nation-wide slump in business last fall brought our business to the verge of disaster. Since that hour I have had but one purpose—to save this company from a receivership. That was accomplished and the new management inherits a business soundly financed and with the finest working organization of any company in the rubber industry in the world.

"My successor is E. G. Wilmer, of Milwaukee, a young man of fine legal training and broad experience in operating business, and with the return of the world to normal conditions there is no reason why Goodyear cannot move forward to a higher plane than it has yet achieved. The bankers in control made me an exceedingly generous offer to continue with the company, which, after careful consideration, I felt justified in declining.

"What I am going to do next I do not know. Since I left school 44 years ago I have labored hard, enjoying my work all the way along, through all its difficulties, up to within the period of the last six months. In truth, I have been tired during that period. The burden is now all off my shoulders. Except for a few days, I have had no vacation for over two years.

"I am going to clear up some of my personal matters next week, then go away for a month's rest, and when I come back I shall go to work—at something."

THE RUBBER TRADE IN OHIO

By Our Regular Correspondent

Few events in the rubber industry during the past three years have brought about more discussion than the unexpected cut of 20 per cent in tire prices by The B. F. Goodrich Co., which has caused every rubber company in Akron and most of the others in the United States to readjust prices. The angles from which the price cut is viewed by rubber men are as varied as their interests, and when the opinions of bankers and stockholders are added to those of the rubber men a great maze of contradictory opinion results.

Statements from the other companies were unavailable beyond the fact that cost records are being looked over to see if so drastic a cut was justified by decreased material and labor costs. The result becomes apparent in the announcements from the other factories that the reduction on cord tires will average about 10 per cent, on fabrics about 15 per cent, and on tubes about 20 per cent.

The Goodyear Tire & Rubber Co. frankly stated to dealers that neither decreases in cost nor previous prices warranted a 20 per cent reduction and therefore its prices were reduced only to a new average, and this was followed by the other companies. Therefore tire manufacturers are divided into two groups, one following the lead of Goodrich in a 20 per cent reduction, and the other virtually following Goodyear with a smaller reduction. The reduction by Goodrich and its followers brings the decrease in tires to more than one-third in six months, whereas, the other reductions will average close to 30 per cent during the same period. On the new basis prices are back to 1913 levels and approximately 40 per cent below the 1910 levels.

Rubber men point out that the value in tire mileage has more than doubled since six or seven years ago; that with lower prices than in 1910 and mileage more than doubled, the automobile owner is today purchasing tire service at a lower price than at any time in the history of the automotive industry. Five years ago it was estimated that tire costs for each wheel of the automobile averaged between one and one-half and two cents a mile. Today the same costs are now believed to be three-quarters of a cent a mile.

Although all Akron manufacturers have made price adjustments, they do not all believe the cut was advisable or the time was propitious. With large quantities of raw materials on hand, and only a small cut in the price of labor and practically no decrease in overhead expenses, the thing to have done was to stand by the former price levels until the raw materials were worked off and wage adjustments had been completed, together with adjustments on freight rates, which are a large factor in the rubber industry.

The manufacturers who lead in the cut, however, take the position that the readjustment of the whole business and industrial structure depends entirely upon convincing the public that prices of all kinds have hit the bottom; and that in this way the buyers' strike which lead to the depression will be effectually broken.

What the general price reduction will mean in volume of business remains a matter of speculation. It is still too soon to prophesy, but every rubber company has redoubled its energy to get business in large volume on the basis of the price cut.

TIRE PRODUCTION CURTAILED

During the past month tire production reached its peak. Firestone was making 20,000 tires daily, Goodyear 19,000, Goodrich 15,000, and Miller half of normal capacity. The smaller companies were also active and many had reached 50 per cent normal production. Despite prevailing optimism, the possibility that a recession of tire demand might take place in the near future led manufacturers to look forward to it.

The slump came during the last week in May, and more quickly than was anticipated. The Goodyear Tire & Rubber Co. announced on May 24 that a general curtailment of tire production in the Akron district will take place immediately, although definite figures were not given out. It is estimated that the Goodyear company will lay off over 1,000 men. The reduction in production will probably be gradual beginning June 1.

Firestone has laid off several hundred men and Miller has ordered a reduction of 20 per cent in its office force. It is expected that other tire companies may make similar reductions in office and factory personnel, pending improved trade conditions.

NEW GOODYEAR OFFICIALS

E. G. Wilmer, of Milwaukee, Wisconsin, is the new president of The Goodyear Tire & Rubber Co., succeeding Frank W. Seiberling, who retired with his brother Charles W. Seiberling, on May 13. Paul W. Litchfield remains as vice-president and factory manager, and George M. Stadelman remains as vice-president and sales director. Edwin Palmer, formerly treasurer and recently secretary, has resigned. H. A. Springford is treasurer and Charles A. Stillman, secretary. The directorate consists of J. P. Cotton, New York, N. Y.; F. W. Litchfield; Grayson P. Murphy, New York, N. Y.; J. R. Nutt, Cleveland, Ohio; Robert C. Schaffner, Chicago, Illinois; A. A. Schlesinger, Milwaukee, Wisconsin; George M. Stadelman, Ralph C. Van Vechten, Chicago, Illinois, and E. G. Wilmer.

The new management took charge officially on May 13, although the stockholders approved the sale of the $30,000,000 of 20-year 8 per cent bonds which had been sold, and the issuance of a like amount of debenture bonds with similar terms, at the meeting held May 11. The new management took hold with efficiency at the highest point in the history of the Goodyear company and success now seems assured.

AKRON NOTES

The Firestone Tire & Rubber Co., Akron, announces that every one of its several thousand employes has become a stockholder, each subscriber taking at least two shares, while there was an over-subscription of almost 50 per cent on the new allotment of employes' stock, within twelve hours. The company employs more than 10,000 people, and claims to be the only organization of its rank on record as having every man and woman on its pay-roll a shareholder in the company. The total number of shares subscribed for by employes is now close to 45,000. A production of 20,000 tires a day was reached in Many and practically all

former employes living in Akron were taken back to work.

"However the standard mileage climbs, we must see that the name Firestone always means to the car owner the most miles for his money, most miles per dollar," is a new sign placed where every employe of the Firestone Tire & Rubber Co., Akron, can see it upon entering the factory gate.

Rubber men were much interested in the suggestion made by Secretary Hoover that monthly reports regarding basic industries, including rubber, be sent confidentially to the Department of Commerce to make possible the issuance of monthly reports regarding the status of business and industry. The amount of raw material on hand, the amount of goods finished, the number of men and women employed, and total unused capacity, are among the questions which will be contained in the reports if the system is adopted.

W. F. Ridge has severed his connection with the Rubber Engineering Co., 437 First-Second National Building, Akron. His future plans have not been determined. W. E. McCornish will continue the business under the same company name.

At the annual meeting of the Burt Manufacturing Co., Akron, on May 2, J. Asa Palmer, for eighteen years connected with the company, and for many years general manager, was elected president and general manager, taking the place of W. F. Warden, who died last January. The other officers and directors remain the same.

On the basis of figures published by The B. F. Goodrich Co., the total production of tires since last September is about 8,000,000, and at present, tires are being manufactured at the rate of about one-fourth of the consumption. Requirements for the year are estimated at 2,710,000 tires a month.

E. C. Shaw, formerly vice-president of The B. F. Goodrich Co., has been named a member of a committee of four, appointed by Mayor Carl Beck, to make efforts to bring to Akron one of the two rehabilitation hospitals planned for Ohio by the Government. Dr. W. H. White, member of the committee with Dr. H. S. MacAyeal, and Vincent Stevens, secretary of the Chamber of Commerce, recently went to Washington to lay the Akron proposition before the hospital committee.

James C. Lawrence, of The B. F. Goodrich Co., was elected vice-president of the Akron Rotary Club at the annual meeting. Dr. Parke R. Kolbe was elected president. Hugh Allen, of The Goodyear Tire & Rubber Co., was elected editor of the club publication.

The Flying Squadron of The Goodyear Tire & Rubber Co. had its annual dinner May 7, in Akron, in the factory lunch room at Plant No. 1, and the feature of the occasion was the awarding of diplomas as Master Rubber Worker to 42 men who had completed during the present year the three-year factory course. About 30 others had already received a similar diploma earlier in the year. T. S. Michaels was toastmaster and P. W. Litchfield made the presentations. One of the most impressive events of the evening was the ovation given Mr. Litchfield when the entire assembly rose to its feet and cheered at his appearance, as evidence of loyalty and appreciation of his efforts during the uncertain days through which the company had just passed.

E. E. Helm, publicity director of The Goodyear Tire & Rubber Co., has been named chairman of the Chamber of Commerce Safety Committee, a branch of the National Safety Council. J. R. Burrell, Goodyear industrial engineer, and P. B. Martens, of the Firestone Tire & Rubber Co., are among the other members of the committee.

H. B. Klingerman, industrial engineer of The B. F. Goodrich Co., was the author of an ordinance for the prevention of the smoke nuisance in Akron. The proposed ordinance, which was introduced to the committee of councilmen, follows the lines of nationally adopted smoke prevention measures and provides for a commission to enforce it, also a smoke inspector to work under the building department head.

MISCELLANEOUS OHIO NOTES

W. H. Hurley has been appointed general sales manager of The McGraw Tire & Rubber Co., Cleveland, Ohio, succeeding C. E. Pumphrey. Previously Mr. Hurley was associated with the Ajax Rubber Co. as district supervisor of western territory. With the McGraw company he has served in the following capacities: district manager at Kansas City, having control of the Eastern territory, with headquarters at New York, and a year ago becoming assistant sales manager.

The Chillicothe Tire & Rubber Co., Chillicothe, Ohio, has elected the following directors and officers: H. G. Egbert, treasurer of The Master Tire & Rubber Co., Dayton, secretary, general manager and director; H. J. Alperin, president of the Public Service Tire & Supply Co., Cleveland, vice-president in charge of sales and director; A. Bernstein, president of the Nu-Cord Tire & Rubber Co., Cincinnati, vice-president in charge of purchases and director; C. A. Hertenstein, retaining the office of president; and Walter W. Boulger, reelected treasurer. The capacity of the plant is 500 to 600 tires and tubes daily. For the present nothing but Ford size fabric tires will be made, though ultimately cord and special brand tires will be made. The business will be conducted entirely through jobbers.

The Victor Rubber Co., Springfield, Ohio, reports resumption of manufacturing operations at full plant capacity. Plans for increasing the tire production are being considered. The increased output of the Ford Motor Co. at Detroit affects Victor production as they manufacture a large number of the rubber mats used in the Ford open models.

H. S. Berlin, formerly an executive with the Firestone Tire & Rubber Co. is now president and general manager of the Victor company.

J. J. Moriarity, a prominent tire development and production engineer, has been made factory manager and L. P. Werlein is now manager of the production planning and materials service departments of the Victor company.

T. G. Graham, formerly with The Goodyear Tire & Rubber Co., Akron, and recently factory manager of the Inland Rubber Co., Chicago, has been named factory manager of The Mason Tire & Rubber Co., Kent. Ohio.

The Surgeons' Rubber Glove Co., recently organized by Lee Miller, one of the founders of The Miller Rubber Co., will build its plant in Wooster rather than Cuyahoga Falls. Efforts to sell some of the stock of the $50,000 corporation at the latter place did not meet with the expected response, it was said by officials in making the announcement of the change. Plans for the Wooster building are complete.

Stockholders of the Interlocking Cord Tire Co., Mogadore, Ohio, which was recently thrown into receivership, have placed $25,000 on deposit as their guaranty to operate the plant if the court will raise the receivership. Plans whereby the creditors will be paid off within the year with money to be made out of operation have also been matured. Thus far the court has not rendered a decision on the proposed plan. At the same time Elihu Harpham, receiver, has asked for the balance due on stock which was purchased on a part payment plan, totaling approximately $21,000, ranging in amounts from $100 to $4,900.

ALUM AS A COAGULANT[1]

Alum has long been used by native holders as a latex coagulant and at least one proprietary coagulant contains alum or the active constituent of alum, namely, aluminum sulphate. The acid nature of aluminum sulphate is responsible for the coagulating

[1]Henry P. Stevens. Bulletin of the Rubber Growers' Association, March, 1921, page 142.

properties of alum. The behavior of alum as a coagulant has been investigated from time to time and it was reported to be a little inferior to acetic acid for this purpose. Its use was recommended only in cases where acetic acid was not procurable. It was also pointed out that acids such as sulphuric acid, which were acetic acid one part to 1,200 parts of latex, and alum one probably more harmful, particularly if used in quantities exceeding the minimum needed for coagulation.

To ascertain to what extent potash alum reduces the rate of cure as compared with acetic acid, a number of samples were prepared, vulcanized and tested. The proportions throughout were: acetic acid one part to 1,200 parts of latex, and alum one part to 400 parts of latex.

The difference in rate of cure is altogether negligible. The latex used contained a very small quantity of sodium sulphite and, as the proportions of acetic acid and alum taken were only just sufficient to produce complete coagulation in "unsulphited" latex, it followed that the presence of sulphite resulted in a slightly incomplete coagulation. The residual liquors were milky in almost all cases. The results show that with "sulphited" latex and barely sufficient coagulant to produce a clean coagulation, no difference in the rate of cure results from substituting alum for acetic acid.

In a second series of tests the latex contained no sulphite, and the proportions of acetic acid and alum taken as stated, the samples coagulated with alum cured on an averge ten per cent more slowly than those cured with acetic acid. Incidentally, it may be noted that this series of acetic and coagulated rubbers cured about 20 per cent slower than the crêpe samples of the preceding series. This may be due to unavoidable changes in the conditions of the experiments or the faster curing may have been caused by the use of insufficient acid to produce complete coagulation, resulting in putrefactive changes setting in earlier than in the later series. The effect of excess of acids or acid reacting substances, particularly strong acids, in retarding the rate of cure may quite possibly be due to the inhibiting effect they exert on putrefactive changes, tending to the formation of organic bases.

While it is not possible to make a direct comparison of alum with sulphuric acid, one can indirectly arrive at an approximate estimate of its effect on the rate of cure by comparing the results in both cases with those obtained with acetic acid. The figures appear to indicate that, while alum has a retarding effect on the rate of cure when compared with acetic acid, this retarding effect is greater still in the case of sulphuric acid. Further samples are in preparation for a direct comparison of all these coagulants.

RUBBER TEA-POT SPOUTS IN ENGLAND

A useful little article made of rubber is the tea-pot spout, which is in growing demand in England, and may be used either to protect a china spout from breaking or to replace one already broken The colors most in demand are white and red, although black is also used. In the case of the red and black spouts, care must be taken to use a compound that will not "bloom" after vulcanization.

The manufacture entails considerable hand labor. The material is first tubed to the required diameter, usually just a little under 9/16-inch. After standing for 24 hours the tubing is cut to correct lengths, and into each piece a porcelain, white metal or plaster of paris form is inserted. The spouts are then trimmed carefully, packed in chalk in square tin trays, covered with a piece of thin tin foil to protect them from wetting, and vulcanized. They are then washed in a solution of soda and hot water, then in clean water, dried and finally sewed on cards which hold two dozen of each size, assorted colors, or all one color, as the trade demand may require.—*The India Rubber Journal*, London.

THE "WILLARD"—A QUALITY FOUNTAIN PEN

Though there are numerous styles of these fountain pens manufactured, all have the quality features—self-filling, 100 per cent full, self-starting, self-cleaning, non-leakable, and non-sweating. There are no projections on the barrel, and each pen is fitted with a patented self-regulating automatic feed, preventing dropping and flooding. With these superior qualities the pen having no stubborn tendencies makes writing a pleasure. The barrel is made of the best hand-turned Pará rubber. The gold point is of the best quality and tipped with the hardest iridium.—Willard Pen Co., 318 West 39th street, New York, N. Y.

THE RUBBER TRADE IN THE MID-WEST

By Our Regular Correspondent

THE MID-WEST RUBBER MANUFACTURERS' ASSOCIATION

There was marked interest shown at the Mid-West Rubber Manufacturers' Association meeting held in Chicago, May 10. While the Board of Directors was in session in the Chicago Athletic Association, the Cooperative Committee held an important session in the offices of the Association. A plan of action was decided upon by the committee and definite recommendations were made to the Board of Directors.

W. W. Wuchter, Nebraska Tire & Rubber Co., presided at the luncheon served to forty-eight members gathered about a single table. The following were called upon for remarks: J. S. Monat, Ohmlac Paint & Refining Co.; Scott Kingwell, *Tires;* S. P. Woodard, Gillette Tire & Rubber Co.; R. W. Lyon, The Jefferson Rubber Co.; W. F. Collins, Great Western Tire & Rubber Co.; H. O. Smith, Racine Auto Tire Co.; S. W. Sweet, Electric Motor & Repair Co.; Paul Elbogen, Fred Stern & Co.; Charles Christie, The Hawkeye Tire & Rubber Co.; Wesley Wilson, Akron Rubber Mold & Machine Co.; J. A. Fleischli, The Cupples Co., gave an interesting talk on air bags, and Harry Herb, Harris Trust & Savings Bank, complimented the officers and members of the Association.

The principal speaker was Edward E. Gore, chairman of the Federal Taxation Committee of the Chicago Association of Commerce, who ably discussed the difficulties encountered at Washington in seeking the correction of unjust taxation. He advocated a court of appeals sitting in various centers of the country where speedy corrections could be made.

Twenty-two manufacturers from plants located in Wisconsin, Minnesota, Iowa, Nebraska, Missouri, Illinois, Indiana, Michigan, Ohio and New York met in executive sessions at 3 p. m., and discussed most interestingly the business conditions prevailing in their respective sections at this critical period.

MISCELLANEOUS MID-WESTERN NOTES

R. W. Smith, L. S. Neff and H. A. Boldt, who recently purchased the stock and equipment of the Badger Tire Repair Co., 142 Oneida street, Milwaukee, Wisconsin, and changed the name to the Badger Tire & Equipment Co., hold the offices of president and treasurer, vice-president, and secretary, respectively. They were the former owners of the West Point Tire & Supply Co., 27th and State streets, in the same city, organized as a copartnership by Mr. Smith and Mr. Boldt in May, 1919. The new company is state distributer for the "Liberty" superheated steam vulcanizer, and also carries tires, accessories, and vulcanizers' equipment.

The Allied Golf Company, Chicago, Ill., makers of golf equipment, have elected the following directors: A. J. Musselman, Charles L. West, James S. White, T. Bendelow and C. R. Wagner. There are about 200 stockholders in the company, principally professional golfers, and most of the products are being sold to them at the present time.

The Sieverkropp Engine Co., Racine, Wisconsin, has added to its line a new hydraulic mechanical press in several sizes, for curing automobile tire beads and mechanical rubber goods, as well as a cold press for automobile tire manufacturers. These

are made from recent designs and will stand hard usage. This concern also builds experimental rubber mills and calenders with 7 by 14-inch chilled iron rolls, steel friction gears, and all other parts of semi-steel. In addition, the company builds special machinery from drawings and designs machinery to order.

Leo F. Joliat has been appointed Detroit branch manager of The Miller Rubber Co., Akron, Ohio. He had nine years experience in the rubber business, seven years as salesman and two years as branch manager before joining the sales organization of the Detroit branch in June, 1920. As a salesman he is well-known in eastern Pennsylvania, New Jersey and the Southern Atlantic States. He says his favorite trade magazines are *The India Rubber World* and *Motor*.

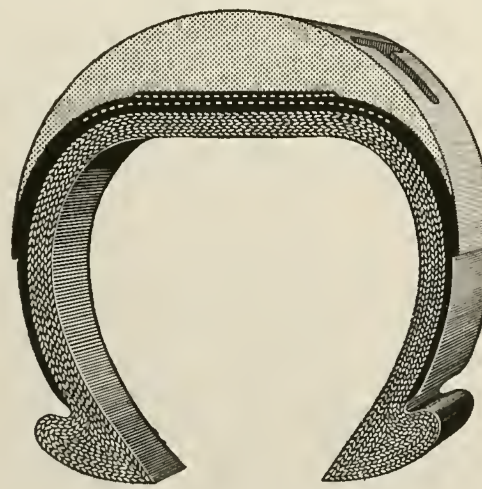
The Lomer Armored Tire Co., New Castle, Indiana, is now manufacturing 30 by 3½-inch fabric tires in quantities, and also 35 by 5 steel cord tires. Molds and cores will be installed within the next few weeks, enabling it to manufacture 36 by 6 and 40 by 8 steel cord tires.

The Fort Wayne Tire & Rubber Manufacturing Co., Fort Wayne, Indiana, was adjudicated a bankrupt at a creditors' meeting late in April. David S. Vesey of Fort Wayne, the trustee in bankruptcy, offers to sell the property which consists of two and one-half acres of land, a three-story main factory and four one-story out-buildings. The machinery is of the latest type; capacity 300 tires and tubes daily.

Calvin Stitt, formerly manager of the Boston and Chicago offices of the Katzenbach & Bulloch Co., has been made manager of the heavy chemical, color and oil department of A. Daigger & Co., 54 West Kinzie street, Chicago, Illinois.

"TRAVELER" TIRE OF UNIQUE CONSTRUCTION

A tire with a unique, flat inside construction is known as the "Traveler" tire. It was designed to overcome the tendency of a tire to flatten in use, which weakens the side-walls by excessive strain and eventually causes blow outs. The "Traveler" tire is so constructed that it is in a normal condition, as it was built, when it is running. When it is inflated it is rounded out and the cross-section is elongated, but when the weight of the car is added it returns to its normal shape, flat inside. The tread is very thick, the additional tread being applied to the tire in the place where it is most needed. "Traveler" tires have been on the market a number of years and the maker claims the construction has been thoroughly tested from every angle.—Traveler Rubber Co., Bethlehem, Pennsylvania.



Traveler Tire in Cross-Section

The life of a tire is the air it contains. The more air, ordinarily, the longer the life. Of course there are exceptions, but it is a safe rule to start with 20 pounds air pressure to the cross-section inch, and if more is needed to add it. Thus a 3½-inch tire will require 70 pounds and a 4-inch tire 80 pounds. Road, load and speed are determining factors in the pressure required.—*Miller News Service.*

THE RUBBER TRADE ON THE PACIFIC COAST

By Our Regular Correspondent

A recent feature in the Pacific Coast rubber trade has been a sharp demand for mechanical rubber supplies to meet the marked revival of building operations. Some large dealers, not having anticipated the active resumption, were soon relieved of their small stocks, and were caused much anxiety in obtaining supplies again in a hurry. Oddly enough, bath-room supplies have lagged behind. This is explained by the fact that the rainy season lingered longer this year than usual.

Trade in tires is excellent, and the price cuts made by the big companies have had a stimulating effect on buyers who had been waiting for this move on the part of the manufacturers. While many dealers were protected on guaranties, not a few were caught with goods that had cost them from 15 to 20 per cent more than present prices. One dealer remarked that the price cuts mean a direct loss of $4,000 to him. Giant cushion and pneumatic truck tires are going well, several big dealers not being able to get enough of them.

An excellent business is being done in rubber sports shoes, and the jobbers expect no let-up until September. Trade in druggists' sundries and bathing caps is close to last season's mark, and in rubber bathing suits, capes, etc., mostly novelties, is ahead of last year. Belting keeps up well, although there has been a falling off in demand from Arizona, New Mexico, and other sections where the mining industry has temporarily shut down.

Buyers of goods generally are purchasing much more cautiously than a year ago, doubtless hoping that further price cuts may be made. As the representative of one of the largest rubber concerns in America remarked: "A year ago we were being chased by buyers, now we are chasing them."

LOS ANGELES AND VICINITY.

At the plant of the Goodyear Tire & Rubber Company of California it was stated that things were picking up in good style, the company's April business having been in excess of $1,200,000. In the middle of May the working force had been increased to 1,350 persons, the output of tires to 2,500 and that of tubes to 2,200 daily, fairly approximating 1920's maximum. Milton Kelly, a certified accountant, has been appointed assistant treasurer to succeed D. J. Koonce, who has gone into another line of business. The refinancing plans of the parent Goodyear company in Akron have made no change in the affairs of the California concern.

The B. F. Goodrich Rubber Co.'s branch at 946 Broadway, Los Angeles, will be moved by September 1 to new quarters in Building E, Terminal Building. The whole seventh floor will be used, and a space of 80,000 square feet occupied, as compared with the present 35,000 feet.

W. F. Lynch has been promoted to the position of manager of the Los Angeles branch of The Mason Tire & Rubber Co., Kent, Ohio. For two years previous he was a salesman in the Cleveland branch, covering western New York and eastern Pennsylvania. Prior to his connection with the Mason company, Mr. Lynch was salesman for the Myers Rubber Co., Cleveland, for three years.

C. C. Case, general manager of the mechanical goods division of the United States Rubber Co., with headquarters in New York, has been visiting all the company's main branches on the Coast.

F. H. Hearsch, formerly western district manager for the Kelly-Springfield Tire Co., has accepted the position of general sales manager of the Samson Tire & Rubber Corporation, Compton, California.

The National Airless Tire Co. will shortly begin the construction of a factory in Norwalk, near Los Angeles, for making non-puncturable, "Los Angeles Airless" tires. The company's of-

fices are in the Grosse Building, Sixth and Spring streets, Los Angeles. The officers are: O. A. Lane, president; H. D. Smith, vice-president; C. F. Evans, treasurer, and C. H. Braden, secretary and general manager.

The Pacific Rubber Ace Co., 281 I. W. Hellman building, Los Angeles, California, advises it has not yet started production but is planning to manufacture the inner tube known as "Rubber Ace," under a royalty paid to the Elgin Rubber Ace Co., Elgin, Illinois. The Pacific company's territory under Elgin covers the states of New Mexico, Arizona, California, Nevada, Oregon, Washington, Idaho and Utah. The company's factory and offices will be located in Los Angeles.

SAN FRANCISCO AND VICINITY.

J. B. Brady, San Francisco branch manager of the United States Rubber Co., has just covered the leading Coast cities and he is enthusiastic about business prospects for 1921.

Ralph Boydston, formerly Goodyear Tacoma branch manager, has taken charge of the new San Francisco branch of the Sound Rubber Co., Tacoma, Washington.

L. G. Lehousse has been appointed special Pacific Coast representative of the United Rubber Co., a subsidiary of The Portage Rubber Co., Akron, Ohio. In 1918 he was appointed resident Pacific Coast manager for the sales department of The Dreadnaught Tire & Rubber Co. of Maryland, Baltimore, Maryland, and in November, 1919, was made Pacific Coast manager of the Los Angeles and San Francisco branches of the Portage company.

B. W. Perks, who since January, 1920, has been in charge of the New York branch of The Portage Rubber Co., Akron, Ohio, has been transferred to the Pacific Coast where he will succeed L. G. Lehousse as Pacific Coast manager of the Los Angeles and San Francisco branches, with headquarters in San Francisco.

The Fresno Tire & Rubber Co. has bought a 7½-acre tract at Belmont for a 3-story concrete factory with a capacity of 500 cord tires and 1,750 tubes a day. The force will number 400 men. Walter S. Munger, president of the Superior Oil Co., heads the concern.

SOUTHWESTERN NOTES.

A somewhat more cheerful tone, due to a reviving demand from tire makers, pervades the cotton market in the Southwest, even though the cotton-planted acreage in the Salt River Valley, Arizona, has dropped from 185,000 in 1920 to less than 75,000 in 1921. Encouragement was felt in the announcement of plans for a million-dollar cotton mill in Los Angeles that will provide large quantities of duck, drills, etc., for rubber and other manufacturers. Some bankers look upon the slump in the cotton industry in the Southwest as a godsend to that section, as the ranchers have learned the lesson that it does not pay to plunge wholly on cotton, but to diversify their crops. With 91½ per cent of the land sown by the Salt River Valley Water Users' Association under cultivation, as compared with 88½ per cent last year, it is estimated that, with varied crops and improved roads, the actual cost of producing cotton may be but half that of last year.

It is stated on good authority that the amount of cotton being held for sale in Salt River and Yuma Valleys, Arizona, and Imperial and San Joaquin Valleys, California, totals 225,000 bales, valued at $22,000,000. Bankers, who realize the need of finding a foreign market for these holdings, are urging support for the Foreign Trade Financing Corporation. The organizing committee of the corporation in this section is composed of leading business men, one of them being A. F. Osterloh, vice-president and general manager of the Goodyear Tire & Rubber Company of California.

The Spreckels "Savage" Tire Co., of San Diego, now at 95 per cent capacity, reports business as particularly good. R. M. Ott, formerly with the Howe Rubber Co., has been made coast representative. J. A. Michels is making a trip over the "Kite territory" and finds trade looking up sharply.

The Ajax Rubber Company of Texas, Inc., 431 Main avenue, San Antonio, Texas, was incorporated under the laws of Texas on December 8, 1920. The officers are: L. D. Ormsby, president and treasurer, San Antonio; F. C. Burnett, vice-president, Dallas—both in Texas; and W. J. Jackson, secretary, New York, N. Y. This company assumed the interests of the former branch of the Ajax Rubber Co., San Antonio, and covers entire southwestern Texas. The company will wholesale Ajax products.

The Universal Tire & Rubber Association, Houston, Texas, has contracted to lease its plant to the Standard Rubber Co., New Orleans, Louisiana, for the period of one year, with an option to purchase the plant. Friendly receivership proceedings were instituted by the officers of the association that its properties might be conserved during the period covered by the contract.

NORTHWESTERN NOTES.

At the annual meeting of the Portland Rubber Workers Club, Portland, Oregon, the following officers were elected: T. R. Conway, president; Charles Voyle, vice-president; and W. T. Peters, secretary and treasurer. The directors elected for the year 1921 were: E. R. Morris, E. L. Harper and J. T. Bailey. The club is carrying on several activities dealing with the education of the public as to the use and care of tires.

A Federal Reserve report states that Pacific coast retailers of automobile tires lead other business lines in liquidating stocks and ordering new goods.

Tire dealers state that the reduction in prices of several well-known automobiles has had as much to do with increasing sales as the cuts made by the large tire manufacturers. There is a good demand for "spares," not part of the standard equipment.

An enterprising and rapidly growing concern is the Sound Rubber Co., Tacoma, Washington, maker of tubes and casings exclusively.

The Dutho Rubber Co. has opened a general tire and tube repair factory at W925 First avenue, Spokane, Washington, with a $16,000 equipment. C. H. Moller is manager and Charles W. Zahn, secretary.

CALIFORNIA BARS METAL TIRES.

The bill—Senate 789, introduced by Mr. Rominger—that passed the California Legislature and was signed by Governor Stephens, virtually prohibits the use of metal tires, or wood or rubber tires having any portion of the tread studded or coated with metal, on any highway of the state.

An exception is made in favor of tire chains. The new law is an amendment to the General Highway Act of 1915. Another provision of the new act is: "No solid rubber tire shall be used on any motor or other vehicle or contrivance for moving loads over any public highway or bridge unless such tire has rubber on its entire traction surface, at least one-inch thick above the edge of the flange."

RUBBER CEMENT FOR MOUNTING PHOTOGRAPHS

Paste has long been an unsatisfactory material in mounting photographs and other illustrations, as the edges curl, and unless the backing is heavy, the pictures do not lie flat, while excess paste smudges the mounting. Pure rubber cement has many good qualities, in fact all that paste has not. Rubber cement does not stretch photographs when mounting, does not buckle them, does not curl up photograph or mounting no matter how thin, and leaves no mark when excess cement is removed. One of the greatest benefits of the rubber cement over paste is that once a photograph is mounted it can be removed without damage by the simple expedient of loosening a corner and pulling off the print.—New York Belting & Packing Co., 91 Chambers street, New York, N. Y.

PROCESSING TIRES, TUBES AND BELTING

SOME NEW AND INTERESTING STATEMENTS

What may be termed an "elixir of youth" is administered to old or new tires and tubes by a new concern, and the results claimed for the treatment are marvelous. For instance, one 35 by 5 "Silvertown" cord tire which had been run 10,815 miles was taken to an expert repair man for a retread. The repairer saw the breaker strip showing in several places, the tread so thin, and the tire so generally used up that he pronounced it an incurable case. Some one suggested trying a new-fangled "process" treatment another repair man was endeavoring to introduce. The worn casing was duly "processed," nothing being added to it nor anything taken away, and returned to the skeptical owner. The latter testifies that since then the tire has run 5,700 miles more, and has given a year and five months of hard service without retreading or rubber addition.

Claims made for the process are that it not only imparts new life to "semi-baked" fabric and rubber compounds "deadened" by vulcanizing heat, adding much to cushion and resiliency, but that by toughening the tread it adds from 50 to 100 per cent to the mileage. It is also asserted that all oil in old tires is removed and the original color restored. New tires, it is said, can be benefited as much as old ones. The process has not been patented, is a laboratory one, and the details are a secret.

According to the written statement of the processing company: "Tires may be processed if they have not been run too far, or if there is a foundation left to work upon, giving many more miles of wear and greater elasticity and physical strength to both fabric and cord tires. The process is a help to both the fabric and the rubber, bringing to life the fabric, and toughening the rubber, making the tires all resilient. All makes of tires and tubes may be processed, giving 50 to 100 per cent more mileage to new tires and a corresponding increase to used tires, according to the life left in them."

The inventor of the process then writes:

"I am through with the tire people who turn over the tires, after I have processed them, to the development departments, where they are merely dissected to learn what I do, after it is understood between us that the only test is to run processed tires side by side with non-processed tires of the same kind, and under the same conditions.

"The best tire made, as regards quality and material, is not prime when finished in the factory. The extreme heat and pressure used in manufacture dries out the oil and wax that nature put in the fabric, and also dries up the compound, so that the tire begins aging at once.

"I restore the pliancy and resiliency all through, and make the tread tougher, staying the aging. My process can restore to good condition overcured or undercured tires, new stiff hard tires, or those hardened by age, in or out of use.

"My process consists of an unpatented chemical formula having some rubber capabilities, and is to be used in a secret process in combination with chemical immersions according to the condition of the tire; thus tending to improve, 'after manufacture' into automobile tires, inner tubing and rubber belting 'compositions,' the capacity for an increase of some of the 'attributes' as provided by gum elastic rubber when used in sufficient quantities.

"This chemical formula and accompanying processes will have the effect of creating an 'auxiliary,' associated with rubber and acting as a 'liberator' thereof and part substitute therefor, in a stiff, continually aging and hardening rubber composition article designed for active movement."

STANDARD PACKINGS FOR RUBBER FOOTWEAR

A Canadian rubber footwear concern has adopted the system of packing 30 pairs of light rubbers in a case, instead of 25 as heretofore; and 15 pairs of heavy footwear, instead of 12. The larger cases are said to cost no more and the expense of closing, stenciling and handling is the same as before. The customer gets a better assortment of sizes, especially in heavy goods, without so many end sizes, enabling him to make a quicker turnover; and freight and express charges are proportionally less on repeat shipments.

While United States manufacturers have not adopted the methods of their Canadian confrères, they are shipping rubber footwear in cheaper fiber cases. Buyers state that the goods are received in good condition and with a considerable difference in the freight rates.

A CANADIAN LEADER IN RUBBER CHEMISTRY

In this age of specialization the rubber chemist has come to occupy a peculiarly important position among production executives. One of the most outstanding authorities whom Canada has produced in this important field is William B. Wiegand, director in charge of rubber manufacture for Ames Holden McCready Limited, Montreal, Canada.


W. B. Wiegand

Mr. Wiegand was born in Conestogo, Ontario, in 1889 and was educated in the public and high schools of Toronto, Ontario, and the University of Toronto, where he received his M. A. degree in 1912 with high honors, being gold medalist in chemistry. After a year of post-graduate work on the faculty of the university, he went into the Morgan & Wright factory and laboratory at Detroit, Michigan. The following year he joined the staff of the Dominion Tire Co., Limited, Kitchener, Ontario, as chief chemist. In 1915 he was transferred to the Canadian Consolidated Rubber Co., Limited, Montreal, Canada, as general technical superintendent, going in 1919 to Ames Holden McCready Limited as director in charge of rubber manufacture. He is also a director of the Ames Holden Tire Co., Limited, and of the Ames Holden Felt Co., Limited, both of Montreal, Canada.

Ever since 1915 Mr. Wiegand has been responsible for the manufacturing and technical problems relating to tires, footwear and mechanicals, and has made a hobby of applying the specialized knowledge and "tricks" of each division to the problems of the others. He is the author of several technical papers read before various chemical societies, two of which have been published in recent issues of The India Rubber World; he is also joint patentee of an impregnated fiber for footwear manufacture.

He is a Fellow of the Canadian Institute of Chemistry, also a member of the American Chemical Society and of the Society of Chemical Industry, London, England.

CANADIAN NOTES

Pioneer Products of Canada, Limited, 11 St. Sulpice street, Montreal, handle "Air-peds" in Canada for Pioneer Products Co., 35 West 39th street, New York, New York. These rubber heel and two-part rubber sole "Air-peds" were described in The India Rubber World, April 1, 1920.

Stephen A. Howell succeeds Harold R. Cole as manager of A. Schrader's Son, Inc., Toronto branch. Mr. Howell who was formerly in charge of the Chicago branch joined the company in 1915. Mr. Cole is now at the main office in Brooklyn, New York.

American vs. European Practice in the Rubber Tire Industry

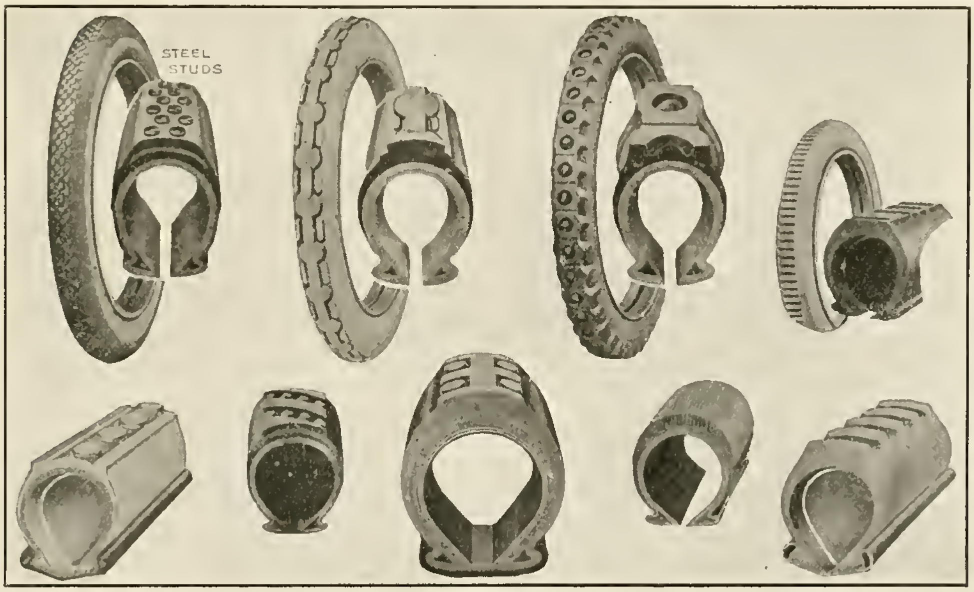
By Albert H. Myers[1]

Having returned recently from a visit abroad in the interests of a certain branch of the rubber industry, the writer believes that probably his observations would be of interest to others who are connected with the industry in this country. The territory covered comprised the greater part of England and France, and the following applies principally to the pneumatic tire-making industry of those countries. The reader should remember that immense tire manufacturing plants are not to be found in Europe. However, there are several plants in England and France which are of a fair size and capable of producing about 5,000 tires a day, compared to our larger plants in this country which can produce from 20,000 to 35,000 tires in a day of 24 hours.

FABRIC VS. CORD TIRE

The regular fabric tire is mostly produced in Europe at the present time, but manufacturers on the other side are increasing the production of the cord tire, which is still in its infancy over there. There are also other manufacturers who have not yet produced cord tires for the trade, but who are making experiments along those lines. One of the prominent cord tires in Europe today is made by laying individual cords, approximately ⅛-inch in diameter, in two or more layers on an iron core by an automatic machine. This was the method first used in America for making cord tires, but is now discarded, and in its place a cord fabric composed of small individual cords is used. These cords are approximately 3/64-inch in diameter and are laid about 23 to the inch. The size and the number of cords per inch vary with different manufacturers.

In the built-up single cord method, the cords are passed through a semi-liquid rubber compound and cabled to size, while in the cord fabric method the fabric is first passed through a rubber-spreading machine, after which it is frictioned and skim-coated on a calender.



Representative European Tires, Showing Tread Designs in Use

REASONS FOR FABRIC TIRES

As the fabric tire is most popular in Europe, comparatively heavy investments have been made in machinery for its production, and consequently many fabric tires will be made for some time to come. Among the special machinery installed for fabric tire production in Europe is the 90-inch calender of which there is a number. These machines weigh as much as 100 tons. Contrary to the statements made in this country that calenders of such large dimensions are not successful, the writer did not hear of any complaints while abroad, the users being more or less enthusiastic about them. One reason why such large machines have been adopted is that due to the greater width of fabric which can be handled, a lesser number of joints are required when building a tire carcass.

A great many smaller tires are now being made, due to the increasing number of light pleasure cars coming into use. The typical car for the average person, especially in England, is smaller than the Ford car produced in this country. The high rate of taxation abroad has made necessary the development of a a small car for the man with average means. It is not uncommon for this class of car to average 30 to 40 miles to a gallon of gasoline. The roads are generally excellent, which tends to higher mileage for the fabric tire than that realized in this country.

The pneumatic tire for bus service in cities is apparently not making much headway. One of the prominent omnibus companies has experimented for about a year to find out if the pneumatic tire was superior for their service. It claims that, all things considered, such as up-keep, etc., the solid rubber tire is superior. Although for touring service, such as the heavy char-à-bancs, the pneumatic tire is generally used.

TYPICAL TREADS—THE STRAIGHT-SIDE TIRE CONTROVERSY

A number of representative European tires are shown to give an idea of some of the different tread designs in use. The steel-studded tread is still commonly seen, and the principal reason for its existence today is the fact that there are city ordinances still in force which make it compulsory to have at least one of these tires on all taxicabs and like vehicles.

The controversy relative to the advantages of the American straight-side tire versus the clincher tire, is unsettled and probably will remain so and take its place beside other customs which are peculiar to the countries involved. The writer did not observe any straight-side tires that were made abroad. Those being shipped over from America are for use on American cars sold in Europe.

EUROPEAN RUBBER MACHINERY

Relative to machinery used in the rubber industries of Europe, it must be remembered that the pioneer plants are as old as ours, but European manufacturers have not been so quick to throw out the old and install the new as we have in the United States; consequently, they do not get the great amount of production for floor space involved that we do. The older mills and calenders run about half the speed of present-day American machinery; the hydraulic vulcanizing presses are generally of the bolted type; in fact, manual labor is used to a much greater extent than in this country. The size of rubber mills generally does not run over 60 inches in roll length, with the exception of where an 84-inch size may have been purchased for use as a

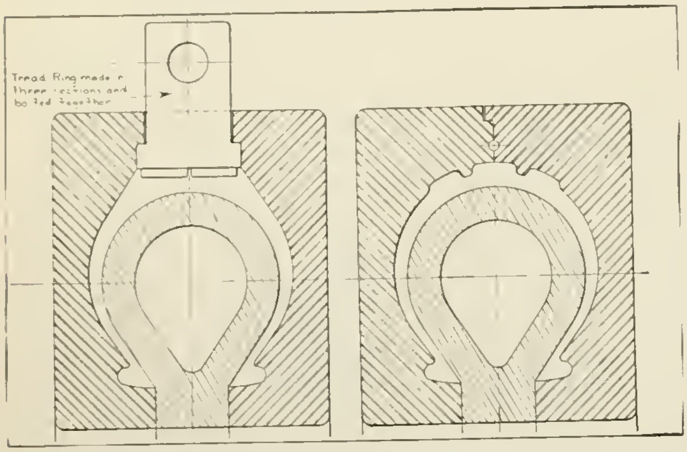
[1]The Wellman-Seaver-Morgan Co., Akron, Ohio.

warming mill for one of the large calenders previously mentioned.

Safety appliances are not as much in evidence abroad as they are in this country. However, the subject is being given more attention with the machinery being installed today. The method of stopping mill lines is mostly by dynamic braking of the motor instead of the familiar clutch brake seen in this country. This, of course, is due to the prevailing use of direct electric current.

EUROPEAN THREE-PART MOLD

The wrapped tread method of curing tires is in considerable use abroad, but where a mold is used it is often of the three-part type that is shown in the accompanying illustration. The mold consists of a top and bottom plate, an outer, or tread



Three-Part Mold
European Type

Two-Part Mold
American Type

ring, made in three sections, and bolts for bolting the sections together. In operation the three sections of the tread ring are brought together around the uncured tire by screwing up the nuts on the bolts which hold the rings together. Then the top and bottom plates are positioned, and the mold placed in the vertical hydraulic vulcanizing press and squeezed together, and the tire cured. It requires three men from ten to fifteen minutes to handle one of these molds—a waste of time, which in the United States would be deemed deplorable. It must be remembered, however, that some of the tread designs used in Europe could not be made clean cut in any other way, so that the remedy is really a redesign of the tread. A typical American tire mold is also illustrated for comparison. The simplicity of its use is readily seen.

THE FLOOD OF AMERICAN TIRES

The writer was surprised to find that a great number of American tires are used abroad, but does not wish to infer that the European manufacturers are not awake to opportunity. This is not so. It is due to being hindered by their obligations that keeps them from expanding as we do in America. It must be remembered that they have been hit harder than we have in the course of events, and therefore do not seem to be overflowing with optimism.

The present flood of American tires in some of the European countries may or may not continue, as it is possible that steps may be taken in the near future to make it more difficult for the American tire manufacturer to compete. This, of course, is a matter of conjecture, but it is well to bear in mind that the present favorable situation may not last.

NO SPRING FAIR AT DANZIG

Consul William Dawson reports that the Danzig city authorities have decided not to hold a spring fair in 1921, but that a fall fair is planned.

RADIUM—A SAFETY FIRST FACTOR

Time and again it has been shown that the scientific curiosity of today becomes an industrial necessity tomorrow. For some time after the discovery of radium in 1902 by M. and Mme. Curie in Paris, the rare radioactive metallic element served little other purpose than that of affording a subject for curious speculations by physicists on matter and energy. Next, the discovery was made that radium had a certain curative value in cancerous and other affections. Finally came an exact and practical application of the newly-found element as a luminous coating superseding the old-time paints made of sulphide of barium or calcium, which chemicals emitted a steadily failing glow after exposure to strong light. The advantage of the radium paint is that it needs no light to impart phosphorescence, it glows of its own accord, and the luminosity it affords is practically perpetual.

One of the first uses to which radium-luminous material was put on an extensive scale was the marking of watch and clock dials to make them easily visible without other light. Now, managers of rubber mills, as well as heads of other factories throughout the country, are closely studying its importance as a "safety first" factor in lessening the chances of their employes being injured. They are finding out that wherever danger lurks in darkness radium-luminous material may be used to largely eliminate life and limb hazards to their employes.

Electric switches, for instance, are often put in nooks and corners of mills where the least fumbling in the dark might mean electrocution to the operator. The efficiency of a fire alarm or a fire extinguisher is greatly increased by having it made visible in the dark. Guards for gear wheels are often illuminated thus, as well as perilous parts of many machines, as an extra safeguard in case of the failure of electric lamps while the machines are being used. It is often necessary to locate telephones, emergency call bells, etc., before time can be taken to reach the switches and turn on electric lights. Often high-pressure gages, installed as an insurance against dangers, are deprived of much of their safety value through inconstant lighting; but their dependability can be greatly enhanced by applying a preparation which makes them luminous 24 hours a day.

AMERICAN ARMY TIRES IMPORTED FROM FRANCE

The American tire trade has been somewhat exercised by reports concerning the importation from France of a considerable stock of standard American makes of pneumatic and solid tires. These were a portion of the American army supplies sold to the French Government as surplus material. The India Rubber World has received the following information on this subject, from its French correspondent.

"The French Government is liquidating these purchases, and about 200,000 tires from this source have been sold to speculators at very low prices. A certain quantity remains in France, going to buyers of American vehicles which were also derived from the liquidation, but the greater part of those sold have been shipped to the United States.

"It seems that this stock was bought at 40 per cent of its 1914 price, and it is reported that the French buyers divided their profit equally with the purchasers. The tires are not in very good condition as the storage was very defective. The huts where they were held being in poor condition, the tires were exposed to light and inclement weather.

"Other quantities are still for sale, as the stocks are said to have amounted to almost a million pneumatic tires. It is possible that they will be bought back by the same agents and shipped to the United States as rubber scrap."

Serious consideration has been given to the possibility of preventing the entrance of these tires into the United States but no effective measures can be found. It is apparently a matter for the individual makers to consider with respect to guaranties on these tires.

The Rubber Trade in Great Britain

By Our Regular Correspondent

Whatever the future may have in store for the trade, it is difficult to be optimistic at the moment. We are now at the end of the fifth week of the coal strike with its general discomforts and bad effects on trade. The dispute as to the reduction in rubber workers' wages is now in the hands of the Rubber Manufacturers' Association and the Workers' Unions, as the Whitley Council seems to have come to an end. The waterproof garment makers to the number of about 5,000, the great bulk of whom are located in Manchester, have now been on a strike for five weeks against the proposal to reduce their wages 17½ per cent, and a settlement does not seem to be imminent. With regard to rubber workers generally, notice of a 10 per cent reduction was first posted by the Leyland & Birmingham Rubber Co., Limited, but this was subsequently withdrawn in view of an official statement to be issued by the Manufacturers' Association. However, discussions are still proceeding with the leaders of the workers' unions.

Rubber workers in the Lancashire area have consented to the following reductions: ten per cent less to male workers; wages of men over 21 years not to fall below 52*s.* 6*d.* for a 47-hour week; 5*s.* per week less to female workers, the wages of those over 18 years not to fall below 27*s.* 6*d.* for 47 hours; half a crown less to workers under 16 years. These terms are only temporary because the operatives' officials have been instructed to press for an advance of wages at the end of three months and also for the standardization of the rubber industry throughout the country. Regular rubber manufacturers have been more affected by the slump than those who specialize in electric cables, rubber card clothing, lawn tennis balls, etc. While the rubber manufacturers are working only two or three days a week the above concerns and others not referred to, are on full time. Reclaimers seem to have been hard hit, some works being closed down altogether for the time being and others working only a fraction of the week. It looks as if the expected trade revival will not immediately benefit the reclaimers as there is little indication of a substantial rise in the price of raw rubber.

The trade generally remains in a depressed condition and apparently wages and probably salaries will have to be reduced to keep business going until the revival of trade, which will come if costs can be brought down. Owing to dullness in the rubber industry, and coal accumulations, the coal strike has not caused any stoppage of work. In some cases where rubber works draw electric power from the municipal works the supply has been curtailed.

RUBBER ROADWAYS, LIMITED

This company was formed in 1913 and financed by the Rubber Growers' Association and some of the plantation companies with the object of experimenting in rubber-paved roads. The first experiments were not very successful and about a year ago a street in Southwark, London, notorious for its heavy traffic, was laid with rubber blocks attached to steel plates. It was found that the rubber became worn on the under side and detached from the steel plates by the heavy traffic. A new method is now under trial and appears to have given very satisfactory results. In this case the rigid steel plate is replaced by one of expanding metal, the idea of the borough engineer whose further report will be awaited with general interest.

FINANCIAL NOTES

The report of J. Mandleberg & Co., Limited, of Manchester, for 1920, shows a decline in profits due to what the directors describe as the unprecedented fall in values. The net profit is £76,206 against £102,882 for 1919. As there was a substantial carry-over and no addition is being made to the reserve, there need have been no reduction except for the fact that the capital was largely increased last year. This necessitates a reduction in the dividend to 15 per cent against 22½ per cent in 1919, the carry forward being £109,553.

The electric cable business of Johnson & Phillips, Limited, of Charlton, London, had a good year, the dividend being maintained at 12½ per cent. Additional working capital, however, is needed to cope with the growth of the business and the intention is to enlarge the borrowing powers and create £350,000 first mortgage debentures, the combined total of which is about £119,000.

F. Reddaway & Co., Limited, the well-known belting manufacturer of Manchester, is paying 8 per cent on the ordinary shares for 1920 the same as in the two previous years. Although rubber belting and mechanicals are largely made at these extensive works the firm is chiefly known for its textile belts.

Metropolitan Vickers Electrical Co., Limited, whose works at Trafford Park, Manchester, were formerly known as the British Westinghouse Co., Limited, shows an increase in net profit of £83,231 over 1919 and the dividend on the ordinary shares has been raised from 8 to 12½ per cent. At the meeting, the chairman, J. Annan Bryce, referred to the clouds which had come over the bright prospects with which the year began. All sensible men, he said, recognized that the worker should be helped to maintain in part, at least, the improved standard of living which he enjoyed during the war, but there must be a fall in wages and this would cause a fall in the cost of living. The claim that a shorter working day would not cause a decrease in output had not proved correct. So far from that being the result, even the output per man per hour was less, with the result of an immense reduction of output and increase of cost. This made it difficult to compete with other countries where this state of affairs did not exist.

OYLERS, LIMITED

Oylers, Limited, London, which has recently failed, was formed in 1911 to take over an existing business largely concerned with the manufacture of rubber surgical goods. The London premises were later added to by the acquisition of the large unused building forming part of the electricity works at Richmond, Surrey. Here the Rapson tire was produced, or partly here and partly in London. The petition for compulsory liquidation was filed by the Isleworth Rubber Co., Limited, creditors for £2,147 though a larger sum £10,180 is said to be due to J. C. Mason. The profit for 1919 was £4,988 and for 1920 £7,069. The total liabilities are put at £82,745 and the deficiency on realization of assets at £68,857. There does not seem any possibility of the business being continued.

INDUSTRIAL RESEARCH ON INSULATING MATERIALS

An interesting and important account of the results obtained by the special committee appointed by Vickers', Limited, appeared in *Engineering*, April 22. The work was carried out at the Ioco Rubber & Waterproofing Works, Glasgow, by some of the scientists engaged at the associated Vickers' concerns, though W. T. Glover Co., Limited, was not represented. Insulating material for electrical apparatus and plants as distinct from cable insulation was largely obtained from Germany and America before the war and the main object of the research was to encourage the manufacture of this material at home. The work was principally concerned with varnished cloth, a material which has long been a specialty made by Glovers, and in which permanent flexibility is required so that transformer coils may be

insulated without the surface cracking. The "tendering" effect of fatty acids produced by oxidation of the varnish film can be kept at a minimum only by careful control of the temperature of storing. If this is too high, a hard film forms on the surface of the varnish while the varnish imprisoned below gradually oxidizes on storing, and as the fatty acids cannot escape they cause great damage to the cotton fiber. Varnished silk, adhesive tape and varnished paper are material specially referred to. It has been known for some time that Vickers, Limited, has been interested in the synthetic resins of the phenol formaldehyde condensation type and it is here stated that where, in addition to electrical properties, a built up sheet or cylinder has to withstand a sudden stress or shock, as in transformer work, the use of a synthetic gum is preferable to shellac. I note the term gum is used instead of resin. In the case of shellac, there is no chemical change after applying it to the paper, but with synthetic resins the cylinders wound with it are subsequently baked to complete the condensation which insures a body of great hardness and insolubility in alcohols and oils. With regard to the use of synthetic resins, the demand exceeds the supply and the two or three makers are certainly not working short time.

It is said that a fusion of interest has been made between holders of American and German Bakelite patents of which there seems to be any number, but this combine does not cover all those who are engaged in the exploitation of synthetic resins which are bound to prove a very serious competitor to vulcanite. It is clear that high scientific control of electrical insulation is of the greatest importance because of the increasing tendency to higher voltages and larger units and Vickers has done good service in allowing its results to be published. It is noticeable, however, that no details of the formulas of the varnishes are given, a fact which will not cause widespread surprise.

BRITISH NOTES

W. H. Davis, formerly a director of the United Oversea Co., Limited, of London, in charge of the rubber department, has now opened offices at Thames Chambers, Beer Lane, London, E. C. 3, as a produce commission merchant, making a specialty of crude rubber.

Irwell & Eastern Rubber Co., Limited, Ordsalle Lane, Salford, Manchester, England, has changed its name to The Greengate & Irwell Rubber Co., Limited, at the same address.

GREAT BRITAIN REDUCES TIRE PRICES

In Great Britain tire prices have been reduced approximately 10 per cent, and in one case a further reduction of £1 ($4.8665 at normal exchange) a tire is noted. A number of accessories have also been reduced ten per cent.

BRAZIL AT THE LONDON RUBBER EXHIBITION

Brazil is to be represented at the forthcoming London Rubber Exhibition by Hypolito de Vasconcellos and Hannibal Porto. Both gentlemen are well-acquainted with the industry and possibilities of Brazil. Mr. Vasconcellos is also well-known in London, where he was Brazilian Consul, while Mr. Porto is a well-known writer on economic and agricultural problems of his own country.

NORWAY REGULATES PNEUMATIC TIRE SIZES

The Norwegian authorities have found it necessary to regulate traffic to suit the roads instead of building the roads to carry the increased traffic. This is due to the enormous expense which would be involved. New regulations provide that motor trucks of 1¾-tons capacity, and less, are not permitted on the roads unless equipped with pneumatic tires. It is specified that tires from 1 to 2 inches greater than the standard size would have to be placed on American trucks if they were to be used on the Norwegian roads. Also that the weight of the truck and the load together must not exceed 5 tons. This practically limits the trucks to 2½-ton sizes or less.

THE RUBBER TRADE IN EUROPE

By a Special Correspondent

FRANCE

The Société Française de Caoutchouc "Montsouris," 33 rue Voltaire, Puteaux, has raised its capital to 2,000,000 francs. This firm manufactures all kinds of articles of hard and soft rubber.

It is reported that the Manufacture Parisienne de Caoutchouc, 19 rue de la Pépinière, Paris, is actively engaged in completing the factory bought from Forges aux Etablissement Fredet. M. Giraudin is in charge of the management of this factory, where the rubber to be used at the other factories of the company will be treated. The factory will be ready to operate in a few months' time.

It may be recalled that the Manufacture Parisienne de Caoutchouc last year acquired three other factories specializing in rubber manufacture and belonging to the Colonial Rubber Co. and to Maison Michel Jackson. These three factories are situated at Prouvy-Thiant, near Valenciennes, at Halluin (in the north), and at Menin (Belgium), and since their acquisition have undergone considerable changes in the way of reconstruction and expansion, which are at present almost completed.

GERMANY

Recently published official statistics for September, 1920, show that the total German foreign trade in rubber for that month amounted to 3,700 quintals (one quintal equals 220.46 pounds). Of this, 800 quintals were imported and 2,900 quintals were exported. The total imports for the period January to September, 1920, came to 18,100 quintals, while exports were 20,000 quintals, in comparison with 34,500 and 152,300 quintals, respectively, for 1913.

The value of exports in September, 1920, was 26,300,000 marks and for the nine months ended September, 1920, 184,600,000. Only soft rubber goods were imported in September, 1920, and amounted to 800 quintals; for the first nine months of 1920 these articles were imported to an amount of 17,900 quintals, against 33,700 quintals in the same period of 1913. In September of last year the exports of soft rubber goods were 2,700 quintals; for the months January—September, 1920, the figures were 18,900 quintals as compared with 141,200 quintals during the corresponding period of 1913. Imports of hard rubber goods were 200 and 800 quintals for the first nine months of 1920 and 1913, respectively. Exports of these goods came to 200 quintals in September, 1,100 quintals during January—September, 1920, and 11,100 quintals for the corresponding period in 1913. The value of soft rubber goods amounted to 22,500,000 marks for September and 158,000,000 for the months January—September, 1920, while the value of the exports of hard rubber during the same periods averaged 3,800,000 marks and 26,600,000 marks, respectively.

Dr. F. Kuhlemann, a director of the Vereinigten Gummiwarenfabriken, Harburg-Wien, Germany, returned last month after a brief business visit to the United States.

GERMAN RUBBER COMPANIES' PROFITS

An examination of the annual reports of the most important German rubber manufacturing firms shows that in general satisfactory profits were made during 1920. As in other countries, business was better during the first part of 1920 than toward the latter part of the year. More than one concern complains of difficulties due to the coal situation in Germany, while the high cost of production was also a more or less disturbing factor.

The Continental-Caoutchouc- und Gutta-Percha-Compagnie, Hanover, reports that in spite of the greatest efforts to obtain sufficient coal, work had to be partly stopped from time to time. During 1920, the sum of 52,684,668.14 marks was spent on coal alone. However, it is expected that the recent purchase of the greater part of the shares in a coal-mining company will help to improve matters as far as coal is concerned.

The working capital was 284,163,502.03 marks and net profits amounted to 14,426,294.16 marks. The report gives a summary of the welfare work done during the year. Expenses for employes in accordance with the requirements of the law amounted to 1,002,812.86 marks; voluntary welfare work cost 2,258,619.52 marks. This latter includes the expenditure of 400,000 marks to cover the cost of sending the children of all the employes to the country for four weeks. Every man who has worked to the company's satisfaction for 10 years receives a life insurance policy of 1,500 marks as a gift. At present 1,303 workers possess such policies, or bank books if they cannot be insured. Office employes are presented with policies ranging from 1,500 to 5,000 marks on completion of their 10 years of service. All these policies are paid out immediately at death or when the holder has reached the age of 65 years. At present 501 office employes hold such policies.

The Mittelland-Gummiwerke A. G., Hanover-Linden, reports net profits amounting to 1,807,330.73 marks. A dividend of 6 per cent on 300,000 marks of preferential shares was declared, as well as 25 per cent dividend on 4,200,000 marks original shares, plus a bonus of 10 per cent on these shares. It was further decided to increase the capital of 4,200,000 marks to 6,600,000 marks.

At a recent meeting of the Kabelwerk Duisburg A. G., in Duisburg, it was proposed to declare a dividend of 16 per cent and a bonus of 9 per cent as in the year before. Net profits for the year 1920 were 2,952,843 marks.

The C. Müller Gummiwarenfabrik A. G., were able to report net profits of 481,651.64 marks for 1920 and as in 1919, declared a dividend of 15 per cent.

The Mannheimer Gummi- Guttapercha- und Asbest-Fabrik, A. G., Mannheim, declared a dividend of 24 per cent for the year 1920. Net profits were 1,253,343.83 marks.

The Bremer Gummiwerke Roland A. G., Bremen, reports that 1920 was more favorable than the previous year. Net profits for the year under review were 197,683.48 marks, and it was possible to declare a dividend of 7 per cent.

The Gummiwerke "Elbe," Aktiengesellschaft, Piesteritz, near Klein-Wittenberg (Elbe), reports a satisfactory year. Net profits amounted to 488,387.26 marks and dividends of 4 per cent and 12 per cent were proposed. The company's statement shows the great increase of costs and expenditure from 659,534.73 marks in 1914, to 1,488,695.61 marks in 1918, 2,576,350.77 marks in 1919 and 7,712,339.23 marks in 1920.

Vereinigte Berlin-Frankfurter Gummiwarenfabriken had net profits of 1,315,637.86 marks and were able to declare a dividend of 15 per cent as in 1919.

NEW FIRMS

Aachener Pneumatic-Reparatur Anstalt S. Saul G. m. b. H., Aachen; repairing of pneumatic tires, manufacture and sale of protectors, repairing material, etc.

Polo Gummigesellschaft Freudmann & Co., Barmen.

Lindener Gummiwarenfabrik G. m. b. H., Hanover, manufacture and sale of all kinds of goods made of rubber or similar material.

Firma Carl Mettler, G. m. b. H., Trier; trade in technical goods of rubber and asbestos, electrical goods, etc.

Mineralöl- und Asbest-Gesellschaft m. b. H. (formerly A. Neuhaus), Paderborn; import and export of mineral oils and fats, technical goods of rubber and glass, asbestos goods, belting, etc.

Gummiwerk Odenwald, G. m. b. H., Mümling-Grumbach (in Odenwald). Manufacture of rubber goods and regenerated rubber, sale thereof.

Firma Tetra A. G., Chemnitz, manufacture and sale of all kinds of hygienic fabrics and articles made thereof; capital, 1,000,000 marks.

Firma Fritz Holzhey, Frankenberg, Saxony; import and manufacture of technical oils and fats, trade in belting, rubber and asbestos goods, stuffing-box packing and all kinds of technical goods.

THE LEIPZIG SPRING FAIR

In spite of political troubles, it seems that the Leipzig Spring Fair was to a certain extent successful and that the turnover was satisfactory. As usual, large numbers of people came from all parts of Germany and quite a number of foreigners were present—Americans, Swiss, Austrians and even Englishmen and Frenchmen. Since the war forced manufacturers to resort to substitutes, rubber at the Leipzig fair has not been so well represented as was the case this time. It is claimed that both quantity and quality were surprisingly good. Everything in hard and soft rubber, gutta percha, celluloid and similar materials, that in pre-war days found a place at the fair, was once more represented. Exhibits of surgical, hygienic, optical and household goods of rubber were particularly complete and numerous. While certain hygienic and sporting articles were poorly represented as late as the last fall fair, much that was interesting in these lines was now to be seen. All sorts of technical goods, bathing caps, tires, soles and heels, jar-rings, toys, balls and hard rubber goods were exhibited in quantity. Prices were favorable and it is not expected that they will be further reduced.

RUBBER FACTORIES IN CZECHO-SLOVAKIA

The most important rubber factories in Czecho-Slovakia are: Vereinigte Berlin-Frankfurter Gummiwarenfabriken, branch in Grottau, Bohemia. There are warehouses of this enterprise in Vienna, Budapest and Prague. Main factories are in Berlin and other German places. At Grottau about 300 workers are employed. The articles manufactured are principally technical and surgical rubber goods; pneumatic tires for automobiles and other vehicles, rubber soles and heels.

Gummi-und Balatawerke "Matador," in Pressburg. About 230 persons are employed at this factory which turns out chiefly technical rubber goods.

Prager Gummiwarenfabrik Wysocan of the "Semperit" Oesterreichisch-Amerikanischen Gummiwerke, A. G. Technical rubber goods of all kinds, asbestos, rubber goods and high pressure plates are made here. A subsidiary is the Prager Asbestund Gummiwerke, G. m. b. H., which manufactures packing of all kinds as well as asbestos and rubber goods.

Schneck & Kohnberger, Gummiwarenfabrik (limited liability company), have a rubber weaving establishment at Odrau, Silesia, and a cotton spinning and cotton throwing factory at Josephtal near Bensen. The works employ about 800 persons and besides the above produce technical rubber goods of all kinds, insulation bands, high pressure plates, rubber heels, rubber threads, bandages, garters and suspenders.

FOREIGN TARIFFS

BRITISH INDIA

A bill of March 1, revising the custom duties of British India, fixes an import tariff of 11 per cent ad valorem on gums, resins and lac of all sorts, and on rubber tires and other manufactures of rubber except pneumatic tires and tubes for motor cars including motor lorries, motorcycles, motor scooters, bicycles and tricycles, on which there is a duty of 20 per cent ad valorem.

BELGIUM

On March 31 Belgium passed a bill providing for an import duty of 12 per cent ad valorem on motorcycle, cycle, and other vehicle parts and detached pieces including tires of rubber or rubber combined with other material, whatever be the predominating material.

SWEDEN

The prohibition on the exportation from Sweden of rubber boots and shoes (Tariff No. 641) was withdrawn in a decree on March 16.

CHILE

The Chilean law dated February 23, increasing import duties, covers balls, former rate of duty 0.12, now 0.25 pesos per kilogram gross; and rubber toys, formerly 2.50, now 5.00 pesos per kilogram gross.

BRAZIL

Two presidential decrees maintain in force the preferential customs treatment accorded to certain articles of United States and Belgium origin on importations into Brazil. This treatment consists of a reduction of duty for both countries of 20 per cent on rubber manufactures coming under No. 1033 of the Brazilian Tariff.

MEXICO

Mexican export duty on chicle has been changed from 15 cents (United States currency) per kilo (2.2 pounds) to 6 per cent ad valorem. These duties are fixed bi-monthly.

In a decree promulgated April 19, and effective on the 23rd, Mexican duty is increased on rubber tires for automobiles from 1 peso (50 cents) per gross kilo to 1.50 pesos per gross kilo of 2.2 pounds, and on rubber tires for motor trucks from 0.50-peso (25 cents) to .75-peso (37¼ cents) per gross kilo.

GERMANY

An order dated April 29 permits the following articles to be exported without license:

India rubber, gutta percha and balata, crude or refined, and waste; used pieces of wares of these materials; "factice" and other rubber substitutes; wares of soft rubber falling under Tariff Nos. 570 to 581; hard rubber and wares of hard rubber falling under Tariff Nos. 582 to 586.

POLAND

An order provides for the payment in paper currency, with an "agio" of 400 per cent (at the rate of 5 paper marks for each gold mark prescribed by the Customs Tariff) on the following imports:

Rubber driving belts, rubber hose, with or without fabric, with or without spring inside, without metal covering on the outside; rubber for packings; technical articles of rubber, not combined with fabric; hemp and cotton driving belts (balata), also with addition of paper yarn; canvas for making driving belts.

SIBERIA

The government of the so-called Far Eastern Republic has temporarily prohibited the export of rubber in all shapes and also manufactured automobiles, motor cycles and parts

NETHERLANDS EAST INDIES

The following export duties are to take effect on August 16, 1921:

Rubber	Export Duty ad valorum
When the market price per ½-kilog. amounts to—	
0.825 florin or less	Nil
More than 0.825 but less than 0.90 florin	¼%
0.90 florin and more but less than 1 florin	½%
1.00 florin and more but less than 1.10 florins	1%
1.10 florin and more but less than 1.20 florins	2%
1.20 florin and more but less than 1.30 florins	3%
1.30 florin and more but less than 1.40 florins	4%
1.40 florin and more but less than 1.50 florins	5%
1.50 florin or more	7%

The duty on rubber in slabs will be the duty on rubber as prescribed in the Export Tariff, decreased by 12 per cent.

THOUGH THERE IS NO NATIONAL REGISTRATION OF MOTOR CARS and trucks in Finland it is estimated that there are about 1,500 passenger cars and 300 to 400 motor trucks. Formerly Germany and Italy met the requirements of this market, but now American cars are preferred. Six hundred thirty-one motor trucks and automobiles were imported into Finland during the first nine months of 1920, about 100 of which were American and the balance German. During this time rubber tires amounting to 323,507 kilos were imported. All automobile tires are imported, the main sources being the United States, Great Britain, Germany and Sweden. Clincher, straight side or quick detachable types are used.

RUBBER IN THE BRITISH WEST INDIES

THE following notes on rubber in the British West Indies appear in an article by C. A. Brown.[1]

While the exportation of rubber from the British West Indies has not attained a leading economic importance, a large amount of investigation has been conducted by the Imperial Department of Agriculture[2] concerning the adaptability of the various rubber-producing trees to the climatic conditions of the different islands. In localities which have an evenly distributed rainfall of over 75 inches a year and a minimum temperature of not less than 65 degrees F., such as obtain in parts of Trinidad, Dominica, and Tobago, the Pará rubber tree (*Hevea brasiliensis*) thrives well, giving on properly cultivated plantations an average yield of 200 pounds of rubber an acre. The Castilloa rubber tree grows better in districts with a moderate rainfall, but the yield of rubber is much less than with Hevea. With the latter tree there is a steady flow of latex nearly all the year, while with Castilloa there is but little wound response and the trees must be tapped at frequent intervals. The problems of tapping the Castilloa and dealing with its latex give difficulty and have not been perfectly solved.

Probably over three-fourths of the plantation rubber made in the British West Indies is coagulated from the latex by means of acetic acid; lime juice is also extensively employed. According to Collens[3], the cheapest and most efficient coagulating agent is a five per cent solution of sulphuric acid, in the proportion of ten drops to 100 cc. of latex. The rubber coagulated by this means was found to be of excellent quality and showed no signs of deterioration.

In the process employed on plantations, the clotted cream, which rises to the surface of the coagulated latex, is gently washed, pressed, and then allowed to dry a day. The "biscuits" of rubber thus prepared are then smoked for three or four days until they become transparent, during which interval they take on an amber color and acquire a characteristic smoky smell.

The chief obstacle to the development of plantation rubber in the British West Indies is the scarcity of cheap labor; for this reason it is doubtful if the industry there will ever achieve the same degree of success as it has gained in Ceylon and the Malay States.

[1] "Industrial and Agricultural Chemistry in the British West Indies." Journal of Industrial and Engineering Chemistry, 13, page 78.
[2] In charge of Sir Francis Watts, Imperial Commissioner of Agriculture.
[3] "Rubber Experiments in Trinidad and Tobago." West Indian Bulletin, 13, 219.

THE RUBBER TRADE IN THE FAR EAST

By Our Regular Correspondent

MALAYA

JUDGING from what one can glean locally, it seems that the advocates of a "shake-out" (a survival of the fittest) are going to win from those in favor of crop restrictions, and preferably, compulsory restriction by 50 per cent. The effect of a "shake-out" would of course be that the poorer concerns would go to the wall and the industry be left in the hands of the wealthy companies who might take the opportunity of combining to keep prices at a profitable level and thus safeguard the rubber industry. Others consider that to drop the entire matter and wait for the survival of the fittest would prolong the present state of depression, without really benefiting anybody in the end. It is interesting to note that the "shake-out" is even looked forward to by some of the small planters.

The attitude of the local government may be said to be helping a "shake-out," at least the indications are that it will probably not intervene to assist the rubber industry by enforcing restriction and by giving financial aid to those concerns in need of it. While it is recognized that government interference in aiding an industry is economically unsound and hence undesirable, still it

is held that the case of rubber is exceptional, for the welfare of Malaya practically hinges on its rubber prosperity.

While the Government is taking its time to announce its policy, more companies are closing down or dismissing members of their European staffs and discharging coolies. The market, too, as might have been expected, is in a pretty uncomfortable state; it is said that there have been about nine big failures in the rubber market at Singapore within the last six months, and it is further reported that two more firms in Singapore are in financial difficulties.

Of course present conditions are making people grumble about everything, and not without some reason. The indifference of the Government has been duly criticized, the Rubber Growers' Association got its share first of all, now the Planters' Association of Malaya has been condemned as futile and inefficient, while finally the Incorporated Society of Planters is practically asked to give an account of its activities, particularly as far as concerns aiding unemployed planters.

The manner of handling the coolie problem by many estates is also strongly disapproved of. It is feared that the wholesale discharge of coolies, resulting in the return to their native land of large numbers of unemployed with discouraging tales of conditions in Malaya, will create much difficulty when better times return and more labor will be required. It is foreseen that such a situation would help to maintain coolie wages at the high level reached before the slump and thus needlessly add to the cost of production, while the present really offers the best opportunity to lower wages to a suitable level.

SOUTH INDIA

A correspondent of the *Indian Scientific Agriculturist* points out the necessity for a wider use of all kinds of improved machinery in Indian agriculture. On rubber estates tractors, ploughs, and harrows could be used to advantage and would replace the large numbers of coolies now required and incidentally diminish the worries and anxieties which the employment of large numbers of coolies entail.

Concerning the effect of the slump on local rubber estates, it is stated that while certain concerns are faring badly, since yields are lower here than in other rubber-producing centers, yet so far none have closed down and it is hoped that this step will not be necessary.

The new rubber mycologist, H. T. Ashplant, is expected to arrive shortly.

It is reported that the rate on tea and rubber from the Malabar Coast (southwest coast of India) to London has been further reduced to 65*s*. per shipping ton, less the usual rebate of 10 per cent.

NETHERLANDS EAST INDIES

Under present conditions, when the press in Ceylon and Malaya, and particularly in the latter region, is urging the need of more thorough and scientific rubber research, it is interesting to note what is being done in this direction for the rubber industry in Java.

First there is a well-staffed Department of Agriculture, Industry and Commerce, at Buitenzorg, Java, besides a Phytopathological Institute (under a highly qualified director) with entomological and mycological laboratories. At the head of each of these laboratories is a chief assisted by three entomologists, or mycologists, and the institute also has an experimental garden with an expert in charge. Then there is a General Agricultural Experiment Station with a staff of twelve experts, of whom three are analysts and three rubber experts. Two of the six experiment stations which provide scientific information for the Dutch rubber industry are devoted exclusively to rubber. Each of these stations has an able staff of experts, from three to eight in number. There is also a physiology fund for scientific research on the physiological rôle of latex in Hevea with a research officer in charge. The expense involved is borne partly by the Government, partly by the planters' associations and partly by the producers.

It is quite evident, therefore, that in the Netherlands East Indies rubber research is taken very seriously and, as might be expected, is ahead of its Malayan and Ceylon neighbors in this respect.

CHANGES IN PLANTATION RUBBER AFTER STORAGE IN THE TROPICS[1]

This is a topic in which interest has of late revived owing, of course, to the present condition in the rubber industry. The general opinion is that plantation rubber and particularly crêpe is not stable under tropical conditions. Dr. de Vries admits that the external appearance of the rubber loses on keeping; thus the color of pale crêpe darkens decidedly and takes on a grayish or brownish yellow tint; smoked sheet becomes dull and loses its brightness. However, the internal qualities on the whole seem to be unaffected. Thus, in samples kept from 2 to 4 years in locked cupboards, and lots kept for two years packed in chests in a godown, tensile strength and slope remained unchanged; the rate of cure generally showed a small increase, while viscosity was the only property that showed a marked change. Samples kept for a short time showed a decided increase in viscosity, while keeping for a longer time resulted in a decrease in viscosity, often markedly so. Both first-grade and the better kinds of second-grade rubber showed nothing more than these slight changes after having been stored for varying lengths of time.

Crêpe from matured rubber behaved in general in a manner similar to that of first-quality crêpe, tensile strength and slope remained approximately the same, but the rate of cure generally decreased somewhat instead of increasing as in the case of first-quality rubber. The viscosity lost its high values and came down to normal or low ones. Here it is interesting to note that while rapid-curing rubber loses in rate of cure when stored, it was found in the case of several samples of abnormally slow-curing rubbers, that storage had the effect of increasing the rate of cure. Abnormalities in rate of cure, therefore, in many cases tend to return somewhat to normal when rubber is kept for some time, which is to say that storage helps to lessen the variability of plantation rubber.

Samples of ill-prepared native rubber from Borneo and Djambi deteriorated markedly on keeping and lost appreciably in tensile strength and viscosity.

CEYLON

NEW USES FOR SCRAP CRÊPE

In two Colombo office buildings rubber carpets have been laid on the staircases by way of an experiment. The carpets are made of refuse rubber, the center portion being of black lower-grade scrap crêpe and the white borders of better quality scrap crêpe. The rubber is not vulcanized or treated in any way and, it is understood, the strips of which the carpet is made are hammered together after having been heated.

It now remains to be seen how they will wear and whether the rubber will become tacky. Owing to the fact that the grade of rubber used in the carpets has now no commercial value, it is difficult to give any idea of their commercial cost. However, one of the two planters who have made these carpets, claims that he can manufacture the carpet at a cost of 34 cents (normally about 11 cents in United States currency) per square foot.

It is held that the success of this experiment might lead to a big local industry. One or two of these locally made mats have been sent to the Rubber Exhibition in London. Meanwhile, it is gathered that the Rubber Control Committee might raise objections if the sale of such carpets and mats was placed upon a business footing, because under the Rubber Growers' Association restriction scheme the grade of rubber from which these carpets are made should be destroyed.

[1]Dr. O. de Vries, in the Archief voor de Rubbercultuur in Nederlandsch-Indie, 5th year, No. 3, March, 1921.

Recent Patents Relating to Rubber

THE UNITED STATES

GRANTED MARCH 29, 1921

O. 1,372,715 Milk bottle stopper. B. F. Merledge, Columbus, Ind.

1,372,757 Pneumatic tire valve for attachment without removing tire from wheel. F. W. Lanchester, London, Eng.

1,372,760 Oil-proof rubber piston packing reinforced with rubber-coated fabric. H. C. Loudenbeck, Pittsburgh, assignor to The Westinghouse Air Brake Co., Wilmerding—both in Pa.

1,372,794 Collapsible rim for tires. O. H. Bartholomew, Peoria, Ill.

1,372,858 Armored tire inner-liner. S. I. Baer, Youngstown, Ohio.

1,372,887 Pneumatic tire. John Lardos, Akron, Ohio.

1,372,893 Hot-water bottle. W. H. Miller, Canton, Ohio.

1,372,938 Peripheral rubber band for protecting tire casing from wear. P. T. Coffield, La Mesa, Calif.

1,372,963 Combined dust and valve cap for pneumatic tires. Albert Kufner, Salem, Ore.

1,372,977 Maternity garment with elastic insert. Annie Prokesch, New York, N. Y.

1,373,018 Rectal syringe and water-bag. Richard Palmer, Teaneck, N. J.

1,373,062 Eraser and holder. L. W. Faber, New York, N. Y., assignor to Eberhard Faber Pencil Co., a New York corporation.

1,373,068 Pneumatic tire pump removably mounted on spoke of wheel and having air-tube connection with tire. J. L. Harper, Seattle, Wash.

1,373,111 Resilient tubeless tire containing hermetically sealed hollow spheres surrounded by rubber interposed between layers of fabric and rubber, and the whole vulcanized together. A. H. Young, Oakland, Calif.

1,373,123 Garter. W. Ferguson, Philadelphia, Pa.

1,373,239 Hose supporter. B. C. Harriss, New Rochelle, New York.

1,373,287 Cushion heel. A. H. Ammann, Peotone, Ill.

1,373,306 Hose supporter. C. A. Cunninghan, Atlantic City, N. J.

1,373,325 Toy airplane. C. G. Gorby, Atwater, Calif.

1,373,360 Shower-bath brush. L. A. Trial, Chicago, Ill.

1,373,370 Resilient tire with inflatable inner tube. Ernest Veltung, New York, N. Y., assignor to Veltung Steel Tire Co., a Delaware corporation.

GRANTED APRIL 5, 1921

1,373,423 Comedian's inflatable suit simulating a ball. I. W. Gruhl, Los Angeles, Calif.

1,373,453 Pneumatic tire alarm. O. F. Schroeder, Santa Ana, Calif.

1,373,472 Molded rubber battery vent. Harry Weida, Highland Park, N. J., assignor to India Rubber Co., a New Jersey corporation.

1,373,485 Inner tube. O. T. Bugg, Poughkeepsie, New York, assignor by mesne assignment to Canvas Inner Tube Co., a Delaware corporation.

1,373,652 Resilient wheel. James Cunningham, St. Louis, Mo., assignor to Demountable Spring Tire Co., New York, N. Y.

1,373,713 Waterproof hat protector. J. F. Schweizer-Caillaux, Vincennes, France.

1,373,803 Syringe attachment. Louis Dunn, Minneapolis, Minn.

1,373,880 Yarn comprising an elastic rubber core and cover of fibrous material spun upon and around said core. I. Garon, Duluth, Minn.

1,374,099 Demountable rim for tires and means for locking. Louis H. Perlman, New York, N. Y.

1,374,100 Demountable channel rim for tires. Louis H. Perlman, New York, N. Y.

1,374,101 Demountable rim for tires. Louis H. Perlman, New York, N. Y.

1,374,104 Demountable rim for tires and means for locking into place. Louis H. Perlman, New York, N. Y.

1,374,106 Demountable rim for tires. Louis H. Perlman, New York, N. Y.

1,374,107 Demountable rim for tires. Louis H. Perlman, New York, N. Y.

GRANTED APRIL 12, 1921

1,374,272 Detachable rim for tires. H. C. Babel, Buffalo, N. Y.

1,374,301 Raincoat. F. W. Howard, New York, N. Y.

1,374,382 Air-chill for pneumatic tires. R. W. Mellor, Girard, Ohio.

1,374,390 Resilient tire with solid rubber core surrounded by sponge rubber, etc., all parts being vulcanized together. G. W. Rode, Jr., Brooklyn, N. Y.

1,374,397 Inflating device for tires. M. C. Schweinert, West Hoboken, and H. P. Kraft, Ridgewood—both in New Jersey.

1,374,426 Fountain drawing pen. H. Burkhardt, Rueschlikon, Switzerland.

1,374,430 Bath spray for attaching to faucet, adapted to fasten in loop around shoulders. M. F. Chevalier, Baldwin Park, Calif.

1,374,458 Vaginal washer. T. H. Larson, Oshkosh, Wis.

1,374,480 Vulcanized boot or shoe. L. A. Trull, Williamsport, Pa., assignor to Lycoming Rubber Co., a Pennsylvania corporation.

1,374,570 Air-bag core for pneumatic tires. A. Huetter, assignor to The Allsteel Riedwell Tire & Rubber Co.—both of Dayton, Ohio.

1,374,572 Hose supporter. N. M. Hurd, Chicago, Ill.

1,374,623 Life preserver suit. O. A. Youngren and J. A. Watt, assignors to National Life Preserver Co., all of New York, N. Y.

1,374,634 Inner tube. G. G. Card, assignor to The Columbus Climax Rubber Co., both of Columbus, Ohio.

1,374,637 Pneumatic tire. De Leon Davis, Richmond, Va., assignor to Unity Tire & Manufacturing Co., a Delaware corporation.

1,374,668 Cord tire fabric. G. W. Lindley, Philadelphia, Pa.

1,374,741 Protective valve for inflating bladders, etc. C. J. Jensen, North Plainfield, N. J.

1,374,753 Cushioned wheel. A. A. Mendenhall, Duluth, Minn.

GRANTED APRIL 9, 1921

1,374,904 Tire construction. J. G. Carillon, Barberton, Ohio.

1,374,930 Adjustable rim for tires. David Lazarus, New York, N. Y.

1,374,957 Inner tube for pneumatic tire. B. C. Seaton, Nashville, Tenn.

1,375,032 Inner tire cushion. J. W. Burgess and G. F. Burgess—both of Kansas City, Mo.

1,375,046 Endless belt strap, etc., of impregnated fabric. A. M. Hardy, Bowmanville, Ontario, Canada.

1,375,283 Welt strip for making rubber welts with fibrous core. E. W. Dunbar, assignor to Apsley Rubber Co.—both of Houston, Mass.

1,375,360 Electrical apparatus for vulcanizing rubber. W. B. Burke, Cleveland, assignor to The Electric Vulcanizing Rubber Co., Akron—both in Ohio. Original application divided.

1,375,372 Disk wheel for pneumatic tires. G. H. Forsyth, Harvey, Ill.

1,375,435 Demountable rim for tires. A. W. Woodward, assignor to the Firestone Steel Products Co.—both of Akron, Ohio.

1,375,511 Combined hat protector and covering for a raincoat. F. W. Howard, New York, and G. B. Cannon, Jr., Brooklyn—both in New York.

1,375,527 Tire casing. C. W. Miegel, Jersey City, N. J.

1,375,559 Fountain pen. Duncan Cameron, Edinburgh, Scotland.

1,375,633 Nail for attaching rubber heels to shoes. H. D. Hamilton, Winthrop, Mass., assignor to United States Shoe Machinery Corporation, Paterson, N. J. (See The India Rubber World, September 1, 1919, page 701.)

GRANTED APRIL 26, 1921

1,375,681 Brush with rubber bristle-cushion, and cover containing mirror. E. A. Dennin, Troy, New York. (See The India Rubber World, May 1, 1920, page 503.)

1,375,682 Squeegee. W. J. Dennis, Chicago, Ill.

1,375,825 Patch for pneumatic tires. J. R. Buechler, Akron, Ohio.

1,376,048 Pneumatic tire nipple and alarm. Hugo Stommel, assignor of one-half to H. Raymond—both of Metuchen, N. J.

1,376,115 Reversible sleeve attachment for pencils or pens. A. F. Record, Kokomo, Ind.

1,376,121 Kite, captive, or observation balloon. Charles F. Smyth, assignor to Connecticut Aircraft Co.—both of New Haven, Conn.

1,376,257 Storage battery. T. R. Cook, East Cleveland, assignor to Willard Storage Battery Co., Cleveland—both in Ohio.

THE DOMINION OF CANADA

GRANTED MARCH 29, 1921

209,841 Rubber heel thicker at back than front, etc. J. Demirjian, Elyria, Ohio, U. S. A.

209,846 Attachment for pens having flat knife blade on one end and rubber tip on the other. H. W. Earp-Thomas, Richmond, Va., U. S. A.

209,866 Universal joint consisting of layers of canvas or fabric treated with rubber. E. J. Hardy, Coventry, Warwickshire, Eng.

209,902 Rubber heel. F. A. Nolan, St. Paul, Minn., U. S. A.

209,916 Revolving duplex rubber heel. H. W. Rogers, Pittsburgh, Pa., U. S. A. (See The India Rubber World, January 1, 1921, page 262.)

209,983 Rubber heel. The National Rubber Heel Co., of Canada, Ltd., St. Catharines, Ontario, assignee of Lamartine B. Fay and John Perkras, coinventors—both of Elyria, Ohio, U. S. A.

GRANTED APRIL 5, 1921

210,022 Cycle saddle of vulcanizable material. J. Jelley, Coventry, and H. Jelley, Birmingham—both in England.

210,027 Pressure gage for pneumatic tires. M. C. Schweinert, New York, N. Y., and H. P. Kraft, Ridgewood, N. J., coinventors—both in the U. S. A.

210,064 Tire pressure gage. W. A. DeWolfe, Consort, Alta.

210,069 Resilient shoe sole having a rubber layer between the inner and outer soles. J. B. Frechette, Valparaiso, Ind., U. S. A.

210,090 Waterproof sole. L. Hofmeister, Milwaukee, Wis., U. S. A.

210,120 Mat woven from resilient cords to serve as non-skid device for pneumatic tires, with means for attaching. W. C. McGeorge, San Francisco, Calif., U. S. A.

210,128 Hair waver. M. L. O'Dell, Montreal, Quebec.

210,203 Shoe upper. The La Crosse Rubber Mills Co., assignee of Edgar S. Bott—both of La Crosse, Wis., U. S. A.

GRANTED APRIL 12, 1921

210,307 Device with rubber bulb, for repairing radiators. T. E. Henderson, Fort Worth, Tex., U. S. A.

210,338 Pneumatic tire with metal blocks embedded in tread. R. G. Mercer, Toronto, Ontario.

210,382 Hydrometer. J. Steiner, Long Island City, New York, U. S. A.

210,392 Reservoir pen. A. E. Wade, Rock Ferry, Chester, Eng.

210,430 Cushion tire for vehicles. The Goodyear Tire & Rubber Co., assignee of J. E. Hale—both of Akron, Ohio, U. S. A.

GRANTED APRIL 19, 1921

210,625 Atomizer. A. Levy, Boulogne-sur-Seine, France.

210,668 Fountain marking brush. M. M. Shackett, New York, New York, U. S. A.

210,774 Gaiter. The Penn Brothers Suspender Co., Inc., assignee of three-fourths of the interest, and G. Green Penn, assignee of one-fourth interest—both of Madison, North Carolina, U. S. A.

GRANTED APRIL 26, 1921

210,997 Cream separator with bulb, etc. G. A. Yeatter, Battle Creek, Mich, U. S. A.

211,047 Cushioned wheel with solid rubber tire. The Redden Resilient Wheel Co., assignee of Eugene E. Redden—both of Springfield, Mass., U. S. A.

211,051 Dust cap for tire valve. A. Schrader's Son, Inc., New York, N. Y., assignee of C. T. Shaffer, San Francisco, Calif., U. S. A.

Chemical Patents will be found on pages 660-661. Machinery Patents on pages 669-670.

THE UNITED KINGDOM

PUBLISHED MARCH 23, 1921

157,016 Tire rim. C. F. Rubsam, 407 Society for Savings Building, Cleveland, Ohio, U. S. A.

157,017 Pneumatic tires. W. J. Mellersh-Jackson, 28 Southampton Buildings, London; Morgan & Wright, Jefferson avenue, Detroit, Mich., U. S. A.

157,025 Pneumatic tire. E. P. Altenburg, New Tread Tire Co., Columbiana, Ohio, U. S. A.

157,031 Detachable tire shoe with rubber tread for adapting tractor wheels to use on roads. Schneider et Cie., 42 rue d'Anjou, Paris.

157,106 Pneumatic tire. de L. Davis, 2039 Green street, Philadelphia, Pa., U. S. A. (Not yet accepted.)

157,132 Self-propelling nozzle. S. C. Sladden, 233 Broadway, New York, assignee of J. T. Burns, Corona, Queens Borough, both in New York, U. S. A. Not yet accepted. (See THE INDIA RUBBER WORLD, September 1, 1919, page 702.)

157,151 Construction of pneumatic tire to assist in attaching to rim. Federal Rubber Co., assignee of B. C. Dowse, both of Cudahy, Wis., U. S. A. (Not yet accepted.)

157,170 Dust cap for tire valves. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)

157,171 Water-bottle stoppers. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of M. C. Schweinert, 42 Riverside Drive, New York—both in New York, U. S. A. (Not yet accepted.)

157,172 Pressure gage for pneumatic tires. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)

157,173 Water-bottle stoppers. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of M. C. Schweinert, 42 Riverside Drive, New York—both in New York, U. S. A. (Not yet accepted.)

157,174 Tire-inflating valves. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)

157,175 Construction of tire valve to assist in attaching stem to tube. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)

157,176 Dust cap for tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of M. C. Schweinert, 42 Riverside Drive, New York—both in New York, U. S. A. (Not yet accepted.)

157,177 Pipe couplings, etc. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of M. C. Schweinert, 42 Riverside Drive, New York—both in New York, U. S. A. (Not yet accepted.)

157,178 Dust cap for tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)

157,179 Interchangeable dust cap for tire valves. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)

157,180 Dust cap for tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of M. C. Schweinert, 42 Riverside Drive, New York—both in New York, U. S. A. (Not yet accepted.)

157,181 Pressure gage for tires. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of W. P. Hammond, 159 Lexington avenue, Passaic, N. J.—both in U. S. A. (Not yet accepted.)

157,182 Nut for use on the valve stem of a pneumatic tire. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of M. C. Schweinert, 42 Riverside Drive, New York—both in New York, U. S. A. (Not yet accepted.)

157,183 Tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of M. C. Schweinert, 42 Riverside Drive, New York, and H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)

157,184 Tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of M. C. Schweinert, 42 Riverside Drive, New York, and H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)

157,185 Dust cap for tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of E. van A. Myers, 77 Evergreen Place, East Orange, N. J.—both in U. S. A. (Not yet accepted.)

157,186 Dust cap for tire. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of E. van A. Myers, 77 Evergreen Place, East Orange, N. J.—both in U. S. A. (Not yet accepted.)

157,187 Tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of J. A. Bowden, 2357 West 23rd street, Los Angeles, Calif.—both in U. S. A. (Not yet accepted.)

157,188 Dust-caps for tire valves, etc. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of E. van A. Myers, 77 Evergreen Place, East Orange, N. J.—both in U. S. A. (Not yet accepted.)

157,189 Valve for fire-extinguishers. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of M. C. Schweinert, 42 Riverside Drive, New York—both in New York, U. S. A. (Not yet accepted.)

157,190 Dust cap for tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of E. van A. Myers, 77 Evergreen Place, East Orange, N. J.—both in U. S. A. (Not yet accepted.)

157,191 Dust cap for tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of M. C. Schweinert, 42 Riverside Drive, New York—both in New York, U. S. A. (Not yet accepted.)

157,192 Tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of M. C. Schweinert, 42 Riverside Drive, New York—both in New York, U. S. A. (Not yet accepted.)

157,193 Pneumatic tire gage. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of M. C. Schweinert, 42 Riverside Drive, New York—both in New York, U. S. A. (Not yet accepted.)

157,256 Artificial limb joint with rubber ring. F. Wels, 31 Schonburgstrasse, Vienna. (Not yet accepted.)

157,259 Artificial leg with rubber cushion in ankle. A. Habermann, 24 Dreimuhlenstrasse, Munich, Germany. (Not yet accepted.)

157,276 Dirigible balloon. O. Ebersbach, 11 Spessartstrasse, Wilmersdorf, Berlin. (Not yet accepted.)

157,315 Corset with elastic inner side strips. S. J. Newman, New Haven, Conn., U. S. A. (Not yet accepted.)

PUBLISHED MARCH 31, 1921

157,524 Spring wheel with continuous outer rigid ring and pneumatic cushions. F. W. Lanchester, 41 Bedford square, London.

157,530 Detachable rim for tires. J. W. Foley, 71 Woodland Road, Handsworth, Birmingham.

157,540 Pneumatic tire. J. Watson, Middle street, North, Driffield, Yorkshire.

157,568 Pneumatic tire. R. R. à C. Beadon, Dufferin Hospitals, Agra, India.

157,646 Solid or pneumatic tires with one or two splash-preventing collars on the tread side. A. Thorn, 22 St. George's Road, Forest Gate, London.

157,673 Protecting sheet rubber in storage. J. Y. Johnson, 47 Lincoln's Inn Fields, London. (Diamond State Fibre Co., Bridgeport, Pa., U. S. A.)

PUBLISHED APRIL 6, 1921

157,698 Repair patch for rubber boots, etc. J. Robertson, 472 Gregory avenue, Weehawken, New Jersey, U. S. A.

PUBLISHED APRIL 13, 1921

158,131 Fiber and rubber composition soles. H. Armstrong, 34 King street, West, Manchester.

158,181 Wire fabric belts having meshes filled with dough of rubber and paper pulp, and built up in layers separated by rubber, flax, canvas or cotton fabric, connected by pressure and covered with vulcanized rubber. A. T. Edwards, 109 Loop street, Cape Town, South Africa.

158,347 Squeegee for cleaning interior of jars, etc. J. R. Barrett, 46 Knighton Park Road, Sydenham, London.

158,352 Reinforced pneumatic tire. H. H. Summers, 28 Cheapside, London.

158,501 Sock suspenders. J. Patterson, 21 Wellington street, Aldershot.

PUBLISHED APRIL 20, 1921

158,551 Pneumatic cushioned vehicle suspension. A. Joel & Co., 68 Hardturmstrasse, Zürich, Switzerland. (Not yet accepted.)

158,656 Rubber studs externally applied to boot soles. E. Clarke, Easemore Road, Redditch.

158,676 Rubber protectors for boot soles. E. Mote, 18 Carter street, Higher Broughton, Manchester.

158,678 Resilient tire with soft rubber core. G. W. Bell, 121 Alexandrine avenue, West Detroit, Mich., U. S. A.

158,691 Improved valve closure for laceless footballs. G. C. Hunter, 95 St. Leonard street, Sunderland.

158,861 Oil-proof rubber and wire fabric piston packing. C. C. Farmer, 132 Hawthorn street, Edgewood, Pennsylvania, U. S. A. (Not yet accepted.)

158,862 Oil-proof rubber and fabric piston packing. H. C. Londenbeck, care Westinghouse Air Brake Co., Wilmerding, Pennsylvania, U. S. A. (Not yet accepted.)

PUBLISHED APRIL 27, 1921

158,963 Pneumatic tire with tubular metal core and rubber tread. H. E. G. Bateman and L. C. Bateman, 18 Western Broadway, Hammersmith, London.

159,000 Rubber device for use in practising golf strokes. J. D. Edgar, 29 Bowsden Terrace, Gosforth, Newcastle-on-Tyne.

159,044 Adjustable elastic connection between gramophone stylus bar and needle. M. J. M. Bryan, Cambridge House, Nether street, Church End, Finchley, London.

159,046 Tubular rubber eye-pieces for eye-glasses. J. E. Godwin, 87 Esme Road, Sparkhill, Birmingham.

159,284 Pneumatic cord tire. H. T. S. McClintock, Dreghorn, Dalkey C. I. Moore, Llandaff Hall, Merrion Road; and J. Callaghan, Sandringham, Leeson Park—all in County Dublin, representatives of J. B. Dunlop.

159,287 Pneumatic tire pressure gage and valve. J. E. Graham, The Châlet, Gipsy Lane, Putney, London.

GERMANY

PATENTS ISSUED, WITH DATES OF ISSUE

336,035 (May 8, 1920.) Extensible grooved belt. Opel-Automobile Verkaufsgesellschaft m. b. H. Frankfort-on-the-Main.

337,240 (September 23, 1920.) Hollow rubber article with pipe. Vereinigte Gummiwaaren-Fabriken-Wien, formerly Menier-J. N. Reithoffer, Harburg, Elbe.

337,272 (September 18, 1920.) Tube for vulcanizing rubber tires. Smith One-Heat System, South Bend, Ind., U. S. A.; represented by G. Sachse, Berlin, S. W. 61.

NEW ZEALAND

PUBLISHED MARCH 10, 1921

44,418 Benzine, etc., container closure-device. Dunlop Rubber Co. of Australasia, Limited, 108 Flinders street, Melbourne, assignee of F. O. Wolff, 27 Kasouka road, East Camberwell—both in Victoria.

44,900 Milking-machine measuring can fitted with rubber tube. R. Preston, Manutuke, Gisborne, N. Z.

44,962 Resilient tire. D. Maggiora, Firenze, Careggi, Italy.

PUBLISHED MARCH 24, 1921

43,404 Round rubber heel. J. E. Thrower, 79 Wellesley street, West, Auckland, N. Z.
45,065 Pneumatic tire made of laminated rubber strips and impregnated threads of silk. John Brown, Herald Buildings, Auckland, N. Z.

PUBLISHED APRIL 7, 1921

43,442 Milking machine teat-cup. D. F. Watson, Waitoa, Thames Line, Auckland, N. Z.
44,875 Milking machine teat cup. C. H. Davis, Ridgeway street, Wanganui, N. Z.

TRADE MARKS

THE UNITED STATES

SERIAL NUMBERS PUBLISHED APRIL 5, 1921*

No. 123,974 The words Ship by Truck within a circle—tires and tubes. Firestone Tire & Rubber Co., Akron, Ohio.
124,276 Representation of a hoof and hoof-print of an animal within a circle—tires and tubes. The Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio.
136,753 The word Hyco—rubber and shoe knives, knives with extension blades and handles, etc. Hyde Manufacturing Co., Southbridge, Mass.
139,254 Conventionalized shield in red bearing the monogram DMTCO—tires. The Denman-Myers Cord Tire Co., Cleveland, Ohio.
142,974 Diamond—tires, tubes, tire patches and sleeves, reliners, etc. The B. F. Goodrich Co., New York, N. Y.

SERIAL NUMBERS PUBLISHED APRIL 9, 1921*

124,278 Angle Tread—tires and tubes. The Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio.
126,550 Sanas—sanitary aprons for small children. A. M. M. White, Elmhurst, N. Y.
134,446 The words Rayngard and Weather Proof within an oval outline—waterproof and weatherproof coats. United States Rubber Co., New Brunswick, N. J., and New York, N. Y.
139,204 Crest Brand Filenes combined with a conventionalized fleur-de-lis and wreath—shoes of rubber fabric, combinations, etc. Wm. Filene's Sons Co., Boston, Mass.
139,850 Collins' Rappid-Sealer and portrait of registrant within representation of a tire—tire repair composition. G. W. Collins, Wilmington, Del.

SERIAL NUMBERS PUBLISHED APRIL 15, 1921*

128,577 Three Point—golf balls. The Worthington Ball Co., Elyria, Ohio.
137,115 Latite—rubber door-mats and bath-mats. George W. Eno Rubber Co., Los Angeles, Calif.
140,099 Wedco within a diamond outline—tire fabrics, ducks, drills, osnaburgs, etc. W. W. Edelstone, Cambridge, Mass.
141,901 Island Chicle—gum used in the manufacture of chewing gum. L. A. Dreyfus Co., New York, N. Y.
142,101 Granite tires. Revere Rubber Co., Providence, R. I.
142,566 Omo, with a pair of wings springing from top points of the letter M—elastic webbing, cord, braid and dress-belting. The Omo Manufacturing Co., Middletown, Conn.
142,953 Bull Dog—tires, tubes and casings. Braender Rubber & Tire Co., Rutherford, N. J.
142,975 Goodrich—rubber bands. The B. F. Goodrich Co., New York, N. Y.
143,298 Racine Country Road—tires and tubes. Racine Rubber Co., Racine, Wis.

SERIAL NUMBERS PUBLISHED APRIL 23, 1921*

130,492 Multi-Mile—tires and tubes. Racine Rubber Co., Racine, Wis.
137,550 Vacuum inside double oval outline—all kinds of leather, fiber, rubber, textile and composition belting. Vacuum Belting Co., Indianapolis, Ind.
142,018 Red Circle on representation of tire enclosing the words Our Daddy's Choice, and the heads and shoulders of a girl and boy—sheet rubber patches. The Jones & Jones Co., Kingman, Kans.

SERIAL NUMBERS PUBLISHED MAY 3, 1921*

123,995 Representation of a pair of hands adjusting sections of tire rim on a tire—solid resilient inner tubing. J. T. McMahon, Kansas City, Mo.
126,107 Representation of tire having black tread separated from gray or white sidewalls by narrow red band or bands—tires. The Dayton Rubber Manufacturing Co., Dayton, Ohio.
136,108 Koloydo—pigment. E. M. & F. Waldo, New York, N. Y.
137,116 Inso—rubber-coated fabric inner tubes for relining pneumatic tire casings. George W. Eno Rubber Co., Los Angeles, Calif.
137,117 Exso—retreads for attachment to the outer surfaces of worn pneumatic tire casings. George W. Eno Rubber Co., Los Angeles, Calif. (The India Rubber World, October 1, 1920, page 36.)
137,343 Pigment Accelerator No. 23—chemical used in the manufacture of rubber. E. M. & F. Waldo, New York, N. Y.
137,344 Sapofor—pigment. E. M. & F. Waldo, New York, N. Y.
138,300 Dixie—suspenders, garters, armbands and belts. The Ohio Suspender Co., Mansfield, Ohio.
140,542 The words Cincy Comforts, the letter C forming the first letter of both words—shoes made of leather, rubber or fabric and their combinations. The Queen City Turn Shoe Co., Cincinnati, Ohio.
140,674 Tru-Arch—women's, men's and children's boots, shoes and slippers of leather, rubber, etc. Thomas G. Plant Co., Boston, Mass.
140,675 Arch Developer—men's, women's and children's boots, shoes and slippers of leather, rubber, etc. Thomas G. Plant Co., Boston, Mass.
140,676 Arch Combination—men's, women's and children's boots, shoes and slippers of leather, rubber, etc. Thomas G. Plant, Boston, Mass.

*Notice of opposition must be filed with the Commissioner of Patents, Washington, D. C., within thirty days after this date.

141,875 Northland—rubber boots, caps, coats, hats, hoods, overshoes, raincoats, sandals, trousers, gloves and overcoats. F. A. Patrick & Co., Duluth, Minn.
143,981 Cleckta—leather and balata belting. Henry F. Cockill & Sons, Limited, Whitcliffe, Cleckheaton, England.
144,131 F-S—tires. Cupples Company, Manufacturers, St. Louis, Mo.
144,166 Representation of a globe surrounded by a belt bearing the word Globestos—brake linings. United & Globe Rubber Co., Trenton, N. J.

TWO KINDS OF TRADE MARKS NOW BEING REGISTERED

Under the rules of the United States Patent Office, trade marks registered under the Act of February 20, 1905, are, in general, fanciful and arbitrary marks, while those registered under the Act of March 19, 1920, Section 1 (b), are non-technical, that is, marks consisting of descriptive or geographical matter or mere surnames. To be registered under the latter act, trade marks must have been used for not less than one year. Marks registered under this act are being published for the first time when registered, any opposition taking the form of an application for cancellation.

GRANTED MARCH 29, 1921

Under Act of February 20, 1905

140,804 Firestone—tires, inner tubes and accessories. Firestone Tire & Rubber Co., Akron, O.
140,811 Grainvey—fabric and rubber elevator belts. The B. F. Goodrich Co., New York, N. Y.
140,812 Orion—fabric and rubber belts. The B. F. Goodrich Co., New York, N. Y.
140,818 Section of orange-and-black striped white hose—rubber-lined fabric hose. The Gutta Percha & Rubber Manufacturing Co., New York, N. Y.
140,847 Oiltite—rubber packing. Jenkins Rubber Co., assignor to Jenkins Bros.—both of Elizabeth, N. J.
140,848 Our Daddy's Choice—tire patches. The Jones & Jones Co., Kingman, Kans.
140,859 Kleinert's—rubber aprons, sanitary baby goods, ear muffs, pantalettes and bloomers. I. B. Kleinert Rubber Co., New York, N. Y.
140,860 Kidoie—baby pants. I. B. Kleinert Rubber Co., New York, N. Y.
140,874 Lion's Paw—tires and tire patches. Leeser & Sons, Terre Haute, Ind.
140,888 Reversette—rubber coats. W. MacPherson, Cambridge, Mass.
140,894 Herringbone—canvas fabric and rubber machinery packings. N. B. Miller, New York, N. Y.
140,899 Money Back—tire tubes, patches, casing patches and patch kits. Money Back Laboratories, Inc., Oklahoma, Okla.
140,900 Man with patched trousers holding tire, etc.—tire tubes, patches, casing patches and patch kits. Money Back Laboratories, Inc., Oklahoma, Okla.
140,901 Money Back and man with patched trousers holding tire, etc.—tire tubes, patches, casing patches and patch kits. Money Back Laboratories, Inc., Oklahoma, Okla.
140,944 Ramo Tires—pneumatic tire shoes and inner tubes. Ramo Tire & Rubber Co., Pittsburgh, Pa.
140,979 Hydrokit—hydrometer apparatus. Steiner Manufacturing Co., Long Island City, N. Y.
141,012 Millrite—leather, rubber and composition belting. Wayne Belting & Supply Co., Fort Wayne, Ind.

Under Act of March 19, 1920, Section 1 (b)

141,029 Bergougnan—rubber tires. Bergougnan Rubber Corporation, Wilmington, Del., and Trenton, N. J.
141,049 Sprague—inner tubes and cord and fabric tires. Sprague Tire & Rubber Co., Omaha, Neb.

GRANTED APRIL 5, 1921

Under Act of February 20, 1905

141,056 Romanjo—automobile and truck tires and inner tubes. Romanjo Tire Co., Chicago, Ill.

GRANTED APRIL 12, 1921

Under Act of February 20, 1905

141,105 Ourbestos—brake lining. Cumings Brothers, Flint, Mich.
141,118 Artcraft—fountain pens. Edison-Cromer Pen Co., Birmingham, Ala.
141,120 Catalpo—purified colloidal clay. W. Feldenheimer, London, Eng.
141,145 Interlocked Products—belting, hose, and machinery packing. Imperial Belting Co., Chicago, Ill.
141,154 Master—tire patch. W. C. Knott, Shreveport, La.
141,194 Red Line—tires, tubes, inner linings and accessories. C. Palmer, Grand Rapids, Mich.
141,209 A kangaroo within a tire—rubber and rubber and fabric tires and inner tubes. Quick Tire Service, Inc., New York, N. Y.
141,273 Neuro-Patho—rubber heels. F. W. Willis, Kansas City, Mo.
141,274 Hi-Stepper—rubber heels. F. W. Willis, Kansas City, Mo.

GRANTED APRIL 19, 1921

Under Act of February 20, 1905

141,309 Adams Mexican Fruit Chewing Gum—chewing gum. American Chicle Co., New York, N. Y.
141,347 Tooth Exercise Gum—chewing gum. D. M. Dickinson, Jr., Detroit, Mich.
141,445 Pacemaker—rubber heels and lifts. Tee Pee Rubber Co., New York, N. Y.
141,452 Globett—rubber and fabric belts. United & Globe Rubber Co., Trenton, N. J.

GRANTED APRIL 26, 1921

Under Act of February 20, 1905

141,474 Adams Kiss-Me—chewing gum. American Chicle Co., New York, N. Y.
141,511 C. C. C.—tires, tubes, inner liners and blow-out patches. C. C. C. Fire Hose Co., Canton, Mass.
141,515 1885 Electrical Wires and Cables—insulated wire and cables. Chicago Insulated Wire & Manufacturing Co., Sycamore, Ill.

141,534 PIRODENT—chewing gum. D. M. Dickinson, Jr., Detroit, Mich.
141,545 THE EXCELSIOR SHOE—boots and shoes of leather, rubber, canvas, fabric and combinations. The Excelsior Shoe Co., Portsmouth, O.
141,562 GO-RU-CO.—waterproof boots with leather tops and knit wool gaiters. The B. F. Goodrich Co., New York, N. Y.
141,601 FLEXYDE—leather, fabric or rubber belts for supporting outer garments. The Marathon Tire & Rubber Co., Cuyahoga Falls, O. (See description elsewhere in this issue.)
141,617 MORE-GRIP SELF-VULCANIZING PATCH—tire and tube patches. V. V. Moore, Cordele, Ga.
141,645 RAY PUNCTURE-PROOF INTERLINERS FOR PNEUMATIC TIRE CASINGS PROTECT THE MOTORING WORLD—tires and interliners. Ray Tire & Rubber Co., Chicago, Ill.
141,650 POLLY BRAND SPEAKS FOR ITSELF—garters and hose supporters. The Russell Manufacturing Co., Middletown, Conn.
141,673 SERV-US—fruit-jar rings. Serv-Us Grocery Products Corporation, New York, N. Y.

Under Act of March 19, 1920, Section 1 (b)

141,733 ARCHEASE—canvas rubber-soled shoes. The Beacon Falls Rubber Shoe Co., Beacon Falls, Conn.
141,700 GOLD MEDAL—tires and tubes. Newman Tire & Rubber Co., Inc., New York, N. Y.
141,813 COLUMBIA and the monogram TRCO on representation of a rubber heel—rubber heels. Taunton Rubber Co., Inc., Taunton, Mass.
141,813 TAYLOR—hygrometers, thermometers, etc., for industrial and domestic use. Taylor Instrument Companies, Rochester, N. Y.

THE DOMINION OF CANADA

REGISTERED

28,155 GO-RU-CO within a panel-shaped figure—waterproof clothing and footwear. The B. F. Goodrich Co., New York, U. S. A.
28,207 COUNTRY CLUB PARLOR GOLF GAME—parlor golf games. F. D. McLaren, Calgary, Alta.
28,289 VENUS above representation of Venus de Milo—erasers, rubber bands, etc. American Lead Pencil Co., New York, U. S. A.
28,291 THE CLIMATIC RAINCOAT: A SHIELD FOR ALL WEATHERS—waterproofs. Northcote, Brewer & Co., Limited, 27 York street, Manchester, County of Lancaster, Eng.

THE UNITED KINGDOM

PUBLISHED MARCH 2, 1921

400,491 AURORA and representation of a sunrise—dental rubber, etc. The International Tooth Co., Limited, 24 to 28 Grafton House, Golden Square, London, W. 1.
403,701 DUNLOP—tire inflators. The Dunlop Rubber Co., Limited, Dunlop House, 1 Albany street, Regent's Park, London, N. W. 1.
403,702 DUNLOP—metal rims for wheels of cycles and motorcycles. The Dunlop Rubber Co., Limited, Dunlop House, 1 Albany street, Regent's Park, London, N. W. 1.
403,703 DUNLOP—golf balls. The Dunlop Rubber Co., Limited, Dunlop House, 1 Albany street, Regent's Park, London, N. W. 1. (Advertised before acceptance, the applicant alleging distinctiveness.)
403,704 DUNLOP—repair outfits for tires and bags of textile material for spare tires and tubes. The Dunlop Rubber Co., Limited, Dunlop House, 1 Albany street, Regent's Park, London, N. W. 1. (Advertised before acceptance, the applicant alleging distinctiveness.)
406,983 DUNLOP—metal tire levers. The Dunlop Rubber Co., Limited, Dunlop House, 1 Albany street, Regent's Park, London, London, N. W. 1.
407,799 DUNLOP—lifting jacks. The Dunlop Rubber Co., Limited, Dunlop House, 1 Albany street, Regent's Park, London, N. W. 1.
410,190 PERMAGRIP—manufactured rubber and gutta percha goods not included in classes other than No. 40. Preston, Hull & Co., Limited, Proprietors of the Coal By-Products Co., 112 High Holborn, London, W. C. 1.
410,746 PARODA—Paddings for airplanes, made principally of rubber. Siebe, Gorman & Co., Limited, 187 Westminster Bridge Road, London, S. E. 1.

PUBLISHED MARCH 9, 1921

411,097 MACKINPROOF—all rubber and other goods included in Class No. 40. Anderson, Anderson & Anderson, Limited, 35 St. Paul's Churchyard, London, E. C. 4.
411,099 WATERTOSH—all rubber and other goods included in Class No. 40. Anderson, Anderson and Anderson, Limited, 35 St. Paul's Churchyard, London, E. C. 4.
411,206 THE RABBIT—golf balls and all golf requisites. A. C. B. Bell, 17 Lansdowne Crescent, Edinburgh.
411,305 NOBEL INDUSTRIES LIMITED—TRADE MARK around edge of representation of a seal having in the center a picture of one active and one inactive volcano—manufactured rubber and gutta percha goods not included in classes other than No. 40. Nobel Industries Limited, 220 Winchester House, Old Broad street, London, E. C. 2.

PUBLISHED MARCH 16, 1921

410,191 PERMAGRIP—repairing outfits included in Class No. 50, for rubber tires, boots, etc. Preston, Hull & Co., Limited, proprietors of the Coal By-Products Co., 112 High Holborn, London, W. C. 1.
410,702 OCTOPUS BRAND and representation of an octopus—machinery belting of rubber or chiefly of rubber. Wallach Bros., Limited, 49 Tabernacle street, Finsbury Square, London, E. C. 2.
411,210 The word GANDY below the representation of a roll of belting—machinery belting of balata or in which balata predominates. The Gandy Belt Manufacturing Co., Limited, Wheatland Works, Wheatland Lane, Seacombe, County of Chester.
411,352 INGOT—druggists' and surgical rubber sundries. Ford, Cook & Co., Limited, 6 Wall street, London, E. C. 1.

PUBLISHED MARCH 23, 1921

B409,368 A diamond outline containing a monogram composed of a reversed D and the letter B joined—rubber working machinery, etc. David Bridge & Co., Limited, Castleton Iron Works, John street, Castleton, Lancashire.
410,232 DRAGON SPRING GARTER and the representation of a dragon—garters. The Heath Spring & Notion Co., Limited, St. George's Works, Birchfield Road, Headless Cross, near Redditch, Worcestershire.
411,187 BAHGID—cushions made principally of rubber. A. F. E. de St. Dalmas, Tacotena, Lansdown Road, Sidcup, Kent.
411,967 NALLOG—All rubber and other goods included in Class 40. Hector Gollan & Son, Limited, 130 Trongate, Glasgow.

PUBLISHED MARCH 30, 1921

409,593 Representation of label bearing the word FLINTOS, above the words MADE IN CANADA—rubber and fabric footwear made in Canada. Canadian Consolidated Rubber Co., Limited, 201 Inspector street, Montreal, Que., Can. Address for service in the United Kingdom, care of Haseltine, Lake & Co., 28 Southampton Buildings, London, W. C. 2.
B410,918 "WATERMAN"—fountain pens. L. E. Waterman Co., 191 Broadway, New York, U. S. A. Address for service in the United Kingdom care of A. M. & W. Clark, 53 and 54 Chancery Lane, London, W. C. 2.
412,240 SPARTAN—rebuilt or reconstructed pneumatic tires. The Welch Standard Tyre & Rubber Co., Limited, 1 Snells Park, Edmonton, London, N. 18.

PUBLISHED APRIL 6, 1921

B410,916 "WATERMAN'S IDEAL"—fountain pens included in Class No. 39. L. E. Waterman Co., 191 Broadway, New York, U. S. A. Address for service in the United Kingdom care of A. M. & W. Clark, 53 and 54 Chancery Lane, London, W. C. 2.
411,439 The words JUNIPERUS above and VIRGINIANA below the representation of a juniper tree within an elipse—ink and pencil erasers, etc. F. Chambers & Co., Limited, The Garden Pencil Works, Derby Road, Stapleford, Nottinghamshire.

PUBLISHED APRIL 13, 1921

B409,997 CAMBRIDGE—tires of rubber or in which rubber predominates. The Dunlop Rubber Co., Limited, Dunlop House, 1 Albany street, Regent's Park, London, N. W. 1. (Evidence has been supplied that the mark is in fact capable of distinguishing the goods.)
411,055 ETCO—rubber goods except tires, etc., included in Class No. 40. George Allen Stetson, trading as The Elastic Tip Co., 370 Atlantic Avenue, Boston, Massachusetts, U. S. A. Address for service in the United Kingdom care of Sefton-Jones, O'Dell & Stephens, 285 High Holborn, London, W. C. 1.

PUBLISHED APRIL 20, 1921

408,586 ADAMS' SPEARMINT CHEWING GUM on a representation of label—spearmint chewing gum. Adams & Beemans, Limited, 89 Great Eastern street, London, E. C. 2.
B409,996 EDINBURGH—tires of rubber or in which rubber predominates. The Dunlop Rubber Co., Limited, Dunlop House, 1 Albany Street, Regent's Park, London, N. W. 1. (Evidence has been supplied that the mark is in fact capable of distinguishing the goods).

PUBLISHED APRIL 27, 1921

402,883 ROCKBESTOS—asbestos yarn, electrical insulation material, etc. Marlin-Rockwell Corporation, 347 Madison Avenue, New York, U. S. A. Address for service in the United Kingdom care of Marks and Clerk, 57 and 58 Lincoln's Inn Fields, London, W. C. 2.
409,801 UM—appliance of steel and rubber for supporting or holding golf clubs, billiard cues, walking sticks, etc. M. V. Farey, 8A, Wellington Mansions, Queen's Club Gardens, West Kensington, London, W. 14.
411,096 MACKINPROOF—rubber-proofed garments. Anderson, Anderson & Anderson, Limited, 35 St. Paul's Churchyard, London, E. C. 4.
411,526 DALCO—rubber heels and soles for boots and shoes. Davies, Lord & Co., Limited, 21 Anchor street, Southport.
412,677 INCA—pads for boots and shoes, made of rubber or having rubber predominating. Blakely's Boot Protectors, Limited, Armley Malleable Ironworks, Modder Place, Armley, Leeds.
411,743 PERSO—suspenders, garters, brace ends and elastic armbands. Samuel Belman, trading as S. Belman & Co., 73 Persbore street, Birmingham, Warwickshire.
412,731 CLARUS—rubber stamps and inking pads. John T. Clarke & Son, Limited, 30 Charles street, Oxford Road, Manchester.
B412,905 WATERMAN—fountain pens. L. E. Waterman Co., 191 Broadway, New York, U. S. A. Address for service in the United Kingdom care of A. M. & W. Clark, 53 and 54 Chancery Lane, London, W. C. 2.
B412,907 WATERMAN'S IDEAL—fountain pens. L. E. Waterman Co., 191 Broadway, New York, U. S. A. Address for service in the United Kingdom care of A. M. & W. Clark, 53 and 54 Chancery Lane, London, W. C. 2.

NEW ZEALAND

PUBLISHED MARCH 10, 1921

16,521 GEMCO—tire display stands, foot-pedal extensions, tire-holders, etc. Gemco Manufacturing Co., 742 South Pierce street, Milwaukee, Wis., U. S. A.
17,246 SAFETEE—toilet articles, including folding shaving brushes having bristles set in hard rubber. Safetee Soap Corporation, 305 Jay street, Brooklyn, New York, U. S. A.
17,686 AJAX ROAD KING—automobile and bicycle tires, casings, inner tubes, patches and cement. Ajax Rubber Co., Inc., Millbrook, Dutchess County, New York, U. S. A.

PUBLISHED APRIL 7, 1921

17,573 ANCHOR RUBBER Co. on representation of seal bearing an anchor, and having border composed of conventionalized rope—rubber footwear, particularly overshoes. Canadian Consolidated Rubber Co., Limited, 201 Inspector street, Montreal, Quebec, Can.

17,735 RUBBADUBDUB—inflatable rubber toys. J. G. Franklin & Sons, Limited, 17 Colvestane Crescent, Dalston, London, E. 8, Eng. (See THE INDIA RUBBER WORLD, April 1, 1921, page 504.)

DESIGNS

THE UNITED STATES

NO. 57,431 Tire. Patented March 29, 1921. Term 14 years. M. Greenspan, Chicago, Ill.

57,461 Tire casing. Patented April 5, 1921. Term 14 years. F. H. Brewster, assignor to Madison Tire & Rubber Co., Inc.—both of Buffalo, N. Y.

57,480 Tire. Patented April 5, 1921. Term 14 years. C. F. Ofensend, assignor to The Miller Rubber Co.—both of Akron, O.

57,490 Tire casing. Patented April 12, 1921. Term 3½ years. R. D. Belden, Marion, O.

57,491 Tire casing. Patented April 12, 1921. Term 3½ years. R. D. Belden, Marion, O.

57,527 Respirator mask. Patented April 12, 1921. Term 7 years. J. W. Knoblock, assignor to American-LaFrance Fire Engine Co., Inc.—both of Elmira, N. Y.

57,528 Respirator. Patented April 12, 1921. Term 7 years. J. W. Knoblock, assignor to American-LaFrance Fire Engine Co., Inc.—both of Elmira, N. Y.

57,566 Tire. Patented April 26, 1921. Term 14 years. J. M. Alderfer, Akron, O.

57,571 Tire. Patented April 26, 1921. Term 14 years. A. Balthazar, Chicopee Falls, and M. R. Shaw, Springfield, assignors to The Fisk Rubber Co., Chicopee Falls—both in Mass.

57,628 Beard softener. Patented April 26, 1921. Term 3½ years. C. S. Finney, Chicago, Ill.

57,637 Tire. Patented April 26, 1921. Term 14 years. R. P. Gourley, Springfield, and H. P. Partenheimer, Chicopee Falls, assignors to The Fisk Rubber Co., Chicopee Falls—both in Mass.

57,639 Cap for tire valves. Patented April 26, 1921. Term 7 years. P. J. Griffin, Boston, Mass.

57,642 Bathing cap. Patented April 26, 1921. Term 14 years. G. K. Guinzburg, assignor to I. B. Kleinert Rubber Co.—both of New York, N. Y.

57,654 Tire placer. Patented April 26, 1921. Term 3½ years. C. A. Hornburg, Waco, Tex.

57,663 Tire. Patented April 26, 1921. Term 14 years. J. P. Kirch, Pittsburgh, Pa.

57,664 Tire. Patented April 26, 1921. Term 14 years. J. P. Kirch, Pittsburgh, Pa.

57,665 Tire. Patented April 26, 1921. Term 14 years. J. P. Kirch, Pittsburgh, Pa.

57,666 Tire. Patented April 26, 1921. Term 14 years. J. P. Kirch, Pittsburgh, Pa.

57,667 Tire. Patented April 26, 1921. Term 14 years. J. P. Kirch, Pittsburgh, Pa.

769,672 (November 23, 1920.) Exchangeable rubber heel which is to be attached to an iron plate to be nailed onto the shoe heel. Konrad Volz, Schönebeckerstrasse 130, Bremen.

769,674 (December 2, 1920.) Rubber to bite into to protect the tongue in cases of attacks of cramp. Robert Wolf, Winkelsfelderstrasse 106, Düsseldorf.

770,021 (February 14, 1921.) Insert of rubber strip for garters. Arthur Liebscher, Hübnerstrasse 21, Dresden.

770,454 (February 7, 1921.) Garter of pure strip rubber. Jakob Braun, Zülpicherstrasse 209, Köln-Sulz.

770,553 (December 17, 1920.) Syringe with piston stopper. George Hasse, Andreas-strasse 21, Berlin.

770,733 (January 29, 1921.) Bed inlay. Mittelland Gummiwerke A. G., Hannover-Linden.

770,741 (February 7, 1921.) Rubber sole. Hessische Gummiwarenfabrik Fritz Peter, Klein Anheim on Main.

770,971 (November 27, 1920.) Heel of rubber or other material. Richard Anhäuser, Turnerstrasse 97, Stettin.

771,015 (February 19, 1921.) Rubber sole. Hannoversche Gummi Regenerierwerke Luttermann & Co., G. m. b. H., Wunstorf.

771,083 (February 15, 1921.) Rubber heel. Rheinische Gummi-und Celluloidfabrik, Mannheim-Neckarau.

771,262 (February 21, 1921.) Collapsible surgical syringe. Akt. Ges. für Feinmechanik, formerly Jetter & Scheerer, Tuttlingen.

771,536 (February 26, 1921.) Pocket inhaling apparatus. Bernhard Rochocz, Rödelstrasse 7, Leipzig-Schleussig.

771,588 (January 12, 1921.) Hygienic douche. Heinrich Bind, Mundenheimstrasse 254, Ludwigshafen on the Rhein.

771,599 (February 2, 1921.) Rubber plate with support of reinforced webbing. Friedrich Theilmann, Waldstrasse 54, Frankfort on the Main-Niederrad.

771,777 (March 1, 1921.) Rubber water bottle. Continental-Caoutchouc und Gutta-Percha-Compagnie, Hannover.

771,819 (March 8, 1920.) Non-skid device for solid twin tires on trucks. H. E. Köhn, Stralsund.

771,978 (September 30, 1920.) Intrauterine pessary. Reischach & Co., G. m. b. H., Berlin.

772,086. (February 10, 1921.) Sanitary band. Wilhelm Roescheisen, Zinglerstrasse 22, Ulm.

772,312 (February 26, 1921.) Dental air-blower. Breslauer Gummiwaren-Manufaktur Rudolf Woitscheck, Breslau.

772,545 (March 5, 1921.) Tire protector. Karl Hahn, Hohenstaufenstrasse 6, Frankfort-on-the-Main.

772,649 (October 22, 1920.) Rupture band. Charles Cluthe, Sr., Mainluststrasse 9, Frankfort-on-the-Main.

772,735 (January 29, 1921.) Alcohol container for injection syringes having fastening consisting of a conical stopper of asbestos, rubber or similar material. Wilhelm Heinrich Gerhard van der Ven, Rees.

772,807 (November 11, 1920.) Rubber nipple stopper for nursing bottles. August Richter, Bühlau near Dresden.

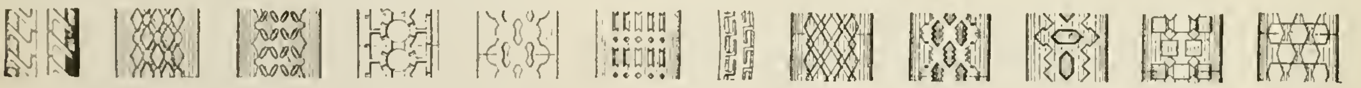
772,842 (March 5, 1921.) Rubber sole. Wilhelm G. Rudolph, Frankfort on the Main.

772,883 (March 9, 1920.) Elastic tire with hollow and level fellies. Hermann Strach, Witteringstrasse 61, Essen-Ruhr.

773,560 (March 16, 1921). Rubber heel. Ernst Karl, Hoheluftchauffee 129, Hamburg.

773,582 (December 11, 1920.) Packing for rubber heels. Schwelmer Gummiwaren-Gesellschaft, Schwelm i. W.

774,052 (November 18, 1920).) Rubber sole with leather insert. Simon Seelig, Genterstrasse 27, Berlin.



57,480 57,667 57,666 57,637 57,664 57,663 57,566 57,665 57,668 57,669 57,670 57,671

57,578 57,491 57,490 57,431 57,732 57,745 57,631 57,709 57,741 57,731

57,668 Tire. Patented April 26, 1921. Term 14 years. J. P. Kirch, Pittsburgh, Pa.

57,669 Tire. Patented April 26, 1921. Term 14 years. J. P. Kirch, Pittsburgh, Pa.

57,670 Tire. Patented April 26, 1921. Term 14 years. J. P. Kirch, Pittsburgh, Pa.

57,671 Tire. Patented April 26, 1921. Term 14 years. J. P. Kirch, Pittsburgh, Pa.

57,725 Automobile wheel for pneumatic tires. Patented April 26, 1921. Term 7 years. F. Richard, Cleveland, O.

57,731 Tire. Patented April 26, 1921. Term 7 years. E. Yockey, Milwaukee, Wis.

57,732 Tire. Patented April 26, 1921. Term 14 years. F. E. Shannon, Akron, O.

57,743 Heel. Patented April 26, 1921. Term 14 years. H. G. Swarr, Lancaster, assignor to Armstrong Cork Co., Pittsburgh—both in Pa.

57,745 Tire tread. Patented April 26, 1921. Term 14 years. A. C. Terrell, Kansas City, Mo.

GERMANY

DESIGN PATENTS ISSUED WITH DATES OF ISSUE

769,629 (February 10, 1921.) Arrangement of inserts of steel plates in round and ordinary rubber heels, as well as soles, to insure better attachment to the footwear. Heinrich Firis, Schwanthalerstrasse 5, Munich.

774,284 (February 10, 1921.) Value for cushion tires. Hugo Hessler, Ulrichstrasse 7, Hannover.

774,347 (March 22, 1921.) Hemorrhoidal pessary. Hugo Gohmann, Sedanstrasse 19, Dortmund.

774,442 (December 13, 1920.) Inhaling apparatus for human beings and animals. Firma Chr. Reimer, Munich.

774,518 (November 29, 1920.) Removable tire rack. Continental-Caoutchouc and Gutta-Percha-Compagnie, Hannover.

774,662 (March 26, 1921.) Air tube for bicycles, motorcycles and automobiles Gummiwerke Fulda. A. G. Fulda.

774,663. (March 26, 1921.) Cover for tires for bicycles, motorcycles, automobiles. Gummiwerke Fulda. A. G. Fulda.

774,696. (March 7, 1921.) Collapsible inhaling apparatus. Johann Joseph Meyer, Königin Louisenstrasse 6, Saarbrücken.

774,727 (March 24, 1921.) Traveling irrigator. Maximilian Bimler, Godullahütte, Kr. Beuthen.

THE FUEL COMMITTEE OF THE NATIONAL ASSOCIATION OF PURCHASING Agents has been engaged in formulating recommendations for reasonably uniform provisions in coal contracts and expressing its idea of a fair contract to be used for the purchase and sale of coal. The offices of the Association are located at 19 Park Place, New York. L. F. Boffey, of that address, is secretary.

Review of the Crude Rubber Market

NEW YORK

The New York rubber market for the last month may properly be described as weak and erratic. The dealers generally are overstocked and demand is very light, such as there is being consumers' business proceeding daily in small volume.

Early in the month the price of smoked sheet declined to 15½ and 15¾ cents under selling pressure. Within a few days after forced selling ceased, the price, under the influence of higher London cables, worked up to 17 cents, although at this time dealers were selling factory consumers at 16¼ cents. The market affords a good selection of off grades such as clean brown, ambers, etc.

Parás worked up gradually to a firmer position and about the middle of the month were offered at 18 and 18½ with buyers at 17½ cents. The Brazilian report that little rubber is coming down the rivers, and no collecting being done, tended to firm the New York market. There have been but few Brazilian offers in quantity. The far eastern markets are reported weak and rubber from those sources is quoted at declining prices.

The New York rubber market has reacted sympathetically with the recent reductions in automobile and tire prices, and a permanent upward tendency is not looked for until the large stocks of crude on hand pass into consumption at normal rate or faster. Today prices are ruling lower again. Spot smoked sheet is being offered to factories at 15 cents; July—September at 16½; October—December at 18; January—March at 20. One offer has been noted for October at 16½ cents.

Disturbed conditions in the trade reported from Akron and the Far East late in May had a depressng effect on the market and resulted in new low price records.

Imports during April were 17,269 tons of all grades, compared with 23,675 tons last year. Plantation arrivals for April were 16,861 tons, compared with 21,036 tons a year ago. Total imports of all grades for the first four months of 1921 were 54,503 tons, compared with 109,670 tons for the same period in 1920.

Spot and future quotations on standard plantation and Brazilian grades were as follows:

Plantations, May 5. Spot first latex crêpe, 18½ cents; May—June, 19 cents; July—September, 20 cents; July—December, 21 cents. May 24. Spot first latex crêpe, 18 cents; July—September, 19 cents; October—December, 20½ cents; January—March, 21½ cents.

May 5. Spot ribbed smoked sheets, 16¼ cents; May—June, 16¼ cents; July—September, 18 cents; July—December, 19 cents. May 24. Spot ribbed smoked sheets, 16 cents; July—September, 17 cents; October—December, 18½ to 19 cents; January—March, 20 cents.

May 5. Spot, No. 1 amber crêpe, 15½ cents; May—June, 16 cents; July—September, 17 cents; July—December, 18 cents. May 24. Spot, No. 1 amber crêpe, 14¼ cents; July—September, 15 cents; October—December, 16½ cents; January—March, 17½ cents.

May 2. Spot, No. 1 rolled brown crêpe, 12 cents; May—June, 12 cents; July—September, 12 cents. May 24. Spot No. 1 rolled brown crêpe, 11½ cents; July—September, 12 cents; October—December, 13½ cents; January—March, 15 cents.

South American Parás and Caucho. May 5. Spot upriver fine, 18 cents; islands fine, 18¼ cents; upriver coarse, 9 cents; islands coarse, 9½ cents; Cametá, 8½ cents; caucho ball, 11 cents. May 24. Spot upriver fine, 18 cents; islands fine, 18½ to 19 cents; upriver coarse, 8½ to 9 cents; islands coarse, 9 to 9½ cents; Cametá, 8½ cents; caucho ball, 9½ to 10½ cents.

NEW YORK QUOTATIONS

Following are the New York spot quotations, for one year ago, one month ago, and May 24, the current date:

PLANTATION HEVEA	June 1, 1920	May 1, 1921	May 24, 1921
First latex crêpe	$0.38 @.39	$0.19 @.19½	$0.18 @
Off latex crêpe	@.	.18 @.18½	@
Amber crêpe No. 1	.38 @.38½	.15½ @	.14¼ @
Amber crêpe No. 2	.37 @.37½	.14½ @	.13¼ @
Amber crêpe No. 3	.36 @.36½	.13½ @	.12½ @
Amber crêpe No. 4	.35 @	.12½ @	.12 @
Brown crêpe, thick and thin	.35 @.36	.15½ @	.13½ @
Brown crêpe, specky	.30 @	.13½ @	.12½ @
Brown crêpe, rolled	.30 @.31	.12 @.12½	.11½ @
Smoked sheet, ribbed	.38 @.38½	.17 @.17½	.16 @
Smoked sheet, plain	.36½ @.37½	.15½ @	.14 @
Unsmoked sheet	.35 @	.15½ @	.14 @
Colombo scrap No. 1	.30 @	.11½ @	@
Colombo scrap No. 2	.28 @	.09½ @	@
EAST INDIAN			
Assam crêpe	@	@	@
Assam onions	@	@	@
Penang block scrap	@	@	@
PONTIANAK			
Banjermassin	.12 @	.07 @	.06¾ @
Palembang	.13 @	.09 @	.07½ @
Pressed block	.25 @	.12 @	.11½ @
Sarawak	@	.06 @	.05¾ @
SOUTH AMERICAN			
PARAS			
Upriver, fine	.39½ @	.17½ @.18	.18 @
Upriver, medium	.37 @	.13½ @	.14 @.14½
Upriver, coarse	.30 @	.09½ @	.08½ @.08¾
Upriver, weak, fine	.36 @	@	.13 @
Islands, fine	.40½ @.41	.18 @	.18½ @.19
Islands, medium	.38 @	.13½ @	.14 @.15
Islands, coarse	*.22 @	.12½ @	.09 @.09½
Cametá	*.22 @	.12½ @	.08½ @
Acre Bolivian, fine	.41 @	.18 @	.17 @.18½
Madeira, fine	.43 @	.19½ @	.19 @.20
Peruvian, fine	.37 @	.16½ @	.16½ @.17
Tapajos, fine	.38 @	.15½ @	.16½ @.17
CAUCHO			
Upper caucho ball	.30½ @.31	.12½ @	.10¾ @.11½
Lower caucho ball	.28 @	.11 @	.09½ @.10
MANICOBAS			
Ceará negro heads	.32 @	.10 @	.12 @
Ceará scrap	.26 @	.06 @	.06 @
Maniçoba, 30% guarantee	.30 @	.11 @	.11 @
Mangabeira thin sheet	.30 @.31	.12 @	.13 @

CENTRALS	June 1, 1920	May 1, 1921	May 24, 1921
Corinto scrap	.25 @.26	.09 @.10	.11 @.11½
Central scrap	.25 @.26	.09 @.10	.10 @.11
Central scrap and strip	.23 @.24	.07 @.08	.06 @.07
Central wet sheet	.18 @.19	.04 @.05	.04 @
Esmeralda sausage	.25 @.26	.09 @.10	.11 @.12
Guayule, 20% guarantee	.27 @	@	@
Guayule, washed and dried	.37 @	.26 @	.26 @
AFRICANS			
Benguela, extra No. 1, 28%	.18 @	@	@
Benguela, No. 2, 32½%	.15 @	@	@
Conakry niggers	.33 @	@	@
Congo prime, black upper	.36 @	@	@
Congo, prime, red upper	.20 @	@	@
Kassai, black	.36 @	@	@
red	.22 @	@	@
Massai sheets and strings	.33 @	@	@
Niger flake, prime	.17 @	.14 @	@
Rio Nunez ball	.35 @	@	@
Rio Nunez sheets, strings	.34 @	@	@
GUTTA PERCHA			
Gutta Siak	.29 @	.15 @.16	.13¾ @.15
Red Macassar	2.60 @	2.00 @2.75	2.30 @2.65
BALATA			
Block, Ciudad, Bolivar	.70 @	.54 @.55	.53 @
Colombia	.50 @.52	.45 @.46	.43 @
Panama	.48 @	.45 @.46	.43 @
Surinam sheet	.84 @	.70 @.71	.74 @
amber	.86 @	.80 @	.81 @

*Nominal.

RECLAIMED RUBBER

The production of reclaimed rubber is at present adjusted to the trade consumption which runs from 25 to 30 per cent of normal. Since all outlets for reclaim are restricted to this extent the quotations on all grades have fallen since the report for last month. In addition to the influences that depress trade in general the drastic reductions in tire prices early in May have disturbed the outlook for reclaimed rubber in common with other divisions of the trade.

NEW YORK QUOTATIONS

May 24, 1921

Prices subject to change without notice

STANDARD RECLAIMS

Floating	$0.14	@	$0.16
Friction	.14	@	.16
Mechanical	.09	@	.11
Shoe	.11¼	@	.13¼
Tires, auto	.11¼	@	.13¼
truck	.09	@	.11
White	.15	@	.16

AMSTERDAM RUBBER MARKET

JOOSTEN & JANSSEN, Amsterdam, report, under date of April 29, 1921: This week the market was rather dull especially for spot parcels, owing to the fact that prices did not fluctuate very much. Only on the terminal market there was a rather big turnover and a good deal of the transactions was done in October December crêpe at prices from about Fl. .63½ to Fl. .66. The demand for spot sheets seems to be slackening down for the present, while on the other hand there are still buyers for sheets on future deliveries now. This week closes practically at the same prices as last week, viz.:

Hevea crêpe, Fl. .56.	Sheets, Fl. .49½ on the spot.
Hevea crêpe, Fl. .61.	Sheets, Fl. .53 July—September.
Hevea crêpe, Fl. .65.	Sheets, Fl. .56 October—December.

NEW YORK AVERAGE SPOT RUBBER PRICES

APRIL, 1921

PLANTATIONS:	18	19	20	21	22	23	25	26	27	28	29	30
Ribbed smoked sheet	16⅞	16¾	16⅝	16¾	16⅞	17¼	17⅜	17¼	17⅛	17	17	16¾
First latex crêpe	19	18¾	18⅝	18¾	18¾	19¼	19⅛	19	18¾	18⅞	18⅞	18¼
Off latex crêpe	16⅞	16¾	16¼	16¼	16¼	17	17¼	17	16¾	17	17	16½
No. 1 blanket crêpe	14½	14⅞	14¾	14¾	14¾	14¾	15	15	15	15	15	14½
No. 2 blanket crêpe	13¾	13⅞	13¾	13¾	13¾	13¾	14	14	14	14	14	13½
No. 3 blanket crêpe	12¾	12¾	12¾	12¾	12¾	12¾	12⅞	13	13	13	13	12½
Clean, thin, brown crêpe	14½	13½	13¾	13⅝	14¼	14½	14¾	14¾	14¾	14	14¼	14
Specky brown crêpe	12¼	11½	11¾	11¾	11¾	12	12¾	12¾	12¾	11¼	12½	11¼
Rolled brown crêpe	11¼	11¼	11⅛	11⅛	11⅛	11	11⅜	11¼	11⅛	11	11	10⅜

MAY, 1921

PLANTATIONS:	2	3	4	5	6	7	9	10	11	12	13	14
Ribbed smoked sheet	16¼	15¾	15¾	16¾	16¼	16⅜	16⅜	16⅜	16¼	16½	16¼	16¼
First latex crêpe	18⅝	18¼	18½	18¾	18½	18½	18¾	18½	18⅜	18¼	18¼	18¼
Off latex crêpe	16½	16¾	17	17¼	16¾	17¼	17¼	17¼	16½	16⅝	16¼	16¼
No. 1 blanket crêpe	14⅞	14¼	14¼	15	15	15	15	15	14¾	14⅝	14½	14¼
No. 2 blanket crêpe	13⅞	13¼	13¼	14	14	14	14	14	13¾	13⅝	13½	13¼
No. 3 blanket crêpe	12⅞	12¼	12¼	13	13	13	13	13	12¾	12⅝	12½	12¼
Clean, thin, brown crêpe	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14⅜	14½	14	14¼	13¾
Specky brown crêpe	11⅞	12¼	12½	12¼	12¼	12½	12¼	12¼	12¼	12⅛	12¼	12¼
Rolled brown crêpe	11¼	10¾	11	11	11¼	11	11	10⅞	10¾	11⅛	11⅛	10¾

COMPARATIVE LOW AND HIGH NEW YORK SPOT RUBBER PRICES

	May 1921*	May 1920	May 1919
PLANTATIONS			
First latex crêpe	$0.17½ @ $0.19¼	$0.38 @ $0.43¼	$0.45½ @ $0.48
Smoked sheet ribbed	.15½ @ .17½	.38 @ .43	.44½ @ .47
PARAS			
Upriver, fine	.16½ @ .18½	.39 @ .41¼	.56 @ .56¼
Upriver, coarse	.08¾ @ .09½	.29½ @ .30½	.34 @ .34¾
Islands, fine	.17½ @ .18	.40 @ .41½	.47 @ .47½
Islands, coarse	.09 @ .12	.21 @	.21½ @
Cametá	.08½ @ .11	.22 @ .23	.21½ @ .23

*Figured to May 25, 1921.

ANTWERP RUBBER MARKET

GRISAR & CO., Antwerp, report under date of April 29, 1921:

Sales during the week ended April 22, amounted to 772 kilos, Congo-Angola thimbles at 2.05 francs; 6,013 kilos of first latex crêpe at a secret price; 9,997 kilos of ribbed smoked sheet at a secret price. During the same week arrivals at Antwerp by the S.S. "Anversville" were: Société Anonyme Bungé, 13,742 kilos and 5,955 kilos (Comminière); Osterrieth & Co., 10,750 kilos.

For the week ended April 29, Antwerp sales were 21,221 kilos of Ambriz thimbles, red, at 2.05 francs. Stocks on hand were about 1,840 tons.

The futures market remains inactive. There was a drop in prices of 0.35 francs during the previous week, and a further drop of 0.05 francs by April 29, when closing quotations were: April—May, 5.40; June, 5.55; July, 5.70; August—September, 5.80; October, 5.90; November—March, 6.05.

HAMBURG RUBBER MARKET

EFFEKTIV-ROHGUMMIMAKLER-VEREIN, Hamburg, reports, under date of April 23, 1921:

Despite the fact that some consumers held back because of the uncertainty concerning further sanctions by the Entente, to be expected after May 1, quite a lively business developed during the week. News of lower quotations in England and a drop in German exchange had no effect on the desire to buy.

Business was done in fine Pará and in various plantation grades; arrivals were normal; the prices moved between:

	Marks		
First latex crêpe	24	@	27
Ribbed smoked sheets	23	@	23½
Ribbed smoked sheets, lower grade	19	@	20
Brown crêpe, clean	17	@	21
Brown crêpe, somewhat barky	15	@	17
Dark crêpe	14	@	16
Hard fine Pará	25	@	27
Caucho ball	19	@	20
Panama and Colombia black balata	60	@	90
No. 1 balata sheet	100	@	110
Jelutong	13	@	17

SINGAPORE RUBBER MARKET

GUTHRIE & CO., Limited, Singapore, reports under date of April 14, 1921:

The weekly rubber auction, held yesterday and today, opened to a dull and depressed market. There were very few buyers present, and with no substantial orders to support the market, a poor sale resulted, only 324 tons being sold out of 1,117 tons catalogd. Standard sheet sold up to 32½ cents, but was not readily salable at this figure. No standard pale crêpe was sold, a few lots being withdrawn at 35 cents. Off-quality sheet and crêpe was again unsalable at reasonable prices. Lower grade crêpes were steady round about last week's prices. The following is the course of values:

	In Singapore per pound[1]	Sterling Equivalent per pound in London
Sheet, fine ribbed smoked	32½ @ ..	—/11⅛ @ —/..
Sheet, good ribbed smoked	17 @ 31	—/ 6⅞ @ —/11¾
Crêpe, good pale	21½ @ 34	—/ 8⅝ @ 1/ 0½
Crêpe, fine brown	18 @ 22	—/ 7⅜ @ —/ 8¾
Crêpe, good brown	11 @ 17	—/ 5⅝ @ —/ 7¼
Crêpe, dark	10 @ 14	—/ 5⅜ @ —/ 6½
Crêpe, bark	8 @ 13	—/ 4¾ @ —/ 6⅛

[1] Quoted in Straits Settlements currency, $1 equals $0.567 United States currency.

FEDERATED MALAY STATES RUBBER EXPORTS

An official report from Kuala Lumpur states that 7,408 tons of rubber were exported from the Federated Malay States in March. This compares with 6,091 tons in February and 9,524 tons in the corresponding month of last year. The total exports for the first quarter of the present year were 20,584 tons as against 30,424 tons in the corresponding period last year and 28,651 tons in 1919. Appended are the comparative statistics:

	1919	1920	1921
January ... tons	7,163	11,119	7,085
February	10,809	9,781	6,091
March	10,679	9,524	7,408
Totals ... tons	28,651	30,424	20,584

STRAITS SETTLEMENTS RUBBER EXPORTS

It is announced by official report from Singapore that 7,275 tons of rubber were exported from Straits Settlements ports in the month of March, as compared with 5,813 tons in February and 5,931 tons in the corresponding month last year. Transhipments amounted to 1,425 tons. The total exports for the first quarter of the present year amount to 18,897 tons as against 36,435 tons last year and 50,973 tons in 1919. Appended are the comparative statistics:

	1919	1920	1921
January ... tons	14,404	13,125	5,809
February	15,661	17,379	5,813
March	20,908	5,931	7,275
Totals ... tons	50,973	36,435	18,897

These figures include transhipments of rubber from various places in the neighborhood of the Straits Settlements, such as Borneo, Java, Sumatra and the non-Federated Malay States, as well as rubber actually exported from the Colony, but do not include rubber exports from the Federated Malay States.

PLANTATION RUBBER EXPORTS FROM JAVA

	January 1920	January 1921	February 1920	February 1921
To Netherlands ... kilos	319,000	753,000	277,000	782,000
Great Britain	148,000	1,036,000	862,000	787,000
Germany	....	47,000	....	15,000
Belgium	....	....	....	5,000
Italy	....	....	....	1,000
United States	1,044,000	510,000	2,233,000	654,000
Singapore	391,000	359,000	351,000	272,000
Japan	....	....	29,000	43,000
Australia	....	138,000	....	64,000
Totals ... kilos	1,902,000	2,843,000	3,752,000	2,623,000
Ports of origin:				
Tandjong Priok ... kilos	529,000	1,563,000	2,054,000	1,024,000
Samarang	74,000	34,000	58,000	20,000
Soerabaya	1,071,000	1,021,000	1,620,000	1,338,000

PLANTATION RUBBER EXPORTS FROM MALAYA

(These figures include the production of the Federated Malay States, but not of Ceylon.)

	Singapore (January 1 to February 28, 1921)	Malacca (January 1 to February 28, 1921)	Penang (January 1 to February 28, 1921)	Port Swettenham (January 1 to April 14, 1921)	Totals
To United Kingdom ... pounds	8,760,940	1,704,487	3,483,100	6,337,530	20,286,057
The Continent	2,408,539	1,739,485	23,067	33,600	4,204,691
Japan	7,658,201	....	....	....	7,658,201
Ceylon	....	....	46,800	166,281	213,081
United States and Canada	8,474,495	15,640	110,067	....	8,600,202
Australia	356,495	806	....	....	357,301
Other countries	....	....	796,533	....	796,533
Totals ... pounds	27,658,670	3,460,418	4,459,567	6,537,411	42,116,066

Compiled by Barlow & Co., Singapore.

RUBBER EXPORTS FROM PENANG

	January 1 to February 28	
	1920	1921
To Great Britain ....piculs[1]	49,694	27,734
Europe	658	173
United States	37,566	823
Totals........................piculs[1]	87,918	28,730

[1]One picul equals 133⅓ pounds.

CRUDE RUBBER ARRIVALS AT ATLANTIC AND PACIFIC PORTS AS STATED BY SHIPS' MANIFESTS

PARAS AND CAUCHO AT NEW YORK

	Fine	Medium	Coarse	Caucho	Totals Pounds
APRIL 19. By the S. S. "Hubert," from Manáos.					
G. Amsinck & Co., Inc......	....	....	....	....	22,249
Various	....	....	....	....	5,299
APRIL 19. By the S. S. "Hubert," from Pará.					
Arkell & Douglas, Inc.......	....	....	....	....	28,904
Heidelbach, Ickelheimer & Co.	....	....	....	....	54,971
H. A. Astlett & Co..........	....	....	....	....	20,000
APRIL 24. By the S. S. "Lake Farahee," from Pará.					
H. A. Astlett & Co..........	90,000	11,000	....	....	101,000
MAY 8. By the S. S. "Glenspean," from Pará.					
General Rubber Co...........	....	....	....	....	33,770
Meyer & Brown, Inc........	117,600*	....	2,240	....	119,840
Poel & Kelly...............	....	....	....	....	7,106
Paul Bertuch	98,140	20,545	2,517	370	121,572
Arkell & Douglas, Inc........	....	....	....	....	62,502
MAY 8. By the S. S. "Lancaster Castle," from Manáos.					
Arkell & Douglas, Inc........	119,981	40,753	8,798	112,455	281,987
Various	8,289	4,023	....	....	12,312
MAY 8. By the S. S. "Lancaster Castle," from Pará.					
Heidelbach, Ickleheimer & Co..	6,006	748	4,312	....	11,066
General Rubber Co..........	....	....	88,191	18,760	106,951
Arkell & Douglas, Inc........	38,777	29,130	....	12,483	80,390
Poel & Kelly...............	38,148	7,106	13,068	....	58,322
Paul Bertuch...............	87,970	....	37,897	....	125,867
Chas. T. Wilson & Co.........	....	....	....	29,700	29,700
H. A. Astlett & Co..........	140,000	24,000	....	....	164,000
Various	....	....	23,888	23,454	47,342
MAY 14. By the S. S. "Dunstan," from Pará.					
H. A. Astlett & Co...........	35,000	....	....	....	35,000
MAY 14. By the S. S. "Dunstan," from Manáos.					
Paul Bertuch	172,858	9,351	2,727	....	184,936
Meyer & Brown, Inc........	114,240*	....	....	78,400	192,640
MAY 17. By the S. S. "Justin," from Pará.					
H. A. Astlett & Co...........	....	....	....	110,000	110,000
Paul Bertuch	28,483	27,668	3,307	....	59,458
Meyer & Brown, Inc.........	25,200*	....	....	44,800	70,000
MAY 17. By the S. S. "Justin," from Manáos.					
Paul Bertuch................	189,137	32,123	8,135	1,596	230,991

* Includes medium.

PLANTATIONS

(Figured at 180 pounds net to the bale or case.)

	Shipment from:	Shipped to:	Pounds.	Totals.
APRIL 19. By the S. S. "Vennonia," at New York.				
General Rubber Co......	London	New York	1,087,740	1,087,740
APRIL 19. By the S. S. "Saxonia," at New York.				
Goldman, Sachs & Co....	London	New York	1,116,000	
Aldens' Successors, Inc..	London	New York	32,220	1,148,220
APRIL 20. By the S. S. "Esther Dollar," at New York.				
Whittal & Co..........	Colombo	New York	54,180	
L. Littlejohn & Co., Inc..	Colombo	New York	347,200	
G. B. Laboyteaux, Jr....	Colombo	New York	71,460	
Baird Rubber & Trading Co.	Colombo	New York	35,840	
H. A. Astlett & Co......	Colombo	New York	70,000	
Firestone Tire & Rubber Co.	Colombo	Akron	202,320	
Pacific Trading Corporation	Colombo	New York	47,700	
General Rubber Co......	Colombo	New York	1,318,320	
Rubber Trading Co......	Colombo	New York	499,500	
William H. Stiles & Co..	Colombo	New York	33,600	
The Goodyear Tire & Rubber Co.	Colombo	Akron	55,620	
W. G. Ryckman, Inc....	Colombo	New York	270,000	
Various	Colombo	Toronto	220,620	
Baird Rubber & Trading Co.	Singapore	New York	67,200	3,293,560
APRIL 21. By the S. S. "Eastern Knight," at New York.				
American Trading Co....	Colombo	New York	71,820	
L. Littlejohn & Co., Inc..	Colombo	New York	33,600	
F. R. Henderson & Co..	Colombo	New York	179,820	
J. A. Medina Co........	Colombo	New York	72,720	
Winter, Ross & Co......	Colombo	New York	12,060	
Rubber Importers & Dealers Co., Inc.......	Colombo	New York	19,800	
East Asiatic Co., Inc....	Colombo	New York	7,380	
Baird Rubber & Trading Co.	Colombo	New York	109,760	
Various	Colombo	New York	592,640	1,099,600
APRIL 22. By the S. S. "City of Canton," at New York.				
Meyer & Brown, Inc....	Colombo	New York	145,600	
William H. Stiles & Co..	Colombo	New York	22,400	168,000

	Shipment from:	Shipped to:	Pounds.	Totals.
APRIL 22. By the S. S. "Trafford Hall," at New York.				
Poel & Kelly..........	Colombo	New York	55,800	
F. R. Henderson & Co...	Colombo	New York	119,160	
L. Littlejohn & Co., Inc..	Colombo	New York	67,200	
Baird Rubber & Trading Co.	Colombo	New York	42,560	284,720
APRIL 22. By the S. S. "Rondo," at New York.				
Aldens' Successors, Inc..	Soerabaya	New York	254,203	
S. & W. Birnbaum......	Soerabaya	New York	73,005	
Adolph Hirsch & Co., Inc.	Soerabaya	New York	55,565	
Various	Soerabaya	New York	295,732	
The Fisk Rubber Co.....	Singapore	Chicopee Falls	4,626	
S. & W. Birnbaum......	Batavia	New York	332,842	
Thornett & Fehr.........	Batavia	New York	137,240	
Manhattan Rubber Manufacturing Co.	Batavia	New York	16,896	
Fred Stern & Co........	Batavia	New York	246,400	
Various	Batavia	New York	91,047	
Various	T'jong Priok	New York	50,087	
Joosten & Janssen......	Sumatra	New York	22,400	1,580,043
APRIL 23. By the S. S. "West Calumb," at New York.				
William H. Stiles & Co...	Far East	New York	67,200	67,200
APRIL 24. By the S. S. "Niew Amsterdam," at New York.				
Meyer & Brown, Inc.....	Rotterdam	New York	168,000	168,000
APRIL 25. By the S. S. "Bolton Castle," at New York.				
Rubber Importers & Dealers Co., Inc..........	Singapore	New York	110,880	
Irwin-Harrisons & Crosfield, Inc.	Singapore	New York	38,520	
Baring Bros.	Singapore	New York	101,160	
L. Littlejohn & Co., Inc..	Singapore	New York	369,600	
Mitsubishi Goshi Kaisha.	Singapore	New York	33,480	
American Trading Co....	Singapore	New York	37,980	
Rogers-Pyatt Shellac Co..	Singapore	New York	18,000	
The Goodyear Tire & Rubber Co.	Singapore	Akron	92,340	
Thornett & Fehr........	Singapore	New York	201,600	
Paterson, Simmons & Co.	Singapore	New York	98,460	
Fred Stern & Co........	Singapore	New York	179,200	
Smith & Schippers.......	Singapore	New York	68,760	
The Fisk Rubber Co.....	Singapore	Chicopee Falls	56,070	
Various	Cochin	New York	288,790	1,694,840
APRIL 26. By the S. S. "Sanuki Maru," at New York.				
Pacific Trading Co......	Colombo	New York	21,600	
Various	Colombo	New York	259,660	
L. Littlejohn & Co., Inc..	Ceylon	New York	89,600	
Hood Rubber Co........	London	Watertown	33,600	404,460
APRIL 29. By the S. S. "Tuscan Prince," at New York.				
American Trading Co....	Singapore	New York	94,680	
Rogers-Pyatt Shellac Co..	Singapore	New York	90,000	
William H. Stiles & Co...	Singapore	New York	100,800	
L. Littlejohn & Co., Inc..	Singapore	New York	560,000	
H. A. Astlett & Co......	Singapore	New York	170,000	
Balfour, Williamson & Co.	Singapore	New York	128,880	
McAllister Bros.........	Singapore	New York	50,400	
Rubber Importers & Dealers Co., Inc..........	Singapore	New York	131,040	
J. T. Johnstone & Co., Inc.	Singapore	New York	168,000	
Poel & Kelly...........	Singapore	New York	372,060	
Thornett & Fehr........	Singapore	New York	417,600	
Mitsui & Co., Limited...	Singapore	New York	33,480	
The Fisk Rubber Co.....	Singapore	Chicopee Falls	73,820	
Pennsylvania Rubber Co..	Singapore	Jeanette	160,920	
Various	Singapore	Toronto	7,200	
Various	Singapore	New York	515,760	
Hood Rubber Co........	London	Watertown	33,600	3,108,240
APRIL 30. By the S. S. "Eurypylus," at New York.				
Rubber Importers & Dealers Co., Inc..........	Singapore	New York	225,180	
Thornett & Fehr........	Singapore	New York	318,240	
Meyer & Brown, Inc.....	Singapore	New York	1,187,200	
William H. Stiles & Co..	Singapore	New York	11,200	
L. Littlejohn & Co., Inc..	Singapore	New York	672,000	
Jaeger & Co...........	Singapore	New York	50,400	
Baring Bros.	Singapore	New York	68,220	
Thos. A. Desmond & Co..	Singapore	New York	116,640	
W. G. Ryckman, Inc.....	Singapore	New York	243,000	
Chas. T. Wilson Co., Inc..	Singapore	New York	93,600	
J. T. Johnstone & Co., Inc.	Singapore	New York	156,832	
F. R. Henderson & Co....	Singapore	New York	164,520	
Poel & Kelly..........	Singapore	New York	296,280	
East Asiatic Co., Inc.....	Singapore	New York	179,460	
Mitsubishi Goshi Kaisha.	Singapore	New York	56,160	
H. A. Astlett & Co......	Singapore	New York	85,000	
Aldens' Successors, Inc..	Singapore	New York	20,160	
General Rubber Co......	Singapore	New York	443,700	
Hood Rubber Co.........	Singapore	Watertown	112,000	
The Fisk Rubber Co.....	Singapore	Chicopee Falls	112,070	
Various	Singapore	Toronto	49,098	
Thornett & Fehr.........	Penang	New York	10,080	
Fred Stern & Co........	Belawan-Deli	New York	22,400	
Baird Rubber & Trading Co.	Colombo	New York	208,320	4,901,760
APRIL 30. By the S. S. "Western Glen," at New York.				
Meyer & Brown, Inc.....	London	New York	112,000	112,000
APRIL 30. By the S. S. "Verentia," at New York.				
Goldman, Sachs & Co....	London	New York	220,320	
L. Littlejohn & Co., Inc..	London	New York	11,200	231,520
APRIL 30. By the S. S. "Alaska Maru," at New York.				
Pennsylvania Rubber Co.	Singapore	Jeanette	61,200	
Poel & Kelly...........	Singapore	New York	648,000	
Eastern Rubber Co.......	Singapore	New York	181,260	
Thornett & Fehr........	Singapore	New York	219,600	
The Fisk Rubber Co.....	Singapore	Chicopee Falls	22,400	1,132,460

	Shipment from:	Shipped to:	Pounds.	Totals.
April 30. By the S. S. "Madioen," at New York.				
L. Littlejohn & Co., Inc..	Java	New York	291,200	
Mitsui & Co., Limited	Soerabaya	New York	50,220	
Baring Bros.	Soerabaya	New York	67,320	
William H. Stiles & Co..	Soerabaya	New York	56,000	
International Products Co.	Soerabaya	New York	28,980	
J. T. Johnstone & Co., Inc.	Soerabaya	New York	22,586	
Various	Soerabaya	New York	69,414	
Mitsui & Co., Limited...	Batavia	New York	39,960	
International Products Co.	Batavia	New York	92,700	
H. A. Astlett & Co......	Batavia	New York	25,000	
Various	Batavia	New York	41,600	
Various	T'jong Priok	New York	18,000	802,980
May 1. By the S. S. "Westbrook," at New York.				
Various	Rotterdam	New York	12,780	12,780
May 1. By the S. S. "Noordam," at New York.				
L. Littlejohn & Co., Inc..	Rotterdam	New York	398,400	
Various	Rotterdam	New York	159,060	557,460
May 11. By the S. S. "Vascenia," at New York.				
L. Littlejohn & Co., Inc..	London	New York	89,600	89,600
May 11. By the S. S. "Carmania," at New York.				
Poel & Kelly...........	Liverpool	New York	12,960	
Various	Liverpool	New York	180	13,140
May 14. By the S. S. "City of Oran," at New York.				
H. A. Astlett & Co......	Colombo	New York	50,000	
Hood Rubber Co........	London	Watertown	22,400	72,400
May 15. By the S. S. "Koranna," at Boston.				
Hood Rubber Co........	Ceylon	Watertown	186,820	
Baird Rubber & Trading Co.	Colombo	New York	50,290	237,110
May 15. By the S. S. "Rotterdam," at New York.				
L. Littlejohn & Co., Inc..	Rotterdam	New York	416,800	
H. A. Astlett & Co......	Rotterdam	New York	20,000	
Various	Rotterdam	New York	87,900	524,700
May 17. By the S. S. "Pipestone County," at New York.				
Fred Stern & Co........	London	New York	44,800	44,800
May 17. By the S. S. "Semmelsdyk," at New York.				
Baird Rubber & Trading Co.	Soerabaya	New York	22,400	
Various	Soerabaya	New York	24,459	
Thornett & Fehr........	Batavia	New York	41,425	
Manhattan Rubber Manufacturing Co..........	Batavia	New York	38,745	
Baird Rubber & Trading Co.	Batavia	New York	18,330	
Lincoln Rubber Co......	Batavia	Akron	19,911	
The Fisk Rubber Co.....	Batavia	Chicopee Falls	22,360	
Various	Batavia	New York	84,833	
Various	Belawan-Deli	New York	82,361	354,824
May 18. By the S. S. "Toyooka Maru," at New York.				
Baring Bros.	Colombo	New York	491,400	
L. Littlejohn & Co., Inc..	Colombo	New York	100,800	
Chas. T. Wilson Co., Inc.	Colombo	New York	141,120	
Meyer & Brown, Inc....	Colombo	New York	190,400	
Baird Rubber & Trading Co.	Colombo	New York	44,800	
Various	Colombo	New York	86,100	1,054,620

CENTRALS

April 19. By the S. S. "Panama," at New York.				
W. R. Grace & Co......	Cristobal	New York	3,900	3,900

AFRICANS

May 8. By the S. S. "France," at New York.				
Bergougnan Rubber Corporation	Havre	Trenton	115	115

PONTIANAK

April 22. By the S. S. "Rondo," at New York.				
Various	T'jong Priok	New York	123,552	123,552
April 30. By the S. S. "Eurypylus," at New York.				
Various	Singapore	New York	85,800	85,800

MANGABEIRA

May 14. By the S. S. "Taurus," at New York.				
Adolph Hirsch & Co., Inc.	Bahia	New York	6,614	6,614

GUAYULE (DRY)

May 13. By rail at Eagle Pass, Texas.				
Continental Mexican Rubber Co.	Mexico	New York	75,020	75,020

BALATA

April 21. By the S. S. "Colon," at New York.				
Fromm & Co............	Cristobal	New York	1,800	1,800
April 22. By the S. S "Lake Fackler," at New York.				
Middleton & Co., Limited	Surinam	New York	4,498	4,498
April 25. By the S. S. "Matura," at New York.				
South & Central America Commercial Co.	Port of Spain	New York	15,000	
Boos & Co.............	Port of Spain	New York	11,250	
Ultramares Corporation...	Port of Spain	New York	4,200	30,450
May 5. By the S. S. "Aurora," at New York.				
Middleton & Co., Limited	Surinam	New York	11,104	
Wm. Schall & Co........	Paramaribo	New York	1,500	12,604
May 5. By the S. S. "Allianca," at New York.				
Fromm & Co............	Cristobal	New York	1,500	1,500
May 9. By the S. S. "Mayaro," at New York.				
South & Central America Commercial Co.	Port of Spain	New York	13,685	13,685

	Shipment from:	Shipped to:	Pounds.	Totals.
May 11. By the S. S. "Quillota," at New York.				
American Trading Co....	Cristobal	New York	2,300	2,300
May 12. By the S. S. "Carrillo," at New York.				
Eggers & Heinlein.......	Cristobal	New York	2,070	2,070
May 18. By the S. S. "Welshman," at New York.				
Fidanque Bros. & Sons..	Liverpool	New York	10,000	10,000

CUSTOM HOUSE STATISTICS

NEW YORK

IMPORTS

	March 1920		March 1921	
Unmanufactured—*free*:	Pounds	Value	Pounds	Value
Crude rubber:				
From Belgium............	229,812	$105,003	....	....
France	681,507	216,758	....	....
Italy	600,396	302,226	....	....
Netherlands	508,979	234,584	282,125	$63,225
Portugal	590,983	153,832	1,022,225	107,547
England	11,807,228	5,261,580	2,495,490	420,552
Nicaragua	22,929	6,103	....	....
Panama	4,581	891	....	....
Salvador	540	135	....	....
Mexico	50,918	20,731	....	....
Bolivia	25,328	9,511	1,213	96
Brazil	5,195.613	1,586,260	2,265.853	283,133
Colombia	28.249	9,261	40,376	10,592
Ecuador	48.485	11,979	....	....
British Guiana.....	5,205	3,449	8,930	2,858
Venezuela	5,514	2,002	28,291	18.270
British India......	215,615	91,362	83,242	16,348
Straits Settlements.	34,750,472	16,908,820	12,680.798	3,914,106
British East Indies.	4.356.545	1,811.948	3,925,847	617,640
Dutch East Indies..	10,279,607	4,586.862	5,167,541	1,313.138
Hongkong	112,374	48,236	....	....
Japan	452,795	225,429	....	....
Costa Rica.........	....	....	175	20
Peru	....	....	4.638	974
Uruguay	....	....	6,051	2,745
Totals	69,973,675	$31,596,962	28,012,795	$6,771,244
Balata	61,035	32,289	46,216	28,042
Jelutong (Pontianak).......	1,052.426	164,260	228.424	29,722
Gutta percha..............	533,955	96,585	134,812	24,051
Totals	71,621,091	$31,890,096	28,422.247	$6,853,059
Rubber scrap and reclaimed.	991,603	68,097	132,709	10,955
Totals, unmanufactured..	72,612,694	$31,958,193	28,554,956	$6,864,014
Manufactures of rubber and gutta percha............	....	$71,338	....	$52,666
Chicle ....*dutiable*	649,546	509,087	125,403	58,997

EXPORTS

Manufactured:				
Automobile and other tires..	....	$4,109,075	....	$593,551
Inner tubes...............	....	480,309	....	47,060
Belting, hose and packing...	....	369,670	....	248,235
Rubber boots and shoes.*pairs*	838,772	778,099	124,701	120,636
Soles and heels............	....	60,155	....	26,995
Druggists' sundries	....	131,905	....	57,900
Other rubber manufactures..	....	468,051	....	233,448
Totals, manufactured...	....	$6,397,264	....	$1,327,825
Insulated wire	....	$507,189	....	$632,633
Unmanufactured—*free*:				
Rubber scrap and reclaimed.	403,991	$45,508	199,704	$14,295

FOREIGN EXPORTS

Crude rubber	94,040	$45,605	152,105	$27,901
Balata	83,390	46,976	27,002	14,751
Jelutong (Pontianak)	....	....	4,536	1,775
Rubber substitutes	17	9	....	....
Rubber manufactures	....	1,398	....	4,056

MASSACHUSETTS

IMPORTS

Unmanufactured —*free*:				
Crude rubber:				
From England	99,943	$45,167	....	....
Straits Settlements...	....	....	2,100	$1,048
British East Indies..	....	....	332,640	53,639
Totals	99,943	$45,167	334,740	$54,687
Rubber scrap and reclaimed.	112,560	6,100	33,600	3,780
Totals, unmanufactured..	212,503	$51,267	368,340	$58,467
Rubber manufactures..*dutiable*	....	$21,932	....	$8,999

EXPORTS

Manufactured:				
Automobile and other tires..	....	$227	....	$1,413
Inner tubes	....	....	....	18
Belting, hose and packing...	....	7,111	....	1,160
Rubber boots and shoes..*pairs*	338,406	278,596	34,984	37,938
Soles and heels...........	....	4,131	....	202
Druggists' sundries	....	2,567	....	470
Other rubber manufactures..	....	40,637	....	14,817
Totals, manufactured...	....	$333,269	....	$56,018
Insulated wire	....	$863	....	$4,897

BUFFALO

IMPORTS

	March 1920 Pounds	March 1920 Value	March 1921 Pounds	March 1921 Value
Unmanufactured—*free:*				
Rubber scrap and reclaimed	275,127	$18,905	....	....
Rubber manufactures..*dutiable*	....	248	....	$551
Chicle ....*dutiable*	9	8	....	....

EXPORTS

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Manufactured:				
Automobile and other tires..	....	$233,616	....	$48,353
Inner tubes	....	40,552	....	33,498
Belting, hose and packing..	....	33,622	....	9,802
Rubber boots and shoes..*pairs*	9,132	13,762	2,783	2,033
Soles and heels............	....	785	....	145
Druggists' sundries	....	21,105	....	14,778
Other rubber manufactures..	....	76,188	....	42,368
Totals, manufactured...	....	$419,630	....	$150,977
Insulated wire	....	$7,672	....	$6,756
Rubber scrap and reclaimed.	311,091	44,305	31,369	4,810

FOREIGN EXPORTS

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Crude rubber	382,756	$156,793	274,345	$47,063
Balata	....	....	28,501	5,852
Jelutong (Pontianak).......	28,750	5,562	41,900	7,358
Rubber scrap and reclaimed.	49,693	9,690	....	....
Chicle	41,498	21,299	....	....
Rubber manufactures	....	104	....	138

PHILADELPHIA

IMPORTS

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Unmanufactured—*free:*				
Crude rubber:				
From Straits Settlements.	894,961	$375,736	....	....
Gutta percha	96,439	9,910	....	....
Totals	991,400	$385,646	....	....
Rubber scrap and reclaimed.	457	68	....	....
Totals, unmanufactured.	991,857	$385,714	....	....
Rubber manufactures..*dutiable*	....	$229	....	$2,038

EXPORTS

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Manufactured:				
Automobile and other tires..	....	$64,900	....	....
Inner tubes	....	5,918	....	....
Belting, hose and packing...	....	22,671	....	$32,170
Other rubber manufactures..	....	3,133	....	278
Totals, manufactured...	....	$96,622	....	$32,448
Insulated wire	....	$1,559	....	....
Rubber scrap and reclaimed	....	....	4,514	$499

NEW ORLEANS

IMPORTS

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Unmanufactured—*free:*				
Crude rubber:				
From Costa Rica	143	$136	....	....
Honduras	880	440	....	....
Nicaragua	4,560	985	3,720	$187
Totals, unmanufactured.	5,583	$1,561	3,720	$187
Chicle ....*dutiable*	5,214	$3,041	617	$280

EXPORTS

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Manufactured:				
Automobile and other tires..	....	$15,740	....	$6,334
Inner tubes	....	1,210	....	41
Belting, hose and packing..	....	5,150	....	8,428
Rubber boots and shoes..*pairs*	13,177	17,700	12,388	18,171
Soles and heels............	....	347	....	201
Druggists' sundries	....	38	....	49
Other rubber manufactures..	....	3,323	....	609
Totals, manufactured....	....	$43,508	....	$33,833
Insulated wire	....	$5,128	....	$3,789

OHIO

IMPORTS

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Unmanufactured—*free:*				
Crude rubber:				
From Straits Settlements..	2,913,216	$1,531,645	....	....
Totals, unmanufactured.	2,913,216	$1,531,645	....	....
Rubber manufactures.*dutiable*	....	$100	....	$446

SAN FRANCISCO

IMPORTS

	March 1920 Pounds	March 1920 Value	March 1921 Pounds	March 1921 Value
Unmanufactured—*free:*				
Crude rubber:				
From British India	160	$96	....	....
Straits Settlements...	4,783,237	2,103,812	81,660	$17,058
Dutch East Indics...	831,050	290,140	76,080	20,132
Hongkong	532	187	....	....
Totals	5,614,979	$2,394,235	157,740	$37,190
Jelutong (Pontianak)	804	259	....	....
Totals, unmanufactured.	5,615,783	$2,394,494	157,740	$37,190
Rubber manufactures.*dutiable*	....	$1,713	....	$3,182
Chicle ....*dutiable*	32,654	22,613	....	....

EXPORTS

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Manufactured:				
Automobile and other tires..	....	$80,935	....	$48,770
Inner tubes	....	6,612	....	1,804
Belting, hose and packing...	....	39,773	....	5,191
Rubber boots and shoes..*pairs*	876	1,555	5,011	16,570
Soles and heels............	....	52	....	1,649
Druggists' sundries	....	2,319	....	1,069
Other rubber manufactures..	....	7,428	....	4,476
Totals, manufactured...	....	$138,674	....	$79,529
Insulated wire	....	....	....	$3,876
Rubber scrap and reclaimed.	613,123	$29,628	40,710	$720

FOREIGN EXPORTS

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Rubber manufactures	....	$25	....	....

WASHINGTON

IMPORTS

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Unmanufactured—*free:*				
Crude rubber:				
From Straits Settlements..	2,300,156	$1,089,963	....	....
Dutch East Indies...	120,178	57,510	....	....
Totals	2,420,334	$1,147,473	....	....
Rubber scrap and reclaimed.	11,000	270	1,690	$68
Totals, unmanufactured.	2,431,334	$1,147,743	1,690	$68
Rubber manufactures.*dutiable*	....	$99	....	$4

EXPORTS

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Manufactured:				
Automobile and other tires..	....	$40,942	....	$988
Inner tubes	....	532	....	16
Belting, hose and packing...	....	6,779	....	1,240
Rubber boots and shoes..*pairs*	1,973	4,127	127	534
Druggists' sundries	....	609	....	853
Other rubber manufactures..	....	4,511	....	3,514
Totals, manufactured...	....	$57,500	....	$7,145
Insulated wire	....	$2,103	....	$30
Rubber scrap and reclaimed.	293,278	20,979	90,759	1,815

CHICAGO

IMPORTS

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Unmanufactured—*free:*				
Crude rubber:				
From England	15	$7	....	....
Gutta percha	....	....	5,878	$1,176
Totals	15	$7	5,878	$1,176
Rubber scrap and reclaimed.	....	....	13,800	414
Totals, unmanufactured.	15	$7	19,678	$1,590
Rubber manufactures..*dutiable*	....	$3,423	....	$5,273
Chicle ....*dutiable*	327,554	205,789	528,129	307,172

MICHIGAN

IMPORTS

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Rubber scrap and reclaimed.	2,697	$34	....	....
Rubber manufactures.*dutiable*	....	6,189	....	$807

EXPORTS

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Manufactured:				
Automobile and other tires..	....	$57,104	....	$26,082
Inner tubes	....	7,464	....	4,443
Belting, hose and packing...	....	4,697	....	2,721
Rubber boots and shoes..*pairs*	3,384	11,537	2,205	7,557
Druggists' sundries	....	4,621	....	611
Other rubber manufactures..	....	15,592	....	6,617
Totals, manufactured...	....	$101,015	....	$48,031
Insulated wire	....	$3,039	....	$9,463
Rubber scrap and reclaimed.	115,929	14,621	30,476	1,219

UNITED STATES CRUDE RUBBER IMPORTS FOR 1921 (BY MONTHS)

1921	Plantations	Parás	Africans	Centrals	Guayule	Maniçoba and Matto Grosso	Balata	Miscellaneous	Waste	Totals 1921	Totals 1920
January ....*tons*	12,819	1,312	43	3	....	....	41	173	1,071	15,462	22,401
February	7,913	432	269	2	25	....	25	216	37	8,919	33,984
March	12,241	1,794	377	1	....	3	29	7	345	14,797	33,998
April	16,861	403	....	5	....	....	64	226	7	17,566	24,957
Totals, 4 months, 1921........	49,834	3,941	689	11	25	3	159	622	1,460	56,744	......
Totals, 4 months, 1920........	97,049	9,432	2,521	428	227	13	267	3,043	2,360	......	115,340

Compiled by The Rubber Association of America, Inc.

EXPORTS OF INDIA RUBBER MANUFACTURES AND INSULATED WIRE AND CABLE FROM THE UNITED STATES BY COUNTRIES, DURING THE MONTH OF FEBRUARY, 1921

EXPORTED TO—	Belting Value	Hose Value	Packing Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Soles and Heels Value	Automobile Tires: Casings Value	Automobile Tires: Inner Tubes Value	Automobile Tires: Solid Tires Value	Automobile Tires: All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
EUROPE:																
Azores and Madeira Islands		$160											$87	$159	$40	$446
Belgium	$59	1,035							$33,158	$6,697		$2,000	16,594	501	2,261	62,305
Bulgaria						13	$16									15
Denmark	974					6,534	8,011	$342	12,148	36	150	500	9,709	75	2,475	34,420
Finland											671				409	1,080
France	2,816					1,417	1,049		30,250	12		105	21,948	1,338	23,553	81,071
Germany		1,523	$450						300	12						2,285
Greece	14								4,540	130			324		80	5,088
Iceland and Faroe Islands				144	$344	1,344	1,332									1,676
Italy		308		2	6	4	5	110	6,606			145	17,537	564	7,754	33,035
Malta, Gozo and Cyprus Islands									910							910
Netherlands	7,905	2,090	1,180	12	41	580	675	64	11,679	5,525			6,730		7,009	42,898
Norway	9,000		45			13,126	11,598	665	6,634	301	68		11,725	845	373	41,254
Poland and Danzig													22,000	1,073		23,073
Portugal				262	1,216	1,140	1,196		2,629	227	40		6,900	275	50	12,533
Roumania	776		66						148							990
Spain	15			140	419			60	27,363	5,271	2,391	300	14,011	511	654	50,995
Sweden	342	1,920	3,797	11	74				29,699	2,194			178,198	282	5,633	222,139
Switzerland	216	591				144	170		2,814				4,789		4,485	13,065
Turkey in Europe						12	7		3,495					83	51	3,636
England	5,014	81,956	10,908	72	103	9,128	8,499	4,740	89,193	8,740	3,143	700	27,782	21,435	105,540	367,753
Scotland			56										6,895	23	965	7,939
Ireland	329		485													814
TOTALS, EUROPE	$27,460	$89,583	$16,987	643	$2,203	33,442	$32,558	$5,981	$261,566	$29,145	$6,463	$3,750	$345,229	$29,164	$161,332	$1,009,421
NORTH AMERICA:																
Bermuda		$1,660	$277	15	$52	1,445	$2,339	$193				$349	$56	$149	$83	$5,158
British Honduras	$20	77	1			72	111		$265	$78		16	329		36	933
Canada	8,662	6,464	3,460	909	2,657	3,921	3,788	140	93,818	9,059	496	861	23,985	16,117	124,005	293,512
Costa Rica	627							313		11		74	966	177	243	2,411
Guatemala	727					192	201	525	4,870	1,052	408	1,200	6,121		79	15,183
Honduras	6,494	1,528	428			68	193		754	96	595		874	284	331	11,577
Nicaragua	67	574				961	1,614	1,869	1,303	1,022			152	535	179	7,315
Panama	2,969	26,369	4,824	303	1,005	7,209	16,435	3,017	23,386	1,781	747	383	27,274	760	2,980	111,930
Salvador		304	36					1,042	2,327	572		745	3,718	164	2,153	11,061
Mexico	30,714	70,797	21,943	36	178	35,297	46,362	4,562	105,987	22,192	12,696	3,335	89,504	9,997	26,701	444,968
Miquelon, Langley, etc.				341	1,012	2	2									1,014
Newfoundland and Labrador		495		2,275	8,351	319	518		97	29			1,228	241	535	11,494
Barbados						507	554		3,512	261		419	150	125	227	5,248
Jamaica	201	573	185			324	430		2,092	121	913		26	18	590	5,149
Trinidad and Tobago		1,448	165			865	852		10,359	1,232	2,768		1,775	86	1,746	20,431
Other British West Indies		97	65			1,493	1,933	359	2,601	305	231	978	137	118	136	6,960
Cuba	1,259	37,666	12,333			20,085	23,096	31,946	89,055	11,072	16,697	4,351	110,819	7,322	23,260	368,876
Virgin Islands of United States			44			703	1,162		371	161			83	1	27	1,849
Dutch West Indies		160				616	742		2,045	287			200		51	3,485
French West Indies	183										138		129		15	465
Haiti		178	38			93	173		1,214	208			31	13	675	2,530
Dominican Republic	30	1,260	688	4	23	1,289	1,833	116	7,810	1,875	97		3,729	370	1,093	18,924
TOTALS, NORTH AMERICA	$51,953	$149,650	$44,487	3,883	$13,278	75,461	$102,338	$44,082	$351,866	$51,414	$35,786	$12,711	$271,286	$36,477	$185,145	$1,350,473
OCEANIA:																
Australia	$2,066	$478	$710	432	$2,043	3,159	$3,732		$38,622	$2,353	$931	$2,045	$50,974	$2,553	$10,714	$117,221
New Zealand	12,025	1,462	2,225	72	190	3,796	3,471	$264	96,798	1,359	8,266		13,937	3,626	7,434	151,057
Other British Oceania											320		80			400
French Oceania									67							67
Other Oceania											334					334
Philippine Islands	10,480	9,416	7,544			36,936	41,724	14,907	68,348	8,987	21,978	16,470	33,089	747	25,906	259,596
TOTALS, OCEANIA	$24,571	$11,356	$10,479	504	$2,233	43,891	$48,927	$15,171	$203,835	$12,699	$31,829	$18,515	$98,080	$6,926	$44,054	$528,675
SOUTH AMERICA:																
Argentina	$944	$10,348	$3,692			2,306	$2,483	$2,604	$109,478	$8,917	$2,278	$672	$52,833	$9,063	$22,439	$225,751
Bolivia	2,088	230	7						739			206	51		402	3,723
Brazil	5,555	12,527	293			3,312	3,294	5,701	14,368	519	380	10	127,841	6,818	7,497	184,803
Chile	11,208	12,176	2,311	368	$1,221	6,116	4,412		6,471	1,059	623		6,933	1,354	8,540	56,308
Colombia	2,422	1,610	658			853	1,091	21	7,883	695	451	115	13,755	856	1,109	30,666
Ecuador	391	695				2,800	2,800		2,942	682	201		771	88	600	9,170
British Guiana		38				195	254		3,908	390			2,564		744	7,898
Dutch Guiana		27				108	200	86	616	96			39	385	2	1,451
Paraguay	1,424															1,424
Peru	1,306	9,610	1,147						23,663	2,908	788	60	16,051	1,264	1,964	58,761
Uruguay	2,068	1,278		1,152	5,183	13,688	13,871		23,367	658			13,099	1,555	12,868	73,947
Venezuela		200	1,793			96	110	668	7,021	923		44	5,044	174	625	16,602
TOTALS, SOUTH AMERICA	$27,406	$48,739	$9,901	1,520	$6,404	29,474	$28,515	$9,080	$200,456	$16,847	$4,721	$1,107	$238,981	$21,557	$56,790	$670,504

EXPORTED TO—	Belting Value	Hose Value	Packing Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Soles and Heels Value	Automobile Tires: Casings Value	Automobile Tires: Inner Tubes Value	Automobile Tires: Solid Tires Value	Automobile Tires: All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
ASIA:																
Aden	....	....	....	....	....	....	....	....	$2.520	$300	....	....	....	....	....	$2,820
China	....	$6,435	$2,520	....	....	7,179	$7,422	$44	13,304	635	....	$200	$74,286	$4,559	$12,546	121,951
Kwantung, leased territory	....	58	....	....	....	216	277	....	....	....	....	....	....	280	....	615
Chosen	....	....	33	....	....	168	138	....	1,918	562	....	....	....	33	....	2,684
British India	$1,666	7,842	1,045	24	$73	578	1,255	26	26,949	6,432	$18,332	2,515	55,785	2,646	1,781	126,347
Straits Settlements	990	80	....	....	....	1,122	1,729	....	31	....	3,475	....	1,513	1,416	435	9,669
Other British East Indies	....	....	....	....	....	....	....	....	....	....	445	....	....	....	121	566
Dutch East Indies	1,406	12,469	276	12	43	503	806	....	67,312	6,167	6,657	899	14,452	1,288	7,743	119,518
Hongkong	....	23	....	48	144	954	1,080	....	3,131	....	102	....	23	198	11,002	15,703
Japan	1,220	2,586	5,297	255	773	13,504	19,322	....	3,996	1,000	500	....	11,327	18	28,565	74,704
Siam	261	....	....	....	....	192	240	....	220	20	....	....	....	627	....	1,368
Turkey in Asia	....	....	....	....	....	104	138	196	31,836	3,043	408	....	179	83	827	36,710
TOTALS, ASIA	$5,543	$29,493	$9,271	339	$1,033	24,520	$32,407	$266	$151,217	$18,159	$29,919	$3.614	$157,565	$11,148	$63,020	$512,655
AFRICA:																
British West Africa	....	....	....	....	....	....	....	$613	$52,506	$7,023	....	....	....	$23	$73	$60,238
British South Africa	$45,538	$39,375	$4,800	644	$3,096	1,114	$1,828	....	17,969	4,235	$1,730	....	$12,307	2,521	18,045	151,444
British East Africa	....	104	....	....	....	....	....	....	3,579	527	226	....	254	....	2,072	6,762
Canary Islands	....	....	....	....	....	....	....	....	3,107	25	....	....	....	51	16	3,199
French Africa	....	....	....	....	....	....	....	....	70	9	....	$296	....	....	....	375
Kamerun, etc.	....	....	....	....	....	15	30	....	....	....	....	....	....	....	....	30
Portuguese Africa	....	....	656	....	....	....	....	247	....	....	50	....	....	....	150	1,103
Egypt	....	910	....	....	....	....	....	....	2,369	32	....	....	171	229	1,941	5,652
TOTALS, AFRICA	$45.538	$40,389	$5,456	644	$3,096	1,129	$1,858	$860	$79,600	$11,851	$2.006	$296	$12,732	$2,824	$22,297	$228,803
GRAND TOTALS	$182,471	$369,210	$96.581	7,533	$28,247	207,917	$246,603	$75,440	$1,248,540	$140,115	$110,724	$39.993	$1,123,873	$106,096	$532,638	$4,300,531

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORY OF THE UNITED STATES

	Belting, Hose and Packing Value	Boots and Shoes Pairs	Boots and Shoes Value	Tires: Automobile Value	Tires: All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
Hawaii	$9,653	....	....	$114,638	$1,584	......	......	$9,213	$135,088
Porto Rico	2,841	....	....	6,490	362	......	......	4,845	14,538
TOTALS	$12,494	....	....	$121,128	$1,946	......	......	$14,058	$149,626

Compiled by the Bureau of Foreign Commerce, Department of Commerce, Washington, D. C.

OFFICIAL INDIA RUBBER STATISTICS FOR THE UNITED STATES

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	February 1920 Pounds	February 1920 Value	February 1921 Pounds	February 1921 Value
UNMANUFACTURED—*free:*				
India rubber:				
From France	827,307	$243,229	....	....
Netherlands	2,586,622	1,123,583	360,640	$74,928
Portugal	220,462	44,000	....	....
United Kingdom	15,639,792	7,431,553	66,981	11,303
Canada	9,820	4,630	....	....
Central America	7,312	2,336	1,609	384
Mexico	125,716	50,065	....	....
Brazil	3,807,367	1,177,767	1,147,121	210,290
Peru	1,722,297	557,203	....	....
Other South Am.	519,485	155,812	28,132	12,757
British E. Indies	42,982,996	18,823,383	17,081,824	5,510,998
Dutch E. Indies	2,429,197	874,662	3,217,698	1,054,815
Other countries	476,531	158,312	29,160	10,202
Totals	71,354,904	$30,646,535	21,933,165	$6,885,677
Balata	328,325	$184,304	187,356	$114,432
Guayule	40,020	12,006	55,150	11,941
Jelutong (Pontianak)	1,292,316	156,414	378,565	49,260
Gutta percha	252,215	52,629	251,611	42,406
Rubber scrap	1,327,957	92,215	277,849	13,733
Totals, unmanufactured	74,595,737	$31,144,103	23,083,696	$7,117,449
Chicle (dutiable)	744,925	$596,143	956,209	$474,545
India rubber and gutta percha	....	58,070	....	65,009
India rubber substitutes	51,200	8,842	796	250

EXPORTS OF DOMESTIC MERCHANDISE

	February 1920 Pounds	February 1920 Value	February 1921 Pounds	February 1921 Value
MANUFACTURED—				
India rubber:				
Scrap and old	1,446,414	$100,129	795,187	$47,005
Reclaimed	409,642	67,451	60,493	8,810
Belting[1]	....	170,299	....	182,471
Hose[1]	....	272,348	....	369,210
Packing[1]	....	105,047	....	96,581
Boots[1] ....pairs	39,933	139,224	7,533	28,247
Shoes[1] ....pairs	1,019,959	866,483	207,917	246,603
Soles and heels[1]	....	64,848	....	75,440
Tires:				
Casings[1]	....	3,849,706	....	1,248,540
Inner tubes[1]	....	214,311	....	140,115
Solid tires[1]	....	213,952	....	110,724
All other tires[1]	....	58,667	....	39,993
Druggists' rubber sundries[1]	....	121,400	....	106,096
Suspenders and garters	....	283,267	....	71,534
Other rubber manufacturers[1]	....	610,247	....	532,638
Totals, manufactured	....	$7,136,779	....	$3,304,007
Fountain pens....*number*	20,458	$17,022	35,959	$56,153
Insulated wire and cables	....	567,036	....	1,123,873

EXPORTS OF FOREIGN MERCHANDISE

	February 1920 Pounds	February 1920 Value	February 1921 Pounds	February 1921 Value
UNMANUFACTURED—				
India rubber	144,575	$60,270	722,789	$134,738
Balata	34,000	19,135	82,163	29,391
Jelutong (Pontianak)	60,454	9,015	....	....
Rubber scrap	3,099	300	....	....
Totals, unmanufactured	242,128	$88,720	804,952	$164,129
MANUFACTURED—				
Gutta percha and India rubber	....	$1,369	....	$12,051
India rubber substitutes	14,540	10,553	....	....
Totals, manufactured	....	$11,922	....	$12,051

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES

	February 1920 Pounds	February 1920 Value	February 1921 Pounds	February 1921 Value
MANUFACTURED—				
To Alaska:				
Belting, hose and packing	....	$5,461	....	$12,990
Boots and shoes..*pairs*	3,154	8,611	3,820	7,973
Other rubber goods	....	5,345	....	3,103
Totals	....	$19,417	....	$24,066
To Hawaii:				
Belting, hose and packing	....	$7,031	....	$9,653
Automobile tires	....	44,259	....	114,638
Other tires	....	502	....	1,584
Other rubber goods	....	4,902	....	9,213
Totals	....	$56,694	....	$135,088
To Porto Rico:				
Belting, hose and packing	....	$9,080	....	$2,841
Automobile tires	....	47,318	....	6,490
Other tires	....	7,539	....	362
Other rubber goods	....	21,388	....	4,845
Totals	....	$85,325	....	$14,538

[1]Details of exports of domestic merchandise by countries during February, 1921, appear in this issue.

RUBBER STATISTICS FOR THE DOMINION OF CANADA

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	January			
	1920		1921	
	Pounds	Value	Pounds	Value
UNMANUFACTURED—*free:*				
Rubber, gutta percha, etc.:				
From United Kingdom	855,876	$478,333	246,056	$76,828
United States	859,030	413,566	965,233	219,515
British East Indies:				
Ceylon	......	......	112,010	31,633
Straits Settlements	532,437	275,751	440,345	103,686
Other countries	2,421	997	....	....
Totals	2,249,764	$1,168,647	1,763,644	$431,662
Rubber, recovered	165,197	$27,836	129,736	21,630
Rubber, powdered, and rubber or gutta percha scrap	105,582	11,376	17,723	1,396
Rubber substitutes	183,429	21,715	134,888	23,099
Totals, unmanufactured	2,703,972	$1,229,574	2,045,991	$477,787
PARTLY MANUFACTURED—				
Hard rubber sheets and rods	6,741	$6,266	7,581	$3,662
Hard rubber tubes	......	3,726	......	1,812
Rubber thread, not covered	5,683	8,382	131	185
Totals, partly manufactured	12,424	$18,374	7,712	$5,659
MANUFACTURED—				
Belting	......	$12,218	......	$14,979
Hose	......	7,963	......	14,478
Packing	......	7,254	......	6,741
Boots and shoes	......	28,765	......	3,341
Clothing, including waterproofed	......	23,579	......	16,562
Gloves	......	933	......	1,919
Hot water bottles	......	3,077	......	1,908
Tires, solid	......	29,636	......	23,188
Tires, pneumatic	......	61,466	......	90,316
Tires, inner tubes	......	889	......	13,802
Elastic, round or flat	......	49,258	......	18,677
Mats and matting	......	465	......	117
Cement	......	5,986	......	2,060
Other rubber manufactures	......	116,740	......	113,425
Totals, manufactured	......	$348,229	......	$321,513
Totals, rubber imports	2,716,396	$1,596,177	2,053,703	$804,959
Insulated wire and cables:				
Wire and cables covered with cotton, linen, silk, rubber, etc.	....	$13,857	....	$8,609
Copper wire and cables, covered as above	......	17,643	......	23,240
Chicle	31,426	9,222	......	......
Fillets	......	......	......	369
Webbing	......	60,539	......	15,660
Fountain pens	......	2,699	......	2,156

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS

	January			
	1920		1921	
	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
UNMANUFACTURED—				
Crude and waste rubber	$19,989	$53	$720	....
MANUFACTURED—				
Belting	$256	......	$16,046	......
Hose	26,858	......	34,110	......
Boots and shoes	238,708	272	233,327	$382
Clothing, including waterproofed	2,194	......	376	818
Tires, pneumatic	891,728	......	348,307	......
Tires	21,437	8,963	8,047	23,096
Other manufactures	21,842	4,067	68,870	3,660
Totals, manufactured	$1,203,023	$13,302	$709,083	$27,956
Totals, rubber exports	$1,223,012	$13,355	$709,803	$27,956
Insulated wire and cable:				
Copper wire and cable	$33,788	......	$64,542	......
Chicle	108,527	......	......	......

RUBBER STATISTICS FOR THE DOMINION OF CANADA

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	February			
	1920		1921	
	Pounds	Value	Pounds	Value
UNMANUFACTURED—*free:*				
Rubber, gutta percha, etc.:				
From United Kingdom	1,536,109	$897,511	26,902	$3,707
United States	616,546	324,054	782,934	151,015
Belgian Congo	59,035	21,947	......	......
Brazil	......	......	72,908	12,659
British East Indies:				
Ceylon	224,000	123,703	......	......
Straits Settlements	1,041,692	484,290	903,500	223,679
Dutch East Indies	114	57	......	......
Other countries	13,262	9,056	......	......
Totals	3,490,758	$1,860,618	1,786,244	$391,060
Rubber, recovered	422,442	75,010	12,223	2,148
Rubber, powdered and rubber or gutta percha scrap	67,511	5,634	187,985	19,924
Rubber substitute	158,505	20,021	64,961	16,597
Totals, unmanufactured	4,139,216	$1,961,283	2,051,413	$429,729
PARTLY MANUFACTURED—				
Hard rubber sheets and rods	5,419	$3,307	12,896	$11,659
Hard rubber tubes	......	1,845	......	1,346
Rubber thread, not covered	5,382	7,950	197	257
Totals, partly manufactured	10,801	$13,102	13,093	$13,262
MANUFACTURED—				
Belting	......	$12,633	......	$9,283
Hose	......	7,718	......	8,630
Packing	......	6,496	......	3,889
Boots and shoes	......	31,992	......	7,285
Clothing, including waterproofed	......	30,977	......	18,873
Gloves	......	754	......	1,874
Hot water bottles	......	495	......	2,319
Tires, solid	......	7,237	......	8,501
Tires, pneumatic	......	412,765	......	236,442
Tires, inner tubes	......	40,050	......	17,668
Elastic, round or flat	......	29,453	......	24,857
Mats and matting	......	281	......	296
Cement	......	8,392	......	1,907
Other rubber manufactures	......	120,830	......	102,332
Totals, manufactured	......	$710,073	......	$444,156
Totals, rubber imports	4,150,017	$2,684,458	2,064,506	$887,147
Insulated wire and cables:				
Wire and cables covered with cotton, linen, silk, rubber etc.	......	$10,761	......	$5,905
Copper wire and cables, covered as above	......	18,469	......	20,077
Chicle	137,455	114,918	90,794	51,925
Fillets	......	6,829	......	47
Webbing	......	39,560	......	9,095
Fountain pens	......	1,144	......	1,099

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS

	February			
	1920		1921	
	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
UNMANUFACTURED—				
Crude and waste rubber	$41,484	$25	$3,663	......
MANUFACTURED—				
Belting	1,354	......	8,097	......
Hose	12,993	......	13,090	......
Boots and shoes	93,079	126	79,359	$1,228
Clothing, including waterproofed	616	9	4,116	......
Tires, pneumatic	822,316	......	166,532	......
Tires	626	3,354	7,978	102
Other manufactures	17,238	1,850	20,209	4,549
Totals, manufactured	$948,222	$5,339	$299,381	$5,879
Totals, rubber exports	$989,706	$5,364	$303,044	$5,879
Insulated wire and cable:				
Copper wire and cable	$438	......	$91,207	......

A LIGHT CAR WEIGHING 1,750 POUNDS AND TRAVELING 25 MILES per hour, covers 2,200 feet per minute and moves with a force of nearly 4,000,000 foot pounds. A heavy car weighing 5,300 pounds and going at 40 miles per hour, travels 3,520 feet per minute, moving with a force in excess of 18,500,000 foot pounds. Tire testing experts say the force of road shocks runs into the millions. Load the car with passengers or increase the speed and you increase these forces millions more. To stand such strains, a standard make five-inch cord tire has 20 to 26 cords per inch. Though each cord has a strength of fifteen pounds, there are eight plies or layers of these cords. This gives the five-inch tire a strength in fabric carcass alone of 2,400 to 3,000 pounds to the square inch, irrespective of strength given by other parts.—Miller News Service.

UNITED KINGDOM RUBBER STATISTICS

IMPORTS

	February 1920		February 1921	
	Pounds	Value	Pounds	Value
Unmanufactured—				
Crude rubber:				
From—				
Straits Settlements	6,252,100	£793,729	4,631,200	£251,928
Federated Malay States	7,557,000	936,944	4,705,900	270,635
British India	1,224,500	154,368	1,262,500	71,610
Ceylon and dependencies	4,105,500	506,041	3,648,300	204,014
Other Dutch possessions in Indian Seas	949,000	122,439	635,500	35,749
Dutch East Indies (except other Dutch possessions in Indian Seas)	735,900	99,103	1,972,600	107,126
Other countries in East Indies and Pacific, not elsewhere specified	397,500	49,582	387,900	19,872
Brazil	3,400	300	432,900	16,706
Peru	....	....	7,900	433
South and Central America (except Brazil and Peru)	36,100	4,034	72,800	3,780
West Africa:				
French West Africa	12,300	1,342	....	....
Gold Coast	3,300	240	2,800	159
Other parts of West Africa	198,600	14,870	55,300	2,688
East Africa (including Madagascar)	17,600	2,045	45,100	2,410
Other countries	115,800	13,990	77,400	4,261
Totals	21,608,600	£2,699,027	17,938,100	£991,362
Waste and reclaimed rubber	1,206,900	18,857	36,300	528
Totals unmanufactured	22,815,500	£2,717,884	17,974,400	£991,890
Gutta percha and balata	849,400	£153,513	855,600	£155,507
Rubber substitutes	76,900	3,012	22,700	620
Manufactured—				
Boots and shoes...*dozen pairs*	19,035	£44,045	9,193	£17,471
Waterproof clothing	....	1,620	....	376
Insulated wire	....	965	....	3,607
Tires and tubes	....	496,511	....	213,264
Other rubber manufactures	....	53,985	....	63,557

EXPORTS

	February 1920		February 1921	
	Pounds	Value	Pounds	Value
Unmanufactured—				
Waste and reclaimed rubber	751,800	£24,573	504,600	£16,667
Rubber substitutes	236,500	11,223	25,900	1,645
Totals	988,300	£35,796	530,500	£18,312
Manufactured—				
Boots and shoes...*dozen pairs*	15,017	£31,577	11,674	£23,654
Waterproof clothing	....	199,560	....	70,946
Insulated wire	....	100,130	....	143,780
Submarine cables	....	39,814	....	106,752
Tires and tubes	....	445,099	....	167,473
Other rubber manufactures	....	294,292	....	200,138

EXPORTS—COLONIAL AND FOREIGN

	February 1920		February 1921	
	Pounds	Value	Pounds	Value
Unmanufactured—				
Crude rubber:				
To Russia	34,000	£4,255	....	....
Sweden, Norway and Denmark	201,000	24,094	324,000	16,741
Germany	226,100	26,061	1,207,400	58,835
Belgium	720,100	82,657	155,500	8,856
France	1,800,900	239,870	499,800	30,264
Spain	6,500	750	34,300	1,859
Italy	559,300	72,521	100,000	5,879
Austria-Hungary	....	....	567,600	29,544
Other European countries	85,300	11,000	585,300	22,649
United States	7,611,500	983,670	300,500	17,173
Canada	638,100	82,708	....	....
Other countries	138,700	16,345	15,600	909
Totals, rubber	12,021,500	£1,543,931	3,790,000	£192,709
Waste and reclaimed rubber	18,800	£425	....	....
Gutta percha and balata	95,100	19,282	83,200	£15,986
Rubber substitutes	3,100	140	12,700	325
Manufactured—				
Boots and shoes...*dozen pairs*	4	£48	14	£47
Waterproof clothing	....	12	....	....
Tires and tubes	....	4,741	....	40,821
Other manufactures	....	2,714	....	1,771
Totals, manufactured	....	£7,515	....	£42,639

UNITED KINGDOM RUBBER STATISTICS

IMPORTS

	March 1920		March 1921	
	Pounds	Value	Pounds	Value
Unmanufactured—				
Crude rubber:				
From—				
Straits Settlements	4,765,800	£596,000	4,958,100	£267,451
Federated Malay States	5,586,300	688,412	5,326,400	303,988
British India	1,345,500	167,229	1,480,200	84,348
Ceylon and dependencies	3,943,200	461,460	4,318,200	233,970
Other Dutch possessions in Indian Seas	708,400	85,934	584,800	33,841
Dutch East Indies (except other Dutch possessions in Indian Seas)	67,400	7,836	2,374,900	134,754
Other countries in East Indies and Pacific, not elsewhere specified	186,400	23,439	215,400	11,041
Brazil	3,492,400	418,040	766,100	34,668
Peru	12,600	1,395	......	......
South and Central America (except Brazil and Peru)	11,200	1,200	11,200	560
West Africa:				
French West Africa	52,600	4,380	5,000	250
Gold Coast	47,400	5,766	32,200	1,699
Other parts of W. Africa	97,500	9,721	24,300	1,262
East Africa, including Madagascar	72,400	8,635	2,200	115
Other countries	241,000	18,428	69,400	3,229
Totals	20,630,100	£2,497,875	20,168,400	£1,111,176
Waste and reclaimed rubber	536,900	13,174	152,500	3,432
Totals, unmanufactured	21,167,000	£2,511,049	20,320,900	£1,114,608
Gutta percha and balata	657,500	£115,982	328,200	£55,679
Rubber substitutes	166,200	7,210	15,100	682
Manufactured—				
Boots and shoes..*dozen pairs*	30,484	£82,076	5,004	£15,039
Waterproof clothing	......	3,156	.....	288
Insulated wire	......	666	......	1,684
Submarine cables	......	50	......	......
Tires and tubes	......	351,724	......	267,910
Other rubber manufactures	......	55,321	......	65,928

EXPORTS

	March 1920		March 1921	
	Pounds	Value	Pounds	Value
Unmanufactured—				
Waste and reclaimed rubber	1,309,900	£27,497	380,800	£6,567
Rubber substitutes	504,800	32,180	64,000	1,791
Totals	1,814,700	£59,677	444,800	£8,358
Manufactured—				
Boots and shoes..*dozen pairs*	7,661	£16,685	7,789	£17,574
Waterproof clothing	......	256,145	......	74,946
Insulated wire	......	130,499	......	164,576
Submarine cables	......	303,406	......	86,682
Tires and tubes	......	590,002	......	244,395
Other rubber manufactures	......	486,516	......	207,045

EXPORTS—COLONIAL AND FOREIGN

	March 1920		March 1921	
	Pounds	Value	Pounds	Value
Unmanufactured—				
Crude rubber:				
To Sweden, Norway, Denmark	141,900	£17,347	51,800	£2,664
Germany	619,100	75,530	701,200	29,916
Belgium	560,800	68,517	52,700	3,828
France	4,408,600	576,609	1,036,100	50,049
Spain	11,200	1,631	53,700	3,240
Italy	1,045,900	130,004	128,800	6,634
Austria-Hungary	22,400	3,555	237,100	13,078
Other European countries	17,900	2,401	88,000	3,534
United States	12,286,000	1,630,407	2,238,500	95,823
Canada	666,500	90,317	......	......
Other countries	135,300	17,612	3,400	209
Totals	19,915,600	£2,613,930	4,591,300	£208,975
Waste and reclaimed rubber	1,000	37	......	......
Totals, unmanufactured	19,916,600	£2,613,967	4,591,300	£208,975
Gutta percha and balata	181,800	£35,351	63,000	£12,263
Manufactured—				
Boots and shoes..*dozen pairs*	60	£245	165	£427
Waterproof clothing	......	......	......	27
Insulated wire	......	......	......	200
Tires and tubes	......	17,362	......	22,401
Other manufactures	......	5,002	......	1,457

KOKOMO "EVERLASTER TWIN-GRIP" FABRIC CASINGS

The Kokomo long-life fabric tires now have the "Everlaster Twin-Grip" tread that was adopted last year on Kokomo bicycle tires and automobile cord tires, and described in The India Rubber World, February 1 and May 1, 1920. Their thick side-walls protect against rut cuts; accurate bead construction avoids rim chafing and wearing friction; and the rubber cushioning between the fabric layers is the seat of plaint strength. The tread owes its favor to a center rib which resists skidding forces. It thus combines the light-running, easy-steering qualities of ribbed tread tires with the protection offered car and driver by non-skid casings. All Kokomo tires now have black treads and Kokomo cords are plainly designated by a red shield on their gray walls.—Kokomo Rubber Co., Kokomo, Indiana.

RUBBER STATISTICS FOR ITALY

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	Eleven Months Ended November			
	1919		1920	
Unmanufactured—	Quintals[1]	Lire[2]	Quintals	Lire
Crude rubber and gutta percha—raw and reclaimed:				
From Great Britain	132		950	
French Asian Colonies	659		2,075	
India and Ceylon	24,563		7,299	
Straits Settlements	43,996		37,115	
French African Colonies	3,977	97,489,950	1,357	61,286,400
Belgian Congo	1,033		2,064	
Brazil	27,344		10,449	
Other countries	917		3,202	
Totals	102,621	97,489,950	64,511	61,286,400
Rubber scrap	14,700	2,105,000	247	37,050
Totals, unmanufacturer	117,321	99,594,950	64,758	61,323,450
Manufactured—				
India rubber and gutta percha—				
Threads	207	600,300	370	1,073,000
Sheets, including hard rubber	121	238,300	268	508,509
Tubes	218	318,350	193	365,750
Belting	561	925,650	764	1,260,600
Rubber-coated fabrics in pieces	434	916,000	789	1,569,400
Boots and shoes ... *pairs*	52,235	1,044,700	167,411	3,348,220
Elastic webbing	292	992,800	655	2,227,000
Clothing and articles for travel	9	36,000	189	756,000
Tires and tubes—				
From Belgium	74		828	
France	3,987		5,040	
Great Britain	1,214	15,041,600	8,246	43,512,000
United States	90		1,385	
Other countries	7		41	
Other manufactures	13,894	26,027,400	15,184	35,938,400
Totals, manufactured	......	46,141,100	......	90,558,870
Total imports	......	145,736,050	......	151,882,320

EXPORTS OF CRUDE AND MANUFACTURED RUBBER

	Quintals 1919	Lire 1919	Quintals 1920	Lire 1920
Unmanufactured—				
India rubber and gutta percha—raw and reclaimed:				
To Austria	......		543	
Spain	2,140	2,109,500	797	2,742,000
United States	2,078		3,600	
Other countries	1		544	
Totals	4,219	2,109,500	5,484	2,742,000
Waste	4,201	840,200	8,298	1,659,600
Totals, unmanufactured	8,420	2,949,700	13,782	4,401,600
Manufactured—				
India rubber and gutta percha—				
Threads	480	1,488,000	356	1,103,600
Sheets, including hard rubber	87	185,600	305	572,000
Tubes	842	1,185,350	1,995	2,591,250
Belting	95	199,500	....	....
Rubber-coated fabrics in pieces	255	766,500	524	1,583,200
Boots and shoes ... *pairs*	6,064	121,280	587	11,740
Other	....	....	2	3,000
Elastic webbing	808	3,070,400	1,263	4,799,400
Clothing and articles for travel	42	210,000	865	4,325,000
Tires and tubes:				
To Austria	862		3,367	
Belgium	1,306		2,380	
Czecho-Slovakia	452		1,174	
Denmark	342		1,455	
France	1,041		2,131	
Great Britain	6,254		10,579	
Netherlands	224		535	
Roumania	150		1,374	
Spain	610		1,412	
Switzerland	1,779	47,487,500	730	120,772,500
Hungary	....		264	
India and Ceylon	944		4,928	
Dutch East Indies	344		2,394	
Straits Settlements	198		2,853	
Australia	507		1,079	
Argentina	1,531		3,400	
Brazil	1,055		2,898	
Other countries	1,396		5,326	
Other manufactures	3,959	7,338,400	13,255	24,428,000
Totals, manufactured	....	62,052,530	....	160,189,690
Total exports	....	65,002,230	....	164,591,290

[1]One quintal equals 220.46 pounds.
[2]One lira equals \$0.193 (normal).

THE MARKET FOR RUBBER SCRAP

NEW YORK

The rubber scrap market is essentially stagnant. There is a small amount of business, mainly in boots and shoes, for the current needs of reclaimers. The continued low prices for crude rubber, high freight rates and the general slackness of industry have eliminated to the vanishing point the demand for rubber scrap.

Exports of rubber scrap for the nine months ended March, 1921, total only one-half those for the same period of 1920, although double those for the same months of 1919.

QUOTATIONS FOR CARLOAD LOTS DELIVERED

May 24, 1921

Prices subject to change without notice

BOOTS AND SHOES				
Arctic tops	*lb.*	*0.075	@	
Boots and shoes	*lb.*	*.03½	@	.04
Trimmed arctics	*lb.*	*.02¾	@	.03
Untrimmed arctics	*lb.*	*.02	@	.02¼
HARD RUBBER				
Battery jars, black compound	*lb.*	*.07½	@	.01
No. 1, bright fracture	*lb.*	.12	@	.15
INNER TUBES				
No. 1	*lb.*	.06	@	.06½
Compounded	*lb.*	.04¼	@	.04½
Red	*lb.*	.04¼	@	.04¾
MECHANICALS				
Black scrap, mixed, No. 1	*lb.*	*.02¼	@	.03
No. 2	*lb.*	*.01½	@	.02
Car springs	*lb.*	*.02½	@	.03
Heels	*lb.*	*.02½	@	.03
Horse-shoe pads	*lb.*	*.02½	@	.03
Hose, air brake	*lb.*	*.01	@	.01½
fire, cotton lined	*lb.*	*.01	@	
garden	*lb.*	.07	@	.01
Insulated wire stripping, free from fiber	*lb.*	*.01½	@	.02
Matting	*lb.*	*.01	@	
Red packing	*lb.*	*.04½	@	.05
Red scrap, No. 1	*lb.*	*.07	@	.08
No. 2	*lb.*	*.05½	@	.06
White scrap, No. 1	*lb.*	*.07	@	.07½
No. 2	*lb.*	*.06	@	.06½
TIRES				
PNEUMATIC—				
Auto peelings	*lb.*	.02	@	.02¼
Bicycle	*lb.*	*.01½	@	.02
Standard white auto	*lb*	*.02¼	@	.02¾
Mixed auto	*lb.*	*.01	@	.01½
Stripped, unguaranteed	*lb*	*.01	@	.01½
White, G. & G., M. & W., and U. S.	*lb.*	*.02¾	@	
SOLID—				
Carriage	*lb.*	*.02¼	@	.02¾
Irony	*lb.*		@	
Truck, clean	*lb.*	*.01½	@	.02

*Nominal.

THE MARKET FOR COTTON AND OTHER FABRICS

NEW YORK

American Cotton. Early in the month the spot market for middling upland cotton took an upward tendency of 50 points, rising on May 2 from 12.40 to 12.90. Steady rise followed, except for a slight drop on the fifth, until 13.05 was reached on the twelfth. Since that time spot prices have fluctuated at somewhat lower levels until 12.50 had been reached on May 24, only 10 points above the starting point of the month. Trade continues very quiet.

Egyptian Cotton. Prices have been relatively weak for Egyptian cotton, due largely to lack of demand in the Alexandria market which is now being affected quite as much by the coal situation in England as by the limited buying here.

Crop advices from Egypt continue to be unsatisfactory. The crop there is having a very late start, which will increase its susceptibility to worm attack. There is much fear that damage from this cause may be very heavy this year, owing to the lifting of the government decree that ginning shall cease after May 1.

Arizona Cotton. Arizona Pima prices are steady. Demand is very small although spinners are showing a good deal of interest

in prices, not only in Arizona cotton but in Egyptian as well. There is a very heavy cut in acreage in Arizona and the crop is expected to amount to less than half that grown last season. However, unless there should be a very radical change in the mill situation there should be ample extra-staple cotton to meet the world's needs for another year at least.

Mechanical Ducks and Drills. The market is slowly but certainly improving in breadth of demand with a better tone generally. The trade is looking forward to an approximately normal market on these fabrics in the late summer or the early autumn.

Raincoat Fabrics. The interest in these materials has been very quiet during the past month and prices are practically unchanged from a month ago.

Sheetings. There is a small improvement in this market since last month. Buyers are taking care of their requirements for thirty to sixty days principally on light-weight sheetings. The heavier numbers are moving slowly.

Tire Fabrics. The demand for tire fabrics seems to be increasing in volume. Each month additional tire manufacturers use up their stocks on hand and come into the market, either for new purchases or for delivery on old purchases; thus there is a materially better interest in tire fabrics. This growth in demand is expected to continue through the summer and well into the autumn, when the tire manufacturing output naturally decreases.

NEW YORK QUOTATIONS

May 24, 1921

Prices subject to change without notice

BURLAPS				
32—7-ounce	100 yards	*$3.50	@	
32—8-ounce		*3.50	@	
40—7½-ounce		*4.00	@	
40—8-ounce		*4.00	@	
40—10-ounce		*4.50	@	
40—10½-ounce		*4.50	@	
45—7½-ounce		*4.50	@	
45—8-ounce		*4.50	@	
45—10-ounce		*5.00	@	
DRILLS				
38-inch 2.00-yard	yard	.13	@	
40-inch 3.47-yard		.07⅞	@	
52-inch 1.90-yard		.15⅞	@	
52-inch 1.95-yard		.15¾	@	
60-inch 1.52-yard		.19⅞	@	
DUCK				
CARRIAGE CLOTH				
38-inch 2.00-yard enameling duck	yard	.14½	@	
30-inch 1.74-yard		.16¾	@	
72-inch 16.66 ounce		.34⅛	@	
72-inch 17.21-ounce		.35½	@	
MECHANICAL				
Hose	pound	.26	@	
Belting		.26	@	
HOLLANDS, 40-INCH				
Acme	yard	.21	@	
Endurance		.24	@	
Penn		.29	@	
Piece goods, 40-inch		.22	@	
Piece goods, 36-inch		.19	@	
RAINCOAT FABRICS				
COTTON				
Bombazine 64 x 60	yard	.12½	@	
60 x 48		.11½	@	
Cashmeres, cotton and wool, 36-inch, tan		.67½	@	
Twills 64 x 72		.10	@	.12
60 x 102		.16	@	
Twill, mercerized, 36-inch, blue and black		.27½	@	
tan and olive		.25	@	
Tweed		.40	@	1.00
printed		.18	@	
Plaids 60 x 48	yard	.10	@	
56 x 44		.11	@	
Repp		.25	@	
Prints 60 x 48		.13	@	
64 x 60		.14	@	
IMPORTED WOOLEN FABRICS SPECIALLY PREPARED FOR RUBBERIZING—PLAIN AND FANCIES				
63-inch, 3¼ to 7½ ounces	yard	1.00	@	2.50
36-inch, 2¾ to 5 ounces		.60	@	1.50
IMPORTED PLAID LINING (UNION AND COTTON)				
63-inch, 3½ to 7 ounces	yard	.60	@	1.37½
36 inch, 2 to 4 ounces		.37½	@	.80

*Nominal.

SHEETINGS, 40-INCH				
48 x 48, 2.35-yard	yard		@	
48 x 48, 2.50-yard		$0.10	@	
48 x 48, 2.85-yard		.08¼	@	
64 x 68, 3.15-yard		.09¼	@	
56 x 60, 3.60-yard		.08¼	@	
48 x 44, 3.75-yard		.07½	@	
SILKS				
Canton, 38-inch	yard	.27½	@	
Schappe, 36-inch		.42½	@	
STOCKINETTES				
SINGLE THREAD				
3½ Peeler, carded	pound		@	
4½ Peeler, carded			@	
6½ Peeler, combed			@	
DOUBLE THREAD				
Zero Peeler, carded	pound		@	
3½ Peeler, carded			@	
6½ Peeler, combed			@	
TIRE FABRICS				
BUILDING				
17¼-ounce Sakellarides, combed	pound	.90	@	1.05
17¼-ounce Egyptian, combed		.80	@	.85
17¼-ounce Egpytian, carded		.75	@	
17¼-ounce Peeler, combed		.80	@	.82
17¼-ounce Peeler, carded		.55	@	.60
CORD				
15-ounce Egyptian	pound	.95	@	
BICYCLE				
8-ounce American	pound	.70	@	.80
10-ounce American		.70	@	.80
CHAFER				
9¼-ounce Sea Island	pound	1.00	@	
9¼-ounce Egyptian, carded		.80	@	.90
9¼-ounce Peeler, carded		.70	@	.80

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS

NEW YORK

The market for chemicals and compounding ingredients continues to share the general improvement noticeable in industrial lines. The very low-priced materials like barytes and whiting are meeting a very serious obstacle to their free movement in the high freight rates which prevail. Bills to protect the barytes, barium products and lead industries are being urged in Washington, owing to dumping of foreign competitive products.

The situation of domestic barytes is particularly difficult between high freight rates and the threatened invasion of importations from German sources.

Aniline Oil. The market is unsettled and weak. Prices have ruled from 20 to 26 cents a pound with distressed lots at 18 cents.

Barytes. Prices rule very low. The market is quiet and movement of the domestic product very restricted on account of oppressive freight charges.

Benzol. Spot stocks of both pure and 90 per cent have been light during the last month. The 90 per cent is going into consumption extensively as a source of motor fuel. The demand for both grades is good, with 90 per cent at 25 to 31 cents a gallon and the pure at 27 to 36 cents.

Blanc Fixe. The same influences prevail to stagnate the movement of this material as in the case of barytes, consequently the market is very dull.

Blue Lead. The rubber trade is somewhat interested in restocking with blue lead in moderate quantities. The material is in fairly good demand at 7½ to 8 cents a pound.

Carbon Black. Early in the month the ruling price was 12 cents with demand improving, followed shortly by reduction of price to 10 cents to stimulate the demand from tire manufacturers which met with some success. At present, however, the demand is rather routine.

Carbon Bisulphide. The demand outside the rubber trade was active early in the month, succeeded by increased call from the latter trade with continuing interest to date.

Carbon Tetrachloride. Normal demand at 12 cents was succeeded by fair call at 6 to 7½ cents a pound. The month closed with supplies in large volume quoted at 11½ to 12½ cents.

China Clay. Market conditions were marked by generally light demand. Freight rates are very much against the free movement of domestic stocks.

Dry Colors. A steady improvement has been noted in most colors. Owing to the quiet condition of the market there has been a tendency to lower prices to stimulate trade conditions.

Litharge. The trade in this material has been steady routine business with mild interest only on the part of rubber manufacturers. Early in May a reduction of ½-cent a pound was made and demand improved at the new quotations of 9½ to 10 cents a pound.

Lithopone. This is the one item on which good business can be reported. Producers are running their plants to capacity. Prices have ruled steady the entire month at 7 cents a pound for lithopone in bags. Manufacturers of tires are said to have been seeking supplies.

Solvent Naphtha. Available supplies are heavy, with demand light. Quotations range from 25 to 30 cents a gallon.

Sublimed Lead. Much the same conditions prevail as in the case of litharge. The demand is inactive. Quotations at 7¼ to 8¼ cents a pound.

Sulphur. The market for commercial flour ranged through dull, from good to routine, where it stands at present.

Talc. There is little interest, supplies light and demand stagnant.

Tar. Pine tar, both kiln and retort, is quoted at $12.50 a barrel with little interest.

Whiting. Chalk whiting is meeting vigorous competition from the by-product variety and prices have been reduced from 5 to 10 cents a 100 pounds in consequence. The demand has fallen off to routine requirements.

Zinc Oxide. Producers are operating at reduced capacity and prices continue unchanged. Some rubber and tire trade orders are appearing and steady improvement rules. The consumption of the rubber trade is said to total 70 per cent of the domestic production.

NEW YORK QUOTATIONS

May 24, 1921

Prices subject to change without notice

ACCELERATORS, ORGANIC				
Accelerene (f. o. b. English port)	*lb.*	13*s.*	@	
Accelemal	*lb.*	$0.60	@	.65
Adco	*lb.*	.75	@	
Aldehyde ammonia crystals	*lb.*	1.00	@	1.05
Aniline oil	*lb.*	.20	@	.30
Excellerex	*lb.*	.65	@	.75
Formaldehyde aniline	*lb.*	.60	@	.65
Hexamethylene tetramine	*lb.*	1.00	@	1.05
Lead oleate	*lb.*	.20	@	
N. C. C.	*lb.*		@	
No. 999	*lb.*	.13½	@	
Paradin	*lb.*	.65	@	
Paraphenylene diamine	*lb.*	1.75	@	2.00
Thiocarbanilide (factory)	*lb.*	.50	@	.65
Vulcocene	*lb.*	.35	@	
ACCELERATORS, INORGANIC				
Lead, dry red	*lb.*	.10	@	
sublimed blue	*lb.*	.07¼	@	.07½
sublimed white	*lb.*	.08¼	@	
white, basic carbonate	*lb.*	.07½	@	.08
Lime, flour	*lb.*	.01½	@	.02½
Superfine	*lb.*	.03	@	
Litharge, domestic	*lb.*	.10	@	
imported	*lb.*	.17	@	
sublimed	*lb.*		@	
Magnesia, carbonate, light	*lb.*	.09	@	
calcined extra light	*lb.*	.55	@	
calcined light	*lb.*	.23	@	.30
calcined medium light	*lb.*	.25	@	
calcined heavy	*lb.*	.06	@	.07
ACIDS				
Acetic 28 per cent	*cwt.*	2.50	@	3.00
glacial, 99 per cent	*cwt.*	9.50	@	11.00
Cresylic (97/99% straw color)	*gal.*	.85	@	
(95% dark)	*gal.*	.80	@	
Muriatic, 20 degrees	*cwt.*	1.20	@	1.75
Nitric, 36 degrees	*cwt.*	5.50	@	6.50
Sulphuric, 66 degrees	*ton*	17.00	@	20.00
ALKALIES				
Caustic soda (76% factory)	*lb.*	.03¾	@	
Soda ash, 58%	*cwt.*	.02½	@	
COLORS				
Black				
Bone, powdered	*lb.*	.06½	@	.14
granulated	*lb.*	.11	@	
Carbon black (sacks, factory)	*lb.*	.09	@	.14
pressed	*lb.*	.10	@	.15
Dipped goods	*lb.*	1.00	@	
Drop	*lb.*	.08	@	.16
Ivory black	*lb.*	.17	@	.45
Lampblack	*lb.*	.10½	@	.45
Oil soluble aniline	*lb.*		@	
Rubber black	*lb.*		@	
Rubber makers' non-flying black	*lb.*		@	
Blue				
Cobalt	*lb.*	.25	@	.30
Dipped goods	*lb.*	1.00	@	
Prussian	*lb.*	.60	@	
Rubber makers' blue	*lb.*		@	
Ultramarine	*lb.*	.16	@	.35
Brown				
Iron oxide	*lb.*	.04	@	.08
Sienna, Italian, raw and burnt	*lb.*	.07	@	.08
Sienna, Italian, raw (tan color)	*lb.*	.07	@	.14
Umber, Turkey, raw and burnt	*lb.*	.05½	@	.07¾
Vandyke	*lb.*	.06	@	.08
Green				
Chrome, light	*lb.*	.36	@	.40
medium	*lb.*	.40	@	.52
dark	*lb.*	.52	@	.58
commercial	*lb.*	.13½	@	
tile	*lb.*	.08	@	.17
Dipped goods	*lb.*	1.00	@	
Oxide of chromium	*lb.*	.60	@	.70
Rubber makers' green	*lb.*		@	
Red				
Antimony, crimson	*lb.*	.40	@	.46
crimson, F.	*lb.*	.35	@	
crimson, R. M. P.	*lb.*	.55	@	
Antimony, golden	*lb.*	.25	@	.30
golden, R. M. P.	*lb.*	.25	@	
golden 1	*lb.*	.30	@	
golden 2	*lb.*	.25	@	
7-A	*lb.*	.42	@	
vermilion sulphuret	*lb.*	.55	@	
red sulphuret	*lb.*	.23	@	.25
Arsenic, red sulphide	*lb.*	.14	@	
Dipped goods, red	*lb.*	1.25	@	
purple	*lb.*	1.00	@	
orange	*lb.*	1.25	@	
Indian	*lb.*	.13½	@	
Iron oxide, reduced grades	*lb.*	.04	@	.12
pure bright	*lb.*	.15½	@	

COLORS—Continued

Maroon oxide	lb.	$0.13½ @
Oil soluble aniline, red	lb.	@
orange	lb.	@
Oximony	lb.	.17½ @
Para toner	lb.	1.60 @
Red excelsior	lb.	@
Rubber makers' red	lb.	3.50 @
purple	lb.	2.50 @
Spanish natural	lb.	.05 @ .06
Toluidine toner	lb.	3.00 @ 3.25
Venetian	lb.	.03 @ .06
Vermilion, American	lb.	.25 @ .30
permanent	lb.	.32 @
English quicksilver	lb.	1.25 @ 1.30

White

Albalith	lb.	.07 @ .07½
Aluminum bronze, extra brilliant	lb.	@
extra fine	lb.	@
Lithopone, Beckton white	lb.	.07 @ .07½
Lithopone, domestic (factory)	lb.	.07 @ .07½
Ponolith (carloads, factory)	lb.	@
Rubber-makers' white	lb.	@
		C.L. L.C.L.
Zinc oxide. American Horse Head	lb.	.08¾ @ .09¾
Special	lb.	.09¼ @ .09¾
XX red	lb.	.08¾ @ .09¼
French process, Florence brand (factory):		
White seal	lb.	.12¼ @ .12½
Green seal	lb.	.11 @ .11½
Red seal	lb.	.10 @ .10½
White seal, imported	lb.	.12¼ @ .12½
Azo factory:		
ZZZ (lead free)	lb.	.08¾ @ .09¼
ZZ (under 5% leaded)	lb.	.08 @ .08½
Z (8-10% leaded)	lb.	.07⅝ @ .08⅛

Yellow

Cadmium, sulphide, yellow, light, orange	lb.	@
red	lb.	@
Chrome, light and medium	lb.	.21 @
C. P.	lb.	.21 @
Dipped goods	lb.	1.25 @
Ochre, domestic	lb.	.03 @
imported	lb.	.03½ @ .04½
Oil soluble aniline	lb.	@
Rubber makers' yellow	lb.	2.50 @ 3.50
Zinc chromate	lb.	.40 @

COMPOUNDING INGREDIENTS

Aluminum flake (carload)	ton	33.00 @40.00
hydrate	lb.	.22 @
Ammonium carbonate (lump)	lb.	.07½ @ .10
Asbestine	ton	20.00 @30.00
Barium, carbonate, precipitated	ton	85.00 @
dust	ton	100.00 @
Barytes, pure white (f. o. b. works)	ton	28.00 @
off color	ton	20.00 @
uniform floated	ton	28.00 @
Basofor	lb.	.05 @
Beta-naphthol	lb.	.40 @
Blanc fixe	lb.	.04½ @
Bone ash	lb.	@
Carrara filler (factory)	lb.	@
Chalk, precipitated, light	lb.	.02¾ @ .03¼
heavy	lb.	.02¼ @ .02½
China, clay, Dixie	ton	22.00 @35.00
Blue Ridge	ton	22.00 @35.00
domestic	ton	7.50 @ 9.00
imported	ton	16.00 @24.00
Cotton linters, clean mill run (factory)	lb.	.01¾ @ .02¼
Diatomite	lb.	.03 @
Fossil flour (powdered)	ton	60.00 @
(bolted)	ton	65.00 @
Glue, high grade	lb.	.30 @ .40
medium	lb.	.25 @ .30
low grade	lb.	.17 @ .19
Graphite, flake (400-pounds bbl.)	lb.	.15 @
amorphous	lb.	.05 @
Ground glass FF. (bbls.)	lb.	@
Infusorial earth (powdered)	ton	60.00 @
(bolted)	ton	65.00 @
Liquid rubber	lb.	.16 @
Mica, powdered	lb.	.15 @
Phenanthrene	lb.	.08 @ .10
Pumice stone, powdered (bbl.)	lb.	.03 @ .08
Rotten stone, powdered	lb.	.02½ @ .04½
Rubber paste	lb.	@
Silica, aluminum	ton	25.00 @30.00
gold bond (factory)	ton	@
silver bond (factory)	ton	@
Soap bark, crushed	lb.	.12 @ .13
Soapstone, powdered gray (carload)	ton	12.00 @
Starch, powdered corn	cwt.	2.43 @ 2.81
Talc, powdered soapstone	ton	22.00 @25.00
Terra blanche	ton	25.00 @28.00
Tripoli flour, air-floated, cream or rose (factory)	ton	30.00 @
white (factory)	ton	32.00 @
Tyre-lith	ton	95.00 @
Whiting, Alba	cwt.	@
Columbia	cwt.	@
commercial	cwt.	1.20 @ 1.25
Danish (factory)	ton	@
English cliffstone	cwt.	1.75 @ 2.00
gilders	cwt.	1.20 @ 1.35
Paris, white, American	cwt.	1.50 @ 1.60
Quaker	ton	13.00 @15.00
Super	ton	@
Wood pulp, imported	ton	@
XXX (f. o. b. plant)	ton	36.00 @
X (f. o. b. plant)	ton	35.00 @
Wood flour	ton	@

MINERAL RUBBER

Elateron (c. l. factory)	ton	@
(l. c. l. factory)	ton	@
Gilsonite	ton	$70.00 @
Genasco (c. l. factory)	ton	50.00 @
(l. c. l. factory)	ton	52.00 @
Hard hydrocarbon	ton	35.00 @45.00
Soft hydrocarbon	ton	35.00 @40.00
320 M. P. hydrocarbon (c. l. factory)	ton	50.00 @55.00
(l. c. l. factory)	ton	57.50 @
300/310 M. P. hydrocarbon (c. l. factory)	ton	40.00 @
(l. c. l. factory)	ton	45.00 @
M. R. X.	ton	@
Pioneer, M. R. (c. l. factory)	ton	48.00 @
(l. c. l. factory)	ton	50.00 @
Raven M. R.	ton	@
Robertson, M. R. pulverized (c. l. factory)	ton	87.50 @
M. R. pulverized (l. c. l. factory)	ton	90.00 @
M. R. (c. l. factory)	ton	62.50 @
M. R. (l. c. l. factory)	ton	65.00 @
Rubrax (factory)	ton	50.00 @
States "A" (c. l. factory)	ton	45.00 @
No. 1 (c. l. factory)	ton	40.50 @
Synpro, granulated, M. R. (factory)	ton	77.50 @

OILS

Avoilas compound	lb.	.16 @ .18
Castor, No. 1, U. S. P.	lb.	.10 @
No. 3, U. S. P.	lb.	.09½ @
Corn	lb.	.10 @
Cotton	lb.	.09 @
Glycerine (98 per cent)	lb.	.18 @ .19
Linseed, raw (carloads)	gal.	.72 @
Linseed compound	gal.	@
Palmoline	lb.	.14 @ .15
Palm niger	lb.	.07 @
Peanut	lb.	.09 @
Petrolatum	lb.	.06 @ .08
Petrolatum, sticky	lb.	.08 @ .10
Pine, steam distilled	gal.	1.15 @ 1.32
Rapeseed, refined	lb.	.12 @
blown	lb.	.12½ @
Rosin	gal.	.40 @ .50
Synpro	gal.	.38 @ .70
Soya bean	lb.	.08 @
Tar	gal.	.32 @ .35

RESINS AND PITCHES

Cantella gum	lb.	.50 @
Cumar resin, hard	lb.	.09 @ .13
soft	lb.	.09 @ .13
Tar, retort	bbl.	12.50 @14.35
kiln	bbl.	12.50 @13.50
Pitch, Burgundy	lb.	.04½ @
coal tar	ton	25.00 @
pine tar	lb.	.03½ @
ponto	lb.	.10 @
Rosin, K	280 lbs.	6.85 @
strained	280 lbs.	5.60 @
Shellac, fine orange	lb.	.90 @

SOLVENTS

Acetone (98.99 per cent, drums [6.62 lbs. per gal.])	lb.	.12½ @ .13½
Benzol (water white, 90% [7.21 lbs. per gal.])	gal.	.25 @ .31
pure	gal.	.27 @ .36
Carbon bisulphide (drums [10.81 lbs. per gal.])	lb.	.06¾ @ .07
tetrachloride (drums [13.28 lbs. per gal.])	lb.	.11½ @ .12½
Motor gasoline (steel bbls.)	gal.	.26 @
73@76 degrees (steel bbls.)	gal.	.37½ @
68@70 degrees (steel bbls.)	gal.	.35 @
Naphtha, V. M. & P. (steel bbls.)	gal.	.25 @
solvent	gal.	.28 @
Toluol, pure (7.21 lbs. per gal.)	gal.	.27 @ .33
Turpentine, spirits	gal.	.68½ @
wood	gal.	.65 @
Xylol, pure (7.21 lbs. per gal.)	gal.	.40 @ .43
commercial	gal.	.28 @ .35

SUBSTITUTES

Black	lb.	.08 @ .15
White	lb.	.10 @ .17
Brown	lb.	.12 @ .16
Brown factice	lb.	.07 @ .15
White factice	lb.	.09 @ .18
Paragol, soft and medium	cwt.	8.81 @
hard	cwt.	8.81 @

VULCANIZING INGREDIENTS

Lead, black hyposulphite (black hypo)	lb.	.40 @
Orange mineral, domestic	lb.	.11¾ @ .13½
Sulphur chloride (jugs)	lb.	.16½ @ .20
(drums)	lb.	.06½ @ .08
Sulphur, flour, Brooklyn brand (carloads)	cwt.	@
Brooklyn brand (less carload)	cwt.	@
Bergenport (carloads, factory)	cwt.	2.55 @
pure soft	cwt.	2.30 @
superfine (carloads, factory)	cwt.	@

(See also Colors—Antimony.)

WAXES

Wax, beeswax, white, commercial	lb.	.55 @
ceresin, white	lb.	.14 @
carnauba	lb.	.20 @
Montan	lb.	.09 @
ozokerite, black	lb.	.30 @
green	lb.	.30 @
paraffin	lb.	.03½ @ .08
Sweet wax	lb.	.12 @

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CAOUTCHOUC GUTTA-PERCHA

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INDIA RUBBER WORLD

CAOUTCHOUC HEVEA BRASILIENSIS FOUNDED 1889 DICHOPSIS GUTTA GUTTA-PERCHA

U. S. Pat. Off. Reg. United Kingdom

Edited by HENRY C. PEARSON

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STATISTICS, STANDARDIZATION AND SAVING

Coming as quite an ironic commentary on our vaunted national efficiency is the statement from the Executive Board of the Federated Engineers' Societies that sheer waste costs the United States a staggering sum. Instancing alone the matter of preventable diseases, the board says that the nation's annual loss through this source is $3,000,000,000. The same authority has data showing that 75 per cent of the serious accidents in industry are avoidable; that unreasonable exactions, restrictions, etc., will cause the country a loss of $500,000,000 in the building trades in 1921; that the textile industry has been getting only 35 per cent efficiency over a term of years through strikes and other wastes, not to mention numerous other industries that are suffering considerably through similar causes.

Over 50 per cent of the losses are laid at the door of industrial managers, and less than 25 per cent are debited against labor. Human energy is still too largely squandered or unutilized, and progress and prosperity must be delayed while 3,000,000 men are idle and consuming their savings. We are forcibly reminded that we must not relax in the least in the general policy of conservation if we are to pass comfortably through the present period of reconstruction and to fortify ourselves properly for the inevitable conflict among the nations for commercial supremacy. Thrift must ever be our watchword, and we must put into practice every possible measure conducive to more efficient production.

Secretary of Commerce Herbert C. Hoover, who is also president of the organization aforementioned, has already shown during his brief incumbency many ways in which the Federal Government can on a large scale not only lessen waste, but actually speed up the work and increase the service of various departments so as to benefit numerous industries particularly and the nation generally. In order to formulate a program for the reduction of waste he is seeking all available information on standardization and simplification; and from the leaders of the major industries or others he welcomes any suggestions that may in any wise be helpful. Particularly has he called upon the Federated Engineers' Societies, which may be fairly said to represent the interests of both capital and labor, to make a careful, impartial survey of the productive agencies of the country, a work which they have promptly undertaken.

It has been remarked by the Secretary that none of the fourteen active bureaus in Washington covers such important items as production, stock, percentage of industrial activity, prices, and monthly reports; and by neglecting to obtain and quickly disseminate such data—the Secretary hates stale statistics—much loss and retardation is occasioned in the nation's business. Apropos to the situation in the rubber industry, the Secretary is of the opinion that—

> If there had been an accurate monthly statement of the current ratio of production, capacity, and operation in the different branches of the industry, and of the stocks of major manufactured and raw materials in hand, they would have been saved tremendous losses, not only in over-accumulation of goods, but also in over-expansion of equipment.

Briefly, the plans for lessening the waste evil are the formation of a national industrial information service, a statistical bureau to report on employment conditions, a national health policy with plans for the employment of defectives, revision of Federal laws retarding stabilization in industry, and a program for the adjustment of labor disputes.

FINANCING FOR EXPORT

Still further swelling the nation's bulging coffers, about a quarter of a billion dollars' worth of gold has been shipped from Europe to the United States since January 1 of this year to settle trade and war bond debts; and so greatly favorable to this nation is the foreign trade

balance that the chances are that the golden flood will continue this way for a long time to come. Desirable indeed as is the great influx of yellow metal, and flattering as it is to our national pride to be heralded as the earth's greatest creditor—owing five billions before the war and now being owed fifteen billions—the fact must not be overlooked that a nation, like an individual, may even be embarrassed with riches. Nor must we forget that in becoming the world's chief creditor we have assumed obligations that must be discharged if we are to prosper and if our debtors abroad are to have the means for liquidating the claims we hold against them.

We are going to finance Europe. We may be slow about starting, but we are going to do it nevertheless. We shall have to do it in self-protection, or else lose much of the immense foreign trade that cost us such a great effort to build up. Long-term credits must be provided to promote imports and exports; and the sooner the war-spent Europeans get such assistance, the sooner will American manufacturers experience a marked improvement in their overseas commerce. Someone must start the ball rolling, just as in the case of the tire-makers. For months they realized that the time was ripe for a reduction in the prices of tires; they knew that buyers were holding off because they thought prices were too high; but each tire-maker was waiting for the other to make a move. Finally one started and others followed.

Perhaps it would have been better for both sides and for business generally had the price-shading taken place before; but the "buyers' strike" has been fairly well broken and that is an achievement at any rate. So, too, may be found a somewhat analogous condition in our foreign dealings. The trading stalemate will soon be supplanted with active, profitable operations when we prove to our European customers that we are quite as willing to give as to take. Moreover, we cannot afford to hoard the gold that we are collecting from them in enormous quantities. We must do as Great Britain did when it was the world's creditor nation, reinvest with the debtor countries the bulk of the money collected from them. By pursuing such a policy our foreign trade will flourish soon like the proverbial green bay tree, and the golden flood will prove a two-fold blessing instead of an embarrassment.

PROFIT RATHER THAN VOLUME

One of the best lessons we learned in war times is that of standardizing methods of manufacturing; cutting out the wasteful frills and getting down to essentials. When the War Industries Board began to regulate production it found that buyers of rubber hose were being offered 139 grades to meet their needs and whims. The board decided that a fraction of that number would serve all useful purposes. So, too, it made sweeping reductions in the 287 sizes and styles of tires, the 325 classes of fruit-jar rings, the innumerable varieties of rubber shoes, not to enumerate the various other rubber productions.

The signing of the armistice abruptly checked the carrying into effect of a standardization program that would have vastly increased the productive power of the nation; but enough had been accomplished to demonstrate its great value, even to indicate that were the manufacturers to get together in real earnest they might almost double the national output without considerable additional effort. But all this means more large-scale specialization and less small-scale diffusion.

As a general principle, the man who makes one article well, both from the standpoint of workmanship and low cost of production, can undersell his rival whose efforts are less well-directed. A small manufacturer may specialize on an exceptional article and win if he has a good shop and low overhead; but the chances are that a middle-class man will fare better by confining himself to staple goods, utilizing specialized machinery, and keeping that going to full capacity. But, it may be asked, how do many of the big, successful rubber companies produce such a diversity of goods? The answer is that they have separate, finely-organized, perfectly-equipped units, practically distinct factories, for each class of goods. Even they are disposed more than ever toward eliminating the least-used varieties and concentrating their capital and endeavors on the production of smaller, more-standardized assortments, obviating much lost motion, and enabling them to figure future business with much more certainty.

A striking illustration of the advantages of specialization and standardization is a big New Jersey concern that found in trying to meet the wants of numerous buyers accustomed to a great profusion of brands and a wide array of styles, it had run its line of manufacture up to an unreasonably high figure. It then decided that henceforth, even though it were to lose some orders, it would simplify and concentrate, and discard small, fussy production that often retarded the execution of large and profitable orders. Nor was it long before the wisdom of such new policy was amply vindicated.

General standardization would be a great step toward national economy, and is no less important in times of peace than in the stress of a world war. It is needed to fortify industrial America against an aggressive and formidable European competition that may be delayed but is still inevitable. It is a road that is but little traveled, yet it is one of the best highways that lead to abiding prosperity.

A recent canvass of the tire companies for figures upon puncture of giant cord tires discovers the fact that there are no statistics. The reason is that the big air containers rarely get punctured. The eight to fourteen plies of cord, the heavy layers of cushion stock and tread stock, to say nothing of the breaker strips, make the tire practically unpuncturable. The bigger they are the better they are.

The Manufacture of Dipped Goods

By John Hadfield

The manufacture of "dipped" goods is commonly conducted as a department in a factory making druggists' rubber sundries, although there are numerous small manufacturers whose entire output is made by the dipping process.

The important rubber goods made by the dipped process are chiefly housekeepers', surgeons', and undertakers' rubber gloves, toy balloons and nursing nipples. These goods contain from 70 to 100 per cent pure rubber by weight and for that reason have great elasticity and toughness, characteristics on which their value chiefly depends.

Dipped goods are cold-vulcanized by either the "acid" or "vapor" cure. For that reason they admit of brighter coloring than goods vulcanized by "hot" vulcanization. If made with expert care dipped goods will render satisfactory service for a reasonable time.

FACTORY PLAN

The manufacture of dipped goods is often conducted in premises and with plant arrangements not best-suited to the work. In addition to conveniently-arranged space and the proper machinery, consideration may profitably be given to providing adequate daylight, effective ventilation, and a scientific air-conditioning system for thoroughly drying the goods in process.

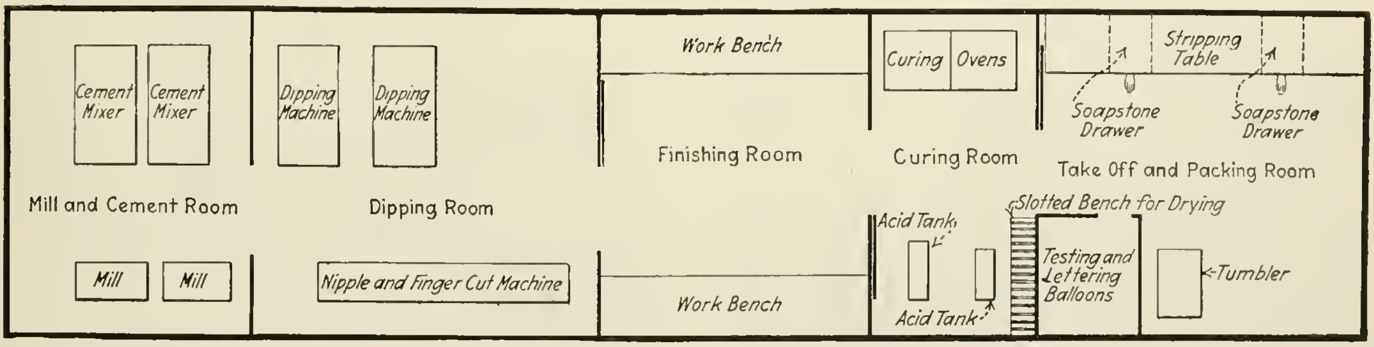


Fig. 1. Plan of a Model Dipped Goods Factory

Various floor plans are possible and some may prefer a two-story arrangement to the single-story plan shown in Fig. 1. Provision is made in this plan for a rubber milling and cement-making room; dipping room; finishing room; curing room; stripping, testing and packing rooms.

MATERIALS AND PROCESSES

RUBBER

In the manufacture of dipped goods only clean grades of fine and plantation Pará rubber are available. Of these the choice favors Beni Bolivian as yielding goods of superior tensile strength. First latex plantation is essentially as good in this respect and superior for light-colored and transparent goods.

It is essential that the rubber employed be clean and well dried. Breaking down the crude gum is usually limited to 15 to 20 minutes on a warm mill, at which point it is ready for solution if destined for making pure-gum goods. If for balloons or compounded stock the selected proportions of rubber, color and lithopone are milled to a uniform mixture by grinding on a hot mill for about 25 minutes.

COLORS

The colors used are oil-soluble aniline pigments such as red, blue, yellow, black and other colors. White is obtained by means of lithopone. This material is also used in connection with the anilines to dilute and improve the resulting color of clear tints.

In compounded goods, such as gloves for household use, Indian-red oxide or other mineral pigment is used for coloring. Compounding for dipped goods presents simple conditions and few difficulties.

CEMENT

The solution of pure or compounded rubber is known as cement. The solvent employed is 56 to 58-degree naphtha. This grade of naphtha should completely distil under 150 degrees F. and is better suited for use in making cement for dipped goods manufacture than the lighter grades of naphtha or gasoline because it does not volatilize so readily from the dipping tanks, and consequently does not induce bubbles in the goods nor form a crusty gas-filled layer of rubber on the surface of the stock in the dipping tank.

Various styles of machines may be employed for dissolving broken down or compounded rubber to suitable consistency for use in the dipping. One of the best is the enclosed type, one style of which is shown in Fig. 2. In such a tightly-closed, revolving drum-like apparatus, cement may be made of very uniform consistency because the solution chamber is tightly sealed against loss of solvent by evaporation. There is another and more important advantage to be noted, namely, minimizing the fire risk from static electricity.

The proportion of solvent in dipping cement for balloons and pure-gum goods is two gallons to each pound of rubber. In the case of compounded gloves the proportion is 35 gallons to 50 pounds of rubber composition.

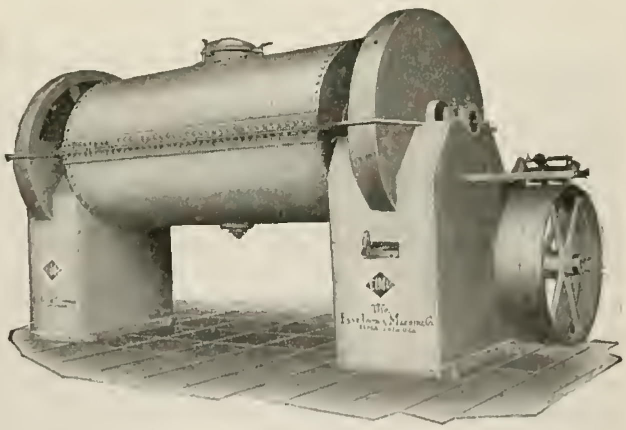


Fig. 2. Eimco Rubber Cement Mixer

CEMENT FOR TRANSPARENT NIPPLES

Transparent nipples are made from the lightest first latex plantation rubber available. Frequently that from Ceylon is specified. Care must be taken that the gum is not overmilled in breaking down, otherwise it will become darkened. The milled gum is

cut in strips and thrown into the requisite amount of solvent in the cement mixer. Solution may be effected by churning 18 to 20 hours.

When dissolved the cement is drawn into a tall, narrow tank provided with a quick-opening gate-valve at the bottom and one or more similar valves higher up for testing the clearness of the cement. In a settling tank of this sort the solution is allowed to stand until the impurities are deposited. It is customary to allow 24 hours for settlement, and at the end of that time to draw off the upper half of the cement, passing it through a fine-mesh brass wire screen as a further precaution before transfer to the dipping tank.

Fig. 3. Mill Room

The cement remaining in the settling tank is sufficiently clean for the manufacture of pure-gum articles of non-transparent grade. But the additional precaution is always taken to strain it through a fine-mesh brass screen when drawn from the settling tank. Settling impurities from the cement is not practiced for stock intended for goods other than transparent nipples, although it is good practice to strain the cement in any event.

MACHINERY AND PROCESSES

MILLING AND CEMENT MAKING

Fig. 3 shows a mill room containing two mills and two cement mixers. These are of the ordinary types. The cement mixers are preferably of the revolving drum type to prevent loss of solvent by evaporation. In preparing rubber cement for any purpose, precautions should be observed against fire. One of these is not to allow the same man to cut the rubber from the mill and place it in the naphtha-filled churn on account of the danger from static electric discharge. The gum should be cut and laid down by one person, picked up by a second and by him placed in the solvent. Also before opening a tightly-closed cement mixer the pressure of gas should be released at a valve provided for this purpose.

Fig. 4. Cement Mixers and Storage Tanks

It is not desirable to soak the rubber before starting the mixing mechanism because that serves to mass the gum and make it difficult to operate the stirrers. Dipping cement should be very thoroughly dissolved to a smooth consistency. The process requires from 18 to 20 hours for proper completion.

DIPPING FORMS OR MODELS

The forms for balloons are usually of wood shellacked, and for other articles, of glass or porcelain. Some of these shapes may be seen in several of the illustrations shown in this article. In service, forms are detachably mounted on bars of wood. The sticks are held in groups for dipping by sliding into grooved cleats on the board seen in Fig. 10.

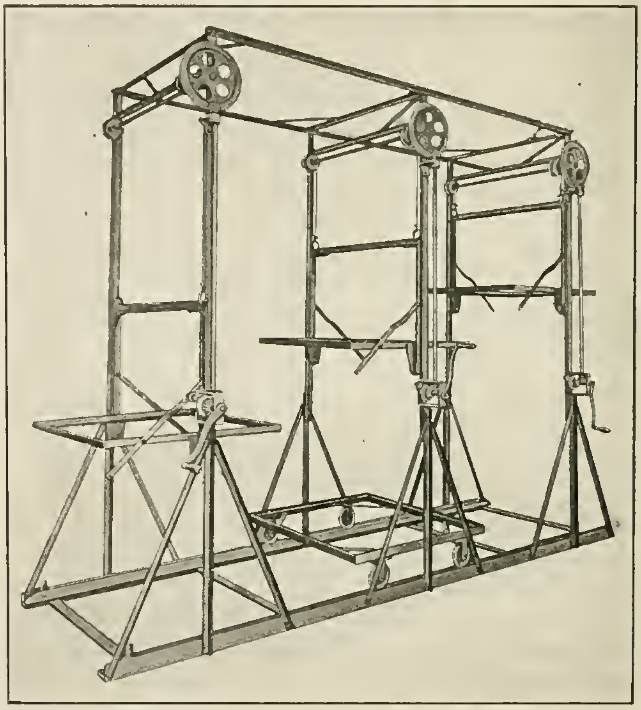


Fig. 5. Dipping Machines—The Ornamental Iron Works Co.

DIPPING MACHINES

A dipping machine comprises a tank for holding the rubber solution and mechanism for lowering and raising the forms on which the goods are made. Such a machine may be designed either for intermittent or continuous dipping and for work with one or more colors at the same time.

INTERMITTENT DIPPING MACHINES

A battery of three gear-lift, glove-dipping machines is shown in Fig. 5. These machines are equipped with one truck to locate the cement tank under any one of the three lifts which hold the forms and raise and lower them in the process of dipping. For smaller work a single-lift hand-power machine, operated by hand-crank and link-belt, is generally used. A machine of this sort is set on a fixed tank and the reversible rack holds the form-boards on both sides and allows double dipping or alternate dipping and drying from either side of the rack. Machines of this sort may be identified in Fig. 7.

CONTINUOUS DIPPING MACHINE

A recently perfected machine for forming dipped goods continuously is shown in the accompanying illustration. It is in the form of a reel that revolves on a shaft driven by a chain gear-

ing from the main shaft. The reel supports nine shafts with carrying heads, each head composed of a frame holding four sets of forms fastened in grooves *E*. Dipping tanks *B* are filled with the rubber solution, and forms *A* are applied to the boards *C*, which are placed in position in the head of the frame *D*. When the forms are in position cams *F* raise the tanks *B*, causing the forms to be immersed in the solution to a predetermined depth, after which the tanks recede. Then the pinion *G* is moved through about 140 degrees, and the ratchet mechanism advances the carrying head *D* one step, thus bringing the next set of forms in position over the dipping tanks. When this has been accomplished, the set of forms which have already been immersed have been moved forward about 36 degrees, placing the forms almost vertically above their original positions, thus permitting each deposit of solution to dry.

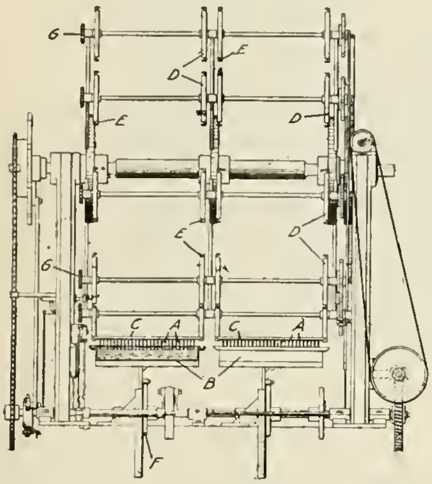


Fig. 6.
Mahoney's Revolving Dipping Machine

When a sufficient number of immersions have taken place to produce the desired thickness on the forms, the lowermost dipping board of the frame is removed and a new one inserted. In this way the operation of the machine is made continuous.

This machine is designed especially for making nipples, medicine-dropper bulbs, finger-cots and similar goods, but not for gloves.

DIPPING ROOM

In laying out a dipping room the machines for dipping gloves and balloons are arranged around the sides of the room and space is reserved in the center for drying the finished goods. Very essential features in both dipping and finishing rooms are those that guard the tacky goods from injury from dust, insects, and particles of all sorts falling from walls and ceiling, or road dust gaining entrance by the force of wind blowing through open windows or through poorly-fastened window frames. Plenty of sun and a well-planned system of power ventilation are important in drying the product between dippings and before vulcanization.

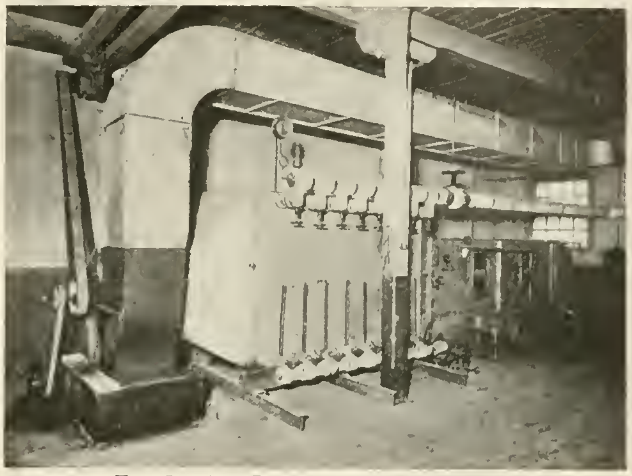


Fig. 8. Air-Conditioning Equipment

The presence of naphtha in dipped goods during the cure results in a lifeless product lacking in resiliency and consequently cannot be permitted. It can be successfully eliminated only by thorough drying. The drying problem of the dipped goods manufacturer is vital to successful production and he realizes how seriously outdoor weather conditions affect his production processes.

Ideal drying conditions—say 72 degrees F. and 55 per cent relative humidity—can be regularly secured only by an air-conditioning system which circulates clean air under controlled conditions of temperature and relative humidity, making every day a "good day." A typical air-conditioning equipment is shown in Fig. 8. The apparatus comprises the humidifier, heaters, fan and automatic control for both temperature and humidity.

DIPPING PROCESS

Hydrometers or other means of testing liquids fail to give practical indications of the suitability of dipping cement for use, and in this matter dependence is placed entirely on experienced judgment. Loss of evaporation of solvent, which would thicken the cement and tend to crust it over, is minimized by covering the

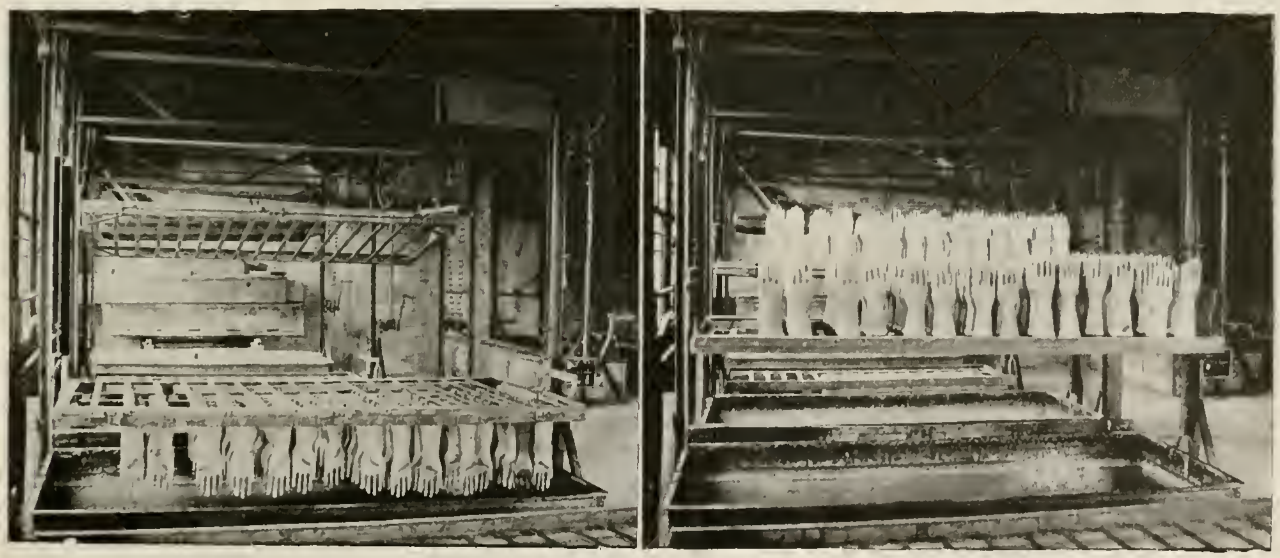


Fig. 7. Dipping Room

Glove-Forms in Position for Dipping

Dipped Glove-Forms Reversed for Drying

dipping tank during the intervals between dips, and also by additions of fresh standard cement, or even by stirring in small quantities of solvent as required.

An interval of about one hour between dips is observed in making balloons and nipples, and double that in the case of gloves. This is requisite to permit air carried down by the forms to rise to the surface, or gas from the solvent that may be evolving from the cement. An interval between dips is also needed so that each film of rubber may dry before the next is added. The following table gives the number of dips and intervening lapse of time for various goods:

Fig. 9. Drying Room

Dipping Table

Article	Number of Dip Coatings	Interval Between Dippings
Toy balloons	3 to 4	45 minutes
Finger cots	6 to 7	2 hours
Compounded gloves	4	2 hours
Pure-gum gloves	9	2 to 2½ hours
Nipples	10 to 12	1 hour

DRYING

Final drying follows the last dipping to eliminate all the solvent before curing. If done under variable weather conditions, the drying time will vary from eight to 24 hours. By far the better method is to employ conditioned air as described in a preceding paragraph, because in that way the drying process can be regularly scheduled with saving of time and certainty of production.

Fig. 10. Balloon-Finishing Department

Dipped goods, like other rubber products, are made to standard weights and standardization is regulated in the dipping room by test-weighing samples stripped from forms as the dipping nears completion.

FINISHING ROOM

Subsequent to dipping and drying, the goods are taken to the finishing room where the work of forming beaded edges is done by rolling the rubber back upon itself, either by hand or machine, and in the case of gloves by applying strips of rubber as reinforcement around the wrist.

BEAD ROLLING

A patented machine for rolling beads on dipped articles is shown in Fig. 11. In this machine the dry uncured article on its form is made to pass between two yielding rolls of sponge rubber, both of which revolve upward against the edge of rubber which is to be beaded. The form revolves as it passes the rollers. The latter are inclined at an angle with relation to the horizontal passage of the rubber edge of the article and for that reason they roll the edge of the rubber upward only to a definite height, thus forming a rolled-up edge of definite size.

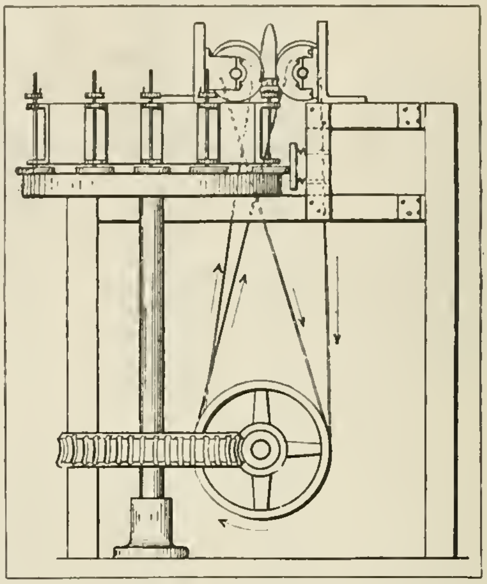


Fig. 11. Hadfield's Bead-Rolling Machine

This machine, when equipped with brush rollers, can be used for stripping small objects like balloons, finger-cots and nipples from their forms after curing, and also for cleaning and polishing forms.

ACID CURE

Vulcanization by the acid-cure is effected by immersion of the dried dipped article on its form into a curing bath consisting of sulphur chloride and carbon bisulphide. The ordinary proportions are four liquid ounces of the former in five gallons of the latter. The time of immersion necessary for thorough cure varies from 15 to 60 seconds according to the thickness of the rubber. In the case of nipples after acid-curing on the outside they are removed from the forms and curing acid is poured into each to cure the inner surfaces.

Fig. 12. Balloon-Stripping Room

VAPOR CURE

Gloves are usually cured by exposure to the vapor of sulphur chloride in an enclosed space at 180 degrees F. for an hour, more

FIG. 13. BINDING AND FINISHING GLOVES

or less, varying with the humidity of the weather. In both acid and vapor-curing it is quite necessary that the goods be thoroughly dry of both naphtha and moisture.

In foggy weather loss by damage due to moisture is practically unavoidable. Another prolific source of trouble by moisture has been traced to water contained in the naphtha. Under some conditions this refuses to settle out and the naphtha presents a foggy appearance. In a case of this sort the naphtha may be rendered clear and all the water separated out of it by the expedient of lowering its temperature to near the freezing point of water.

FIG. 14. ACID AND VAPOR-CURE ROOM

STRIPPING ROOM

After curing, the goods proceed to the stripping room where they are dusted with talc, stripped by reversing from their forms, and the talc dust removed by tumbling the articles in a tumbling barrel. Following this the goods are tested and packed for shipment.

FIG. 15. TESTING BALLOONS

COMPARATIVE SUMMARY FOR THE MANUFACTURE OF RUBBER GOODS, 1919 AND 1914

A PRELIMINARY statement of the general results of the 1920 census of manufactures with reference to the rubber industry has been issued by the Bureau of the Census, Department of Commerce. This report consists of establishments engaged principally in the manufacture of all kinds of rubber products during the year 1919.

Reports were received from 475 establishments having a total value of products of $1,138,216,000. In 1914 there were 342 establishments with a total value of products of $300,994,000. Of the 475 establishments reported by the rubber industry in 1920, 96 were located in Ohio; 73 in New Jersey; 56 in Massachusetts; 43 in New York; 32 in Pennsylvania; 26 in Connecticut; 22 in California; 21 in Illinois; 16 in Indiana; 10 in Rhode Island; 9 each in Iowa and Wisconsin; 8 each in Missouri and Oklahoma; 7 in Michigan; 6 in Texas; 4 each in Colorado and Washington; 3 each in Georgia, Kansas, Minnesota and Nebraska; 2 each in Maryland, North Carolina, Oregon, West Virginia and Delaware; and 1 each in Louisiana, Kentucky and Maine.

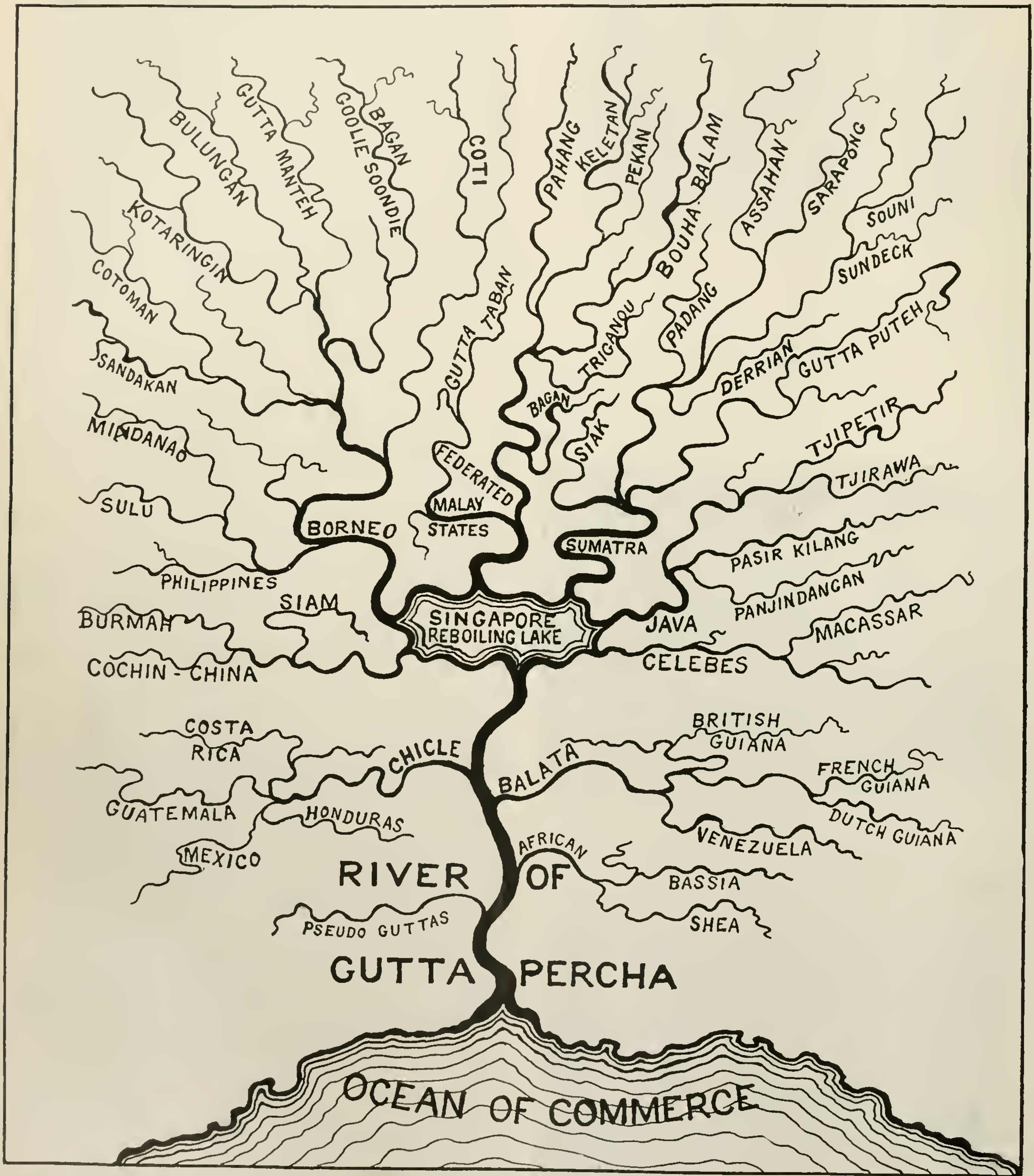
The comparative statistics for 1919 and 1914 are summarized in the following statement. The figures for 1919 are preliminary and subject to such changes and corrections as may become necessary upon further examination of the original reports.

		1919	1914
Number of establishments		475	342
Value of products[1]		$1,138,216,000	$300,994,000
Tires:			
Pneumatic—			
Automobile—			
Casings	*Number*	22,727,000	8,022,000
	Value	$485,904,000	$105,679,000
Inner tubes	*Number*	39,700,000	7,908,000
	Value	$199,305,000	$20,101,000
Motorcycle and bicycle—			
Casings	*Number*	3,422,000	
	Value	$11,892,000	$3,728,000
Inner tubes	*Number*	1,393,000[3]	6,906,000
	Value	2,904,000	
Solid—			
Truck	*Number*	1,620,000	
	Value	$43,917,000[3]	
All other	*Number*	6,635,000	13,736,000
	Value	$9,005,000	
Boots and shoes:			
Rubber boots	*Pairs*	9,208,000	4,025,000
	Value	$26,067,000	$12,648,000
Rubber shoes and overshoes	*Pairs*	66,195,000	57,212,000
	Value	$64,713,000	$37,858,000
Canvas shoes with rubber soles	*Pairs*	19,896,000	
	Value	$25,177,000	(2)
Heels (includes only those sold as such or on hand)	*Pairs*	126,572,000	
	Value	$14,238,000	(2)
Soles, including composition or fiber	*Pairs*	18,437,000	
	Value	$4,321,000	(2)
Rubberized fabrics:			
Automobile and carriages	*Yards*	14,429,000	
	Value	$10,697,000	(2)
All other	*Yards*	17,630,000	
	Value	$13,712,000	(2)
Belting	*Value*	$22,436,000	$7,989,000
Hose	*Value*	26,998,000	16,854,000
Packing	*Value*	7,317,000	3,508,000
Clothing	*Value*	10,450,000	6,799,000
Druggists' and stationers' sundries	*Value*	13,834,000	7,512,000
Hard rubber goods	*Value*	34,230,000	(2)
All other manufactures of rubber	*Value*	80,720,000[4]	40,133,000
Reclaimed rubber (produced and sold as such or on hand)	*Pounds*	121,795,000	(2)
	Value	$23,716,000	$11,135,000
All other products	*Value*	6,663,000	10,136,000

[1] In addition, in 1919, products to the value of $7,574,000 were reported by establishments assigned to other classifications and in 1914 to the value of $752,503.
[2] Not reported in 1914.
[3] Not segregated in 1914 (number of solid tires not shown).
[4] Includes scrap and old rubber (sold or on hand).

REPLETE WITH INFORMATION FOR RUBBER MANUFACTURERS—H. C. Pearson's "Crude Rubber and Compounding Ingredients."

The River of Gutta



Millions of Gallons of Latex from the Sapotads of Asia and Central and South America Go to Make Up the 10,000,000 Pounds of Gutta, Balata and Chicle Used in the Arts. The Chart Shown Above is Illustrative of the Sources and Native Names

A Glossary of Words and Terms Used in the Rubber Industry—VI[1]

By Henry C. Pearson

GUTTA PERCHA

Gutta Percha (Gum Plastic). The more or less resinous, plastic gum obtained from the concrete milk of many trees of the natural order *Sapotaceæ*, notably the *Palaquium gutta* and allied genera common in the Malay Peninsula, Borneo, Sumatra, the Philippines, and the Sunda Archipelago. The term is said to be derived from the Malayan "gatah," "guetah," or "gueutta," meaning a balsam, or a rubbery gum; and "pertcha," a tree, also a scrap, the native product looking like scraps of raw rubber before being manipulated in hot water for marketing. It is nearly white when pure, but is marketed as a grayish, reddish, yellowish, or most generally brownish, hard, tough, dense, inelastic, highly dielectric, almost inodorous substance; easily molded and impressible in hot water; resistant to most acids; inalterable in fresh or salt water; and oxidizing when exposed to air and light. It is a hydrocarbon mixture with a specific gravity varying from .9628 to .99923. It melts at 194 degrees F.

Few unmixed gutta perchas reach the market, most of them being mixtures. The deep color is chiefly due to the steeping of the gum with bark and wood particles in hot water. Besides resins, it contains varying amounts of dirt, water, and even air. Also called gutta.

Assahan. A white, chalky, friable gutta percha from northeast Sumatra, of inferior quality, and with about 20 per cent débris. When fresh, the cakes have an odor not unlike ripe cheese.

Bagan Goolie Soondie. A hard, wine-colored, soapy-feeling, good grade of gutta percha from Borneo, chiefly exported from Singapore. A term also applied to gutta closely resembling balata.

Balam-Merah, or Sambun. A Palembang high-grade gutta percha. Identical with gutta-merah. See Gutta-Merah. Very little reaches the market in a pure state. Reddish-gray, sometimes coppery when pure, very coherent, compact and hard. In section it shows layers. Pear-shaped in Palembang, but in various shapes on the south coast, such as cylinders, blocks and also folded sheets. Bounces on stone or wood floors, and creaks when two pieces are rubbed together, which characteristics diminish in proportion to the amount of adulteration. The mixtures are commonest in southern and eastern Borneo, the adulterants generally used being jelutong, hangkang, sawdust, etc. The nearly pure article is commonly mixed with bringin, making a valuable grade, or with sambun, also yielding a fine grade of gutta. See Bringin and Sambun.

Balata. The gum of the bully or bullet tree (*Mimusops balata* or *globosa*) of the natural order *Sapotaceæ*, sometimes used as an adulterant of the better grades of gutta percha or as a substitute for some inferior grades. The gum is usually a reddish-gray or brown, often looks like dried skins, soapy to the touch, more flexible and ductile than East Indian gutta percha, which it resembles in the amount of resin content and in the fact that it softens readily in hot water, retaining its molded shape when cooled. Exported from Colombia, Venezuela, Panama and the Guianas. Comes as sheet and block, the former of which is the best grade. The grades are Surinam, amber, Surinam sheet, Venezuela (Ciudad Bolivar) block, Colombia block, and Panama block.

Banca Reboiled. A low grade of mixed gutta percha from the island of Banca, east of Sumatra.

Banjermassin. A producing district and point of export in south Borneo for gutta percha; a term formerly applied to an especially high grade of gutta percha, but now less expressive, the gutta now usually marketed being hard, blackish, porous-looking, and containing bark débris, etc. Used also as a name for jelutong rubber.

Banjer Red. A first-grade gutta percha from the Banjermassin district, Borneo, and the product of the *Dichopsis gutta*.

Banjer White. A medium grade of gutta percha from the Banjermassin district, Borneo. Contains often 33 per cent of water and 15 per cent of dirt.

Bassia. A gutta percha from the African tree *Bassia Parkii* and regarded by some as comparable to East Indian gutta.

Bila or Red Soondi. A term sometimes applied to bagan. See Bagan.

Blitang. A Palembang, Sumatra, gray-brown, fibrous gutta percha, always mixed with wood and bark, and usually compounded of the waste of balam-merah mixtures and inferior guttas. In the better grades some true balam-merah is added. It is seldom coherent or resilient. It is shipped in oblong blocks, sometimes with an outer layer of good gutta.

Block Balata. See Balata.

Book Gutta. A low-grade gutta, prepared at Siak in Sumatra and exported from Singapore in sheets folded as a "book" with rounded edges. It is usually firm, tough, and somewhat elastic when clean. Sections show a closely-laminated, pinkish and white structure. Impurities include bark, clay and water. On cleaning and drying it loses 20 to 25 per cent in weight. See Gutta Siak.

Bouhábalam. A white, chalky, friable, nerveless gutta from Malacca in the Malay Peninsula.

Bringin. Also known as suntik or sundek. A gutta percha ranking second in quality to balam-merah. See Balam-Merah. Seldom appears on the market pure, but is often mixed with balam-merah. It is usually exported to Singapore. When pure it is grayish-white, very coherent, and in section shows a compact mass without visible layers. Bounces and creaks like balam-merah. These qualities and the color are markedly affected by adulteration with inferior grades of gutta. Dujan is generally used for mixing, and its similar color and strong cohesion make detection of adulteration difficult, although expert handlers note less resilience and toughness. Admixture with hangkang or jelutong alters color, lessens resilience or bounce, and imparts a peculiar odor. Sometimes classed with waringin. See Waringin.

Bulongan, or Bulungan. A first grade of gutta percha from a district of that name in eastern Borneo; a hard, nervous, blackish, knotty gum, white or violet in section, sometimes containing much débris; exudes a viscous liquid which hardens on contact with air.

Bulongan, or Bulungan White. A medium grade of gutta percha from the district of the same name in eastern Borneo.

Chicle. A Central American gum containing about 17 per cent of gutta, the product of the coagulated latex of certain of the *Sapotaceæ*, chiefly the *Achras sapota*. Crude chicle comes in rectangular blocks containing bark and dirt, the shrinkage being from 30 to 50 per cent. In cleaned chicle the blocks are pulverized by machinery, the bark picked out, and the product dried and bagged, the shrinkage being about 10 per cent.

Ciudad Bolivar Block. See Balata.

Cleaned Chicle. See Chicle.

Colombian Block. See Balata.

Coti. A good gutta percha from eastern Borneo; netted on the surface, reddish yellow, but little bark, hard, and nervous. Compares well with bulongan.

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[1] Continued from The India Rubber World, May 1, 1921, pages 561-562.

Cotoman. A hard gutta percha, lacking nerve, from eastern Borneo; smooth surface, very white, has about 30 per cent shrinkage.

Crude Chicle. See Chicle.

Crude Gutta Percha. Gutta percha as it is received from the gatherers or reboilers.

Getah Moendirig. A brown, second-grade gutta from the province of Bantam, Java.

Goolie. A Malay term for the material extracted from the thin latex of inferior sorts of guttiferous trees.

Goolie Red Soondie, or Sundi. A good grade of gutta percha exported from Serapong, Borneo.

Gum Plastic. From the Latin, *gummi plasticum*. An old and expressive name for gutta percha, as distinguished from gum elastic (*gummi elasticum*) or caoutchouc, and referring to its unique property of being easily softened and molded in hot water, or, more slowly, in hot air.

Gutta. The essential element of gutta percha. A whitish, smooth, amorphous substance insoluble in ether, alcohol, or light petroleum spirit at ordinary temperatures. Softens at 114 degrees F. Assigned the formula $(C_{10}H_{16})X$. Also a Malay term for a variety of gums. A short term for gutta percha.

Guttane. A fourth substance (in addition to gutta, fluavile, and albane) isolated from gutta percha by Oesterle in 1892.

Gutta Bassia. See Bassia.

Gutta Cotie. See Coti.

Gutta-Merah, or Getah Taban Merah. A term applied to a reddish gutta percha of the highest grade shipped from Singapore, the balam-merah of Palembang and the sambun of Banjermassin. Also a name given by Chinese traders to mixtures of balam-merah with poor guttas.

Gutta Penang. A low-grade gutta percha exported from Singapore, but ranking in quality above gutta cotie. It is marketed in rolled sheets 5 or 6 inches in diameter; color, slightly pinkish, and is somewhat bark-specked.

Gutta Percha Fat. A vegetable fat of a high melting point (40 degrees C.) obtained from the seeds of the gutta percha tree.

Gutta Quality. A condition determined by the relative proportions of true gutta and resins in the gutta percha mass, the grades having the most gutta and the least resin ranking highest.

Gutta Shapes. Forms in which the gum is usually shipped: balls, square cakes, cylindrical rolls, pear and bottle-shaped masses, etc.

Gutta Resins. Fluavile—a transparent, yellowish resin, and albane—a white, crystalline resin, which together form from 10 to 54 per cent of the gutta percha of commerce.

Gutta Shea. A gum coagulate from the shea, galam, or bambouk tree, said to be the nearest approach to gutta percha among African products; also known as karite gum. Authorities differ as to its value as a gutta percha substitute.

Gutta Siak. See Siak.

Gutta Sundek, Sundi or Soondie. Also called gutta babou. A valuable gutta, fine samples of which show a bright, white, compact mass, some ivory-like; often colored with bark extract.

Gutta Susu. A rubber sometimes miscalled gutta percha, and often used as an adulterant of gutta percha, especially of balam-merah, to which, though not mixing intimately, it imparts some of its elasticity. Obtained from a vine in Sumatra and Borneo, and chiefly exported from Singapore.

Gutta Taban or Tuban. A Malay term for the *Palaquium gutta*, which some claim is the proper name for gutta percha. A high-grade gutta exported from Selangor in the Federated Malay States.

Gutta Teban Sutra. Malay term for a high-quality, silky-feeling gutta percha. Some authorities accord it first place. Also called gutta derrian. See Gutta Taban.

Hangkang, or Jangkang, or Jongkang. A gutta which in the Dutch East Indies is used for adulterating better kinds of gutta percha. Gray-white, often reddish, and dark-brown outside; hard, brittle, with little resilience, has a peculiar odor, and is often very dirty. Shipped chiefly from Banjermassin and Pontianak.

Indian Gutta Percha. A gum long used as an adulterant of guttas in Singapore; hard, brittle when cold, but plastic in hot water. See Pala Gum.

Indragiri. A high-grade gutta from the Indragiri river section in eastern Sumatra.

Jangkang. See Hangkang.

Kalipáya. Native Philippine name for the *Palaquium ahernianum*, a tree yielding much of the gutta percha gathered in the islands.

Keletan. A gutta from the northeast part of the Malay peninsula; when new—waxy, rose-colored; old—white, chalky; friable, lacks nerve.

Koatei Gutah Merah. A good, reddish gutta exported from Singapore; grades average 44 and 46 per cent pure gutta.

Kotaringin. A fine white to brownish gutta from south Borneo.

Kou Gum. See Sicete.

Leaf Gutta. Gutta percha extracted by solvents from leaves, chiefly the Palaquium.

Liquid Gutta Percha. A fluid obtained by dissolving gutta percha in chloroform, adding a little finely-powdered carbonate of lead and, after the insoluble matter has settled, decanting the clear liquid.

Macassar. A district in southern Celebes producing much gutta percha. A term formerly applied to very high-grade gutta percha, but now referring mostly to various sorts from Banjermassin—kotaringin, coti, bolungan, and sandekan.

Madar Gutta. A pseudo-gutta from the sun-dried milk of the *Callotropis procera*; habitat, deserts of Central India, Rajputana, and Sind.

Majang, or Mayang. A Malay word for the gutta percha tree.

Maragulai. A very hard gutta, grayish and sometimes very white.

Mazer Wood. An ancient name for gutta percha.

Mixed White. A medium grade of so-called white gutta percha from Borneo.

Niger Gutta. An African gutta percha, also known as bassia. See Bassia.

Njatoeh. A very hard gutta, but sensitive to light, from Banjerang, Java.

Padang. A fair grade of gutta from Padang on the west coast of Sumatra; yellowish-red, specky, hard, nervous, has about 40 per cent débris.

Padang Reboiled. A low grade of mixed gutta from Padang.

Pahang. The choicest grade of gutta percha, taking its name from the state of Pahang in the Malay peninsula. Usually has few impurities and is exceptionally rich in true gutta; yellowish white, rarely reddish, and sometimes faintly green.

Pahang White. A white, chalky, friable gutta from Pahang; soft, nervous, and with about 40 per cent débris.

Pala Gum. See Indian gutta percha.

Panama Block. See Balata.

Panjindangan. A medium grade Java gutta.

Pasir Kilang. A Javanese grade of gutta.

Pekan. A slightly hard, nervous gutta, plum brown, from Pehang.

Penang. See Gutta Penang.

Perak. A gutta of good quality produced at Perak. See Njatoeh.

Puan, or Dujan. A gutta like balam-merah. See Balam-Merah.

Putih, or Puteh. A Malay term under which several vari-

eties of gutta are exported. In parts of south and east Borneo it indicates dujan or an admixture of dujan, but in Palembang it refers to various mixtures of suntik with puan, or, roughly, to good, whitish, and often spongy gutta blends; a Sumatra variety, white, chalky, friable, and nerveless.

Raw Gutta Percha. See Crude Gutta Percha.

Reboiled. A term applied to an operation performed by Chinese traders who buy odd lots, soften them with hot water, and make them into a fairly homogeneous mixture.

Recovered Gutta. Gutta percha reclaimed from waste, chiefly cable strippings.

Red Macassar. See Macassar.

Resins of Gutta Percha. Fluavile and albane. See Gutta Resins.

Resistance. An electrical test applied to gutta perchas to determine insulation value. The white guttas show especially high resistance, but they are seldom used alone as dielectrics.

Sambun. See Balam-merah Gutta.

Sandakan. A very pure gutta percha, bright yellow or yellowish-white, exported from Sandakan in northeast Borneo.

Sapotaceæ. A natural order of trees, many genera of which yield gutta percha.

Sarawak. Name of a fine grade of gutta percha produced in the Sarawak territory in northwest Borneo; deep-brown, nervous, with a spongy, veined surface.

Sarawak, Mixed. A low mixed grade of reddish gutta percha from Sarawak, and often much speckled with bark.

Serapong, or Sarapong, Goolie Soondie. A good grade of gutta percha from Serapong, Borneo; the cleanest of the raw guttas, containing usually but 3½ per cent of dirt, but having over 25 per cent of water. This term is often applied to several mixtures.

Sheet Balata. See Balata.

Siak. An east Sumatra gutta percha, reddish yellow, about 50 per cent bark débris, fairly hard, but little nerve. See Book Gutta.

Sicte Kou Gum. Chicle extracted from the fruit of the sapota tree. See Chicle.

Soondie, or Sundi. A Malay term derived from gutta-sundek.

Souni. A Sumatra gutta percha of varying mixture and quality.

Sumatra Sorts. A term formerly applied to various medium guttas.

Suntik, Sundek, or Bringin. See Gutta Sundek.

Surinam Sheet and Amber. An old name given to Balata from Dutch Guiana. See Balata.

Susu-poko. Malay for English milk tree. A gum produced in the Malay peninsula used as a gutta percha substitute after treatment with sulphur chloride.

Talotalo Gum. A hard, gutta-like, inelastic gum from the Fiji Islands. Also called "Kau Drega."

Teban, or Taban. A Malay term for the gutta percha tree and often used in names of gutta percha sorts.

Tensile Strength. The chief mechanical property of gutta percha and proportioned to the amount of resin in the gum.

Tjipetir. A Javanese gutta.

Tjirawa. A gutta variety from Java.

Triganou, or Trigano. A gutta from the northeast of the Malay peninsula; white, chalky, friable, with about 31 per cent of adulterant.

Tu Chung Rubber. A gum, regarded as true gutta percha, from the chung tree (*Eucommia ulmoides*), that is indigenous to China.

Venezuela Block. See Balata.

Progress of the Malayan Rubber Restriction Movement[1]

By Richard Hoadley Tingley

Through the courtesy of a well-known rubber importer, I am able to present some of the facts in relation to the rubber restriction movement in the Malayan peninsula—its inception, history and results, both present and prospective.

ATTEMPTS AT COMPULSORY RESTRICTION

The Planters' Association of Malaya recognized that the present 25 per cent voluntary restriction scheme is in every way unsatisfactory and by no means sufficient to bring down the output to an economic level. This body, which consists of the managers and planters of the rubber estates of the Federated Malay States and the Straits Settlements, approached the Government of the Federated Malay States on the subject, and found it sympathetic. The Planters' Association was therefore requested to draw up a bill for approval. This scheme provided for—

A 50 per cent compulsory restriction on the output of all rubber estates in the Federated Malay States and the Straits Settlements on the actual crop of 1920. The present 25 per cent restriction is on the estimated crop of 1921.

Estates unable to carry on owing to lack of funds may apply to the Government for financial assistance. The Government may give such assistance up to a maximum of $3 an acre per month (Straits dollars).

The Malayan Government approved these proposals, but before any legislation of this kind could be passed, the authority of the Secretary of State for the Colonies in London was required. The proposals were therefore cabled to him. The Secretary, in turn, consulted the Rubber Growers' Association of London which represents all the big rubber companies whose registered offices are in London. It is calculated that they control approximately 1,200,000 acres of the planted acreage of the Middle East, and incidentally the members of the Planter's Association of Malaya are almost all managers of estates under the control of London directors, who, in turn, are members of the Rubber Growers' Association. Precisely what happened in London is not quite clear, but the outcome has been that the Rubber Growers' Association declined to agree to any plan of compulsory restriction.

Many influential men in the Malay States agree that a compulsory scheme is the only one which will meet the case, but almost without exception these same men are convinced that no compulsory scheme will ever be sanctioned by the Rubber Growers' Association. It seems to be the intention of that body to seize this opportunity of allowing the weaker and badly financed estates to pay the penalty and to pass out of existence (or alternatively, to allow the wealthier estates to buy them up at a low figure), and, as a result, leave the bigger and more stable estates in a strong position for the future. In other words, they are strongly opposed to government control and prefer to let the ordinary rules of trade work out logically—the strong surviving, the weak going to the wall.

"During my visit to Kuala Lumpur," says the investigator in his dispatches, "a conference was held between the Government and the Planters' Association of Malaya. There had been a strong difference of opinion on the question of including the small

[1]From private reports recently received by F. R. Henderson & Co., New York, N. Y., from its eastern correspondent, Henderson Brothers, Limited, Singapore, who sent a special representative into the field to ascertain conditions at first hand.

estates under 100 acres in the scheme of compulsory reduction. The Government contended that such a restriction would spell certain death to most of these. It must be borne in mind that there are thousands of small native owners in the Malay Peninsula, with allotments of from 5 to 50 acres who tap their own trees and live on the proceeds. These estates aggregate almost 500,000 acres, so I am informed, although I have not been able to verify these figures. The Planters' Association definitely declined to allow the exclusion of the small estates from the plan, and, as no agreement could be reached, the meeting broke up. It is important to note that no official reports of any kind were issued here regarding the scheme. Innumerable articles have appeared in all the local Malayan papers, giving their own views and their own forecasts of the future. Most of these, however, are absolutely contradictory and very misleading.

"My own personal belief, which is that of a great majority of the planters, is that the decision rests with the Rubber Growers' Association in London, and that, as they represent for the most part the wealthy and well-financed estates, they will prefer to see the poorer and weaker estates go out of cultivation rather than consent to compulsory restriction under government control. The Dutch East Indies, Borneo, Ceylon and South India have not at present any similar proposals, and unless they also agree to government control, the Federated Malay States would suffer much more severely than other planting countries."

One of the principal sources of revenue of the Government of the Federated Malay States is the export duty on rubber which ceases when the price falls below 50 cents (Straits) per pound (about 1*s.* 2*d.*, or approximately 23 American cents). At present prices, therefore, the Government is losing a large part of its income, and it is to the direct advantage of the Government that the price of rubber should advance to higher levels.

THE TWENTY-FIVE PER CENT VOLUNTARY RESTRICTION

This scheme, which has been in force since November, 1920, has produced very extraordinary results. In the first place, the restriction is not on the crop of 1920, but upon the estimated crop of 1921. The analysis of the outcome up to the present time shows very conflicting results. Many estates have carried out the plan according to agreement. Others have reduced as much as 40 or 50 per cent. Some have considerably increased their crops, while, on the contrary, some have ceased tapping altogether.

Native estates and those owned locally are not included in the scheme, as they are not under the control of the Rubber Growers' Association which is responsible for its inception. A good many of the locally-owned European companies registered in the East are restricting—either by adopting alternate-day tapping or resting less profitable areas. Some few have closed altogether, owing to lack of funds. The net result seems to be that the native and locally-owned estates of Malaya are now producing approximately 25 per cent less than a year ago.

It has been almost impossible to arrive at any reliable data regarding the Chinese estates, but a very large portion of their crop is, as is well known, of a low grade. At present, these grades are almost unsalable and are probably being stored. "I have learned from Chinese sources," continues the report, "that the larger estates, that is, estates over 50 acres, are producing their rubber at a very cheap rate—18 to 20 cents per pound—or between 5*d.* and 6*d.* Singapore (approximately 8 to 10 cents United States currency). The very small estates—5 to 50 acres—are finding it difficult to produce below the selling price and many of them are closed down. It is certain, therefore, that they must, in the aggregate, show a big reduction on last year—probably 25 to 35 per cent would be a fair estimate."

On the European Malayan estates the crops show great variation, some are greater, some less than last year, but on the total figures the net result has been a decrease of about 12 per cent. This figure is arrived at by a direct comparison of the crop of December, 1919, and December, 1920. As these estates account for the great bulk of the rubber produced in Malaya, it is now estimated that the total reduction on all estates is about 15 per cent.

The tendency is for the crops to show greater reductions as time goes on. There is no doubt that a great many of the smaller and poorer estates are already greatly restricted and in many cases closed down, and the acreage out of bearing will tend to increase rapidly if present low prices continue. From an analysis of the entire report it is safe to estimate total crop output is now well up to the standard of 25 per cent voluntary restriction.

COST OF PRODUCTION

It is obvious that everything possible is now being done to cut down expenses. Estimates are subject to the most rigid scrutiny and everything not absolutely necessary is cut out. On the European estate no capital expense is allowed for new buildings or new machinery unless of the most urgent need. The directors tell their managers, "We have no funds to give you. If the estate is to continue, you must produce under the selling price." This is the best possible incentive to economy as the manager's job depends on his ability to cut costs to the lowest figure. The report states that one manager, when placed in this position, had actually cut his costs down to 6½*d.* f.o.b., or about 10¼ cents per pound, United States currency.

The cost of labor in 1920 was high, partly owing to the general tendency to higher living costs, and partly to scarcity of help. Rates of pay vary considerably throughout the Federated Malay States. In Jahore and Malacca they are higher than in Selangor, Perak and Negri-Sembilan. As a result of the slump many of the estates have discharged the coolies and the consequent surplus has resulted in lower wages all around. Chinese coolies who earned 60 cents a day ten months ago are now glad to get 45 cents (Straits). Many of the estates are replacing their Chinese by Tamils who are cheaper and less independent. The price of rice has fallen enormously and all commodities, as acetic acid and tapping and packing articles, show a downward tendency and are more likely to become cheaper than not.

"The average well managed estate," the report continues, "is able to produce rubber at the present time, at 38 cents, Straits (about 11*d.* per pound, 18 cents United States currency), and new estimates show further reductions. I saw several estate estimates of 30 to 32 cents (14 to 14¾ cents United States currency) for 1921, and the agents assured me that these costs could easily be realized with proper care. In the Jahore and Malacca districts the costs are a few cents higher, but there, also, well-managed estates ought to produce at about 10½*d.* (about 17 cents United States currency) per pound, f.o.b. The average cost to a London estate between the f.o.b., and the 'all in' cost, after adding in the directors' and secretarial expenses, selling charges, freight, insurance, etc., is 2¼*d.* per pound, so that the 'all in' costs of a good average estate in the Federated Malay States, for the year 1921, should not exceed one shilling per pound (about 19½ cents United States currency).

"As regards the Chinese estates, it is difficult to generalize, but it is certain that a fairly large Chinese estate can produce as cheaply as a European one. The only figures I actually possess show that the Chinese estates of 100 acres and upwards are producing as low as 6*d.* per pound, f.o.b. The smaller ones are more expensive but vary so much that it is impossible to give a firm figure. The fact that most of the very small native estates turn out 'junk' which fetches a very low price has probably accounted for many of them stopping tapping altogether.

"It is worth noting that the slump has already caused a certain amount of unemployment among both Europeans and natives. The Government has the matter in hand and is arranging to employ the surplus labor on government works, like roads and buildings. Otherwise, a large unemployed force in this country would lead to trouble of a very serious nature like gang robberies

and other crimes. A starving Chinaman is a dangerous citizen."

THE VALUE OF ESTATES

In discussing this subject, the report divides the estates into three classes:

1. These are the estates which have been opened and planted in the best way. They are clean, healthy, and furnished with permanent buildings, up-to-date factories, and will be able to carry on for years without any heavy expenditure for new buildings and capital outlay. In this group are classed all the best London estates, like Harrisons & Crosfield, Guthrie, Boustead, etc. or the Holland-American plantations in Sumatra. For various reasons the original cost of such estates varied enormously, but it may be taken as a good safe figure that to open, plant, and provide all permanent buildings, etc., and to bring a first-class estate into full bearing costs about £50 per acre. In 1919 such an estate was valued by the market value of the shares at about £150 per acre, that is, a one-pound share was quoted on the London Stock Exchange at three pounds. At the present time its market value is about £1 12*s.* 6*d.*, or £80 per acre.

2. There are a great many estates in the East which have all the properties of a rubber estate without being nearly first class. They have been badly planted, overtapped, and in most cases have poor buildings and factories. Most Chinese estates come in this group, and, from what could be learned locally, it would be possible to purchase an estate of this description at the present time for between £40 and £50 per acre. It is in this group that the biggest wastage will take place for the reason that many have no funds and cannot operate at present prices.

3. The native-owned estates which consist of simply so many rubber trees and the most primitive means of tapping and curing the rubber. These are worth practically nothing at the present time.

"On my visit to Kuala Lumpur," says the investigator, "I had a conversation with a director of a large company which possesses 5,495 acres under rubber, and is a first-class, well-managed property in every respect. He informed me that his company had just completed the purchase of 1,000 acres adjoining their estates, for £36 per acre. This rubber was well-planted and in good condition but not yet in bearing and the owners were unable to finance it until maturity. An offer of £36, cash down, closed the deal. I have no doubt that if any one was prepared to bid a reasonable price for many estates the owners would be only too glad to sell, but the figures I have given are the present values according to the market value of the shares."

STOCKS OF RUBBER

This is a subject on which it is exceedingly difficult to obtain reliable figures. In Kuala Lumpur, Ipoh, and Penang there are many estates which have large stocks on hand, but one can get nothing definite. One thing is certain, estates that did not sell rubber forward for 1921 and are able to hold on to it, are certainly doing so. Similarly, the Chinese are holding big stocks here, bought months ago, and are simply sitting on it indefinitely until they can sell at a profit. Although there is no means of proving it, the report's estimate of between 60,000 tons and 100,000 tons for the Middle East cannot be very far out. No one can do more than guess at the figure, but there is certainly a great deal of rubber in stock.

IN GENERAL

"While the big men in the planting industry," concludes the report, "fully realize the nature of the present crisis, they are by no means panic-stricken. A very great majority of the large estates are well-provided with funds and can last for a long time. It would be in their interests if the slump resulted in the disappearance of many of the smaller and poorer estates. Where convenient and possible, it might pay the big estates to buy up the smaller ones. They take the view that this is not the first slump in the history of the industry, nor is it confined to rubber alone, and that things will right themselves in time. Restriction of tapping is by no means an evil. It enables the estate to rest its trees and improves them in every way for bigger yields in the future. The results of alternate-day tapping are uncertain, but it has been proved that if one can obtain 75 per cent of rubber by alternate-day tapping, as compared with daily tapping, the cost of production is the same. The lower the selling price of rubber, the more profitable is the alternate-day tapping system, owing to saving in labor. Results so far show that alternate-day tapping will yield at least 60 per cent of daily tapping, and the probability is that this percentage will greatly increase as time goes on. Furthermore, many estates were overtapped during the boom. To rest them now will do them all the good in the world.

"I have also tried to find out how long it would take for an estate which ceased operations entirely and was allowed to grow up to weeds, to reach a state when it would be of no value. Even after a year's neglect it could be brought back to bearing with a good deal of expense. After two years' neglect it would be so overgrown as to be practically valueless. In any case, it would cost very little to keep an estate clean, even if no tapping took place, and some estates are adopting this policy where the company has surplus cash. It is always expensive tapping new areas for the first time, and it is cheaper and better in every way to leave the trees as long as possible before tapping them.

"The general position in Malaya is bad, but by no means hopeless. Although for the moment very few estates are producing rubber under the present selling prices, the result of drastic economy will tend to bring down costs very considerably and will give the estates a very necessary lesson in economy. Native and Chinese estates will suffer badly and unless matters improve, many will probably pass out of existence and become overgrown with weeds. Apart from any compulsory restriction scheme, there will be a big reduction in output this year, and I believe every month will see a still further reduction in output generally. It will depend on how soon and how much the market recovers to a profitable level whether a big acreage in the Federated Malay States will be lost for the future."

COMPRESSED CARBON BLACK

Carbon or gas black as first obtained at the factory is very bulky and only about three to four pounds are contained in the standard bag measuring 22 by 12 by 8 inches. By agitation and proper methods of packing, however, much of the contained air is expelled so that the standard package will contain 12½ pounds, net.

Carbon black, being light and fluffy, if used on ordinary rubber mills in an open room, is apt to be thrown up into the air as the rolls revolve, rendering the operating conditions insufferable. In consequence, black mixing is often conducted in a separate room on hooded mills provided with a slight suction draft so that the dust will be more or less under control. In this way the ordinary uncompressed black may be tolerated.

The desire to improve the conditions of handling carbon black in the mixing room has led manufacturers to consolidate it in compact packages. This is a slow process since the required pressure must be applied gradually, permitting the air to seep out of the bag where it is tied. In addition, the pressure at the final stage must be left on the black some time, as otherwise expansion would take place on removal of the pressure. Pressed black, as ordinarily put out at the present time, is in standard bags measuring 22 by 12 by 4 inches, or these are again compressed to measure 22 by 6 by 6 inches. This final compression shows a reduction in volume of more than half the original package.

Many rubber manufacturers find that this compressed black, while more acceptable to the workmen, is more difficult to mix than in the loose condition. This fact, together with the increased price entailed, tends to confirm continuance of the general practice of segregating the mixing of black stocks in a room apart from other rubber work.

Tire Production in the United States

Statistics published by the United States Department of Commerce, together with those gathered and prepared by The India Rubber World, show the development of the American rubber tire industry during and since the world war.

That its phenomenal growth is due chiefly to the enormous and steadily increasing use of the automobile for both business and pleasure is indicated by the rapidly advancing motor vehicle registration for recent years and the fact that only about 2½ per cent of the tire product is being exported. The United States consumes practically all the tires it makes.

AMERICAN MOTOR VEHICLE REGISTRATION

The total 1919 registration of 7,558,666 cars represented a gain of 23 per cent over 1918; that of 9,211,295 cars in 1920, a gain of 22 per cent over 1919. Five states—New York, Ohio, Pennsylvania, California and Illinois, named in their relative order, have about one-third of the total registration of the whole country. Their 3,107,050 motor vehicles is over 81 per cent more than the combined registration of the entire world exclusive of the United States.

Of the entire world registration of passenger cars and trucks, numbering 10,922,278, 83 per cent are in the United States. In other words, there are nearly 5½ times as many cars in operation in the United States as in all the rest of the world. It is interesting also to note that in 1914 the United States had more motor vehicles than all the rest of the world now has.

Assuming five tires per car as the average annual consumption in 1913 and three and one-half tires per car the present consumption, owing to the wider use and longer life of cord tires, the American demand for tires has grown from about 6,275,000 in 1913, to about 32,239,532 in 1920, or more than five times that of 1913. On the same basis, the 1920 tire demand for the rest of the world was only 5,988,440 tires.

AMERICAN TIRE AND TUBE PRODUCTION

During the past seven years the American tire and tube production, actual and estimated, has been as follows:

PNEUMATIC TIRE AND TUBE PRODUCTION

Year	1913	1914	1915	1916	1917	1918	1919	1920
Casings	*6,588,000	*8,983,000	*12,840,000	†18,564,957	†25,840,656	*21,000,000	*35,000,000	*43,750,000
Tubes	....	....	....	†16,785,398	†23,256,752	*19,000,000	*34,500,000	*43,125,000

*Estimated. †Under 6 inches.

It will be seen that the figures for 1917, the last year prior to government curtailment of tire production, show an increase to nearly four times the output for 1913. Although production in 1918 was curtailed to about 85 per cent of the 1917 output, the 1919 production showed an increase over 1917 of 23 per cent in casings and 48 per cent in tubes. In 1920 the production of casings and tubes increased about 25 per cent. At an average of $25 per tire, the retail value of the 1920 product of casings was about $1,093,750,000, to which may be added $172,500,000 for the tube production at an average of $4 per tube, making a total of $1,266,250,000 for the pneumatic tire output of 1920.

AUTOMOBILE REGISTRATION

Year	1913	1914	1915	1916	1917	1918	1919	1920
Cars	1,254,971	1,711,339	2,445,664	3,512,996	4,983,340	6,146,617	7,558,666	9,211,295

AMERICAN CRUDE RUBBER CONSUMPTION FOR TIRES

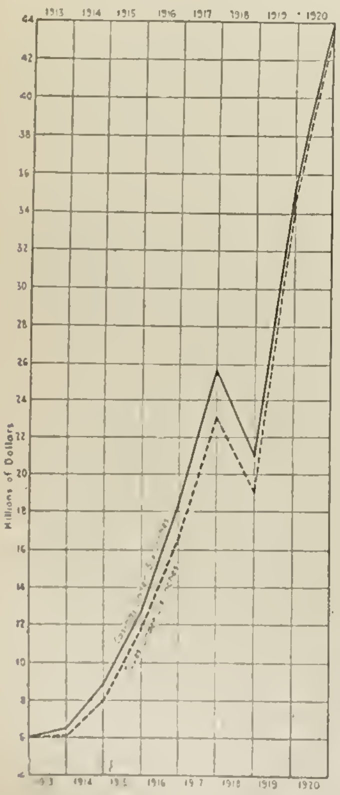
For the manufacture of the tires and tubes mentioned above the consumption of crude rubber was as follows:

	1918*	1919*	1920
Automobile and motor truck casings ..... *pounds*	150,000,000†	225,000,000†	204,852,163
Inner tubes	35,000,000†	48,000,000†	51,025,392
Solid tires	48,000,000	40,000,000	26,482,247
Other tires and sundries	15,000,000	12,000,000	10,075,927
Totals	248,000,000	325,000,000	292,435,729

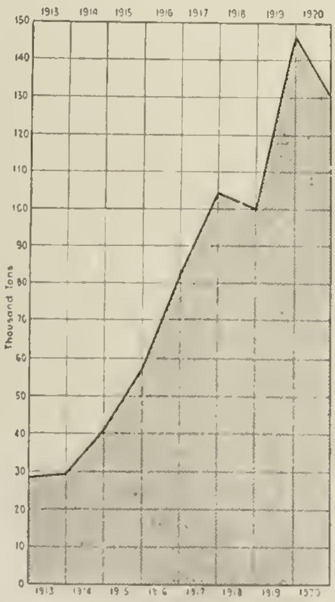
*Estimated.
†Under 6 inches.

Only the estimated total weights are available for the years 1913-1916. They are in pounds: 1913, 65,880,000; 1914, 89,830,000; 1915, 128,400,000; 1916, 185,649,570. The total 1917 consumption was 233,386,796 pounds. As compared with these figures, only 47,907,520 pounds of rubber were required to manufacture the 5,988,440 tires required to meet the 1920 world demand exclusive of the United States, assuming 8 pounds of rubber per tire.

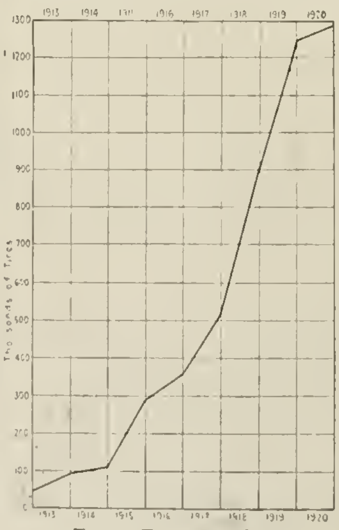
In 1920 some 51 per cent of the total india rubber im-



Pneumatic Tire and Tube Production



Crude Rubber Consumed in Tires and Tubes



Truck Tires for Original Equipment

Passenger-Car Tires for Original Equipment

ports into the United States was used for tires and tire sundries as against 60 per cent in 1919, 75 per cent in 1917 and 58 per cent of the imports for the fiscal year 1913, indicating the greater supply of the raw material. The actual quantity of crude rubber used in 1920, however, was not quite 4½ times that for the year 1913, as against almost five times the 1913 quantity in 1919 and about 3½ times that for the year 1917.

AMERICAN TIRE DEMAND FOR ORIGINAL EQUIPMENT

Statistics of motor vehicle production in the United States indicate the increasing number of pneumatic and solid tires required annually for original equipment.

MOTOR VEHICLE PRODUCTION

Year	Passenger Cars	Motor Trucks	Totals
1913	461,500	23,500	485,000
1914	543,679	25,375	569,045
1915	818,618	74,000	892,618
1916	1,493,617	90,000	1,583,617
1917	1,740,792	128,157	1,868,947
1918	926,388	227,250	1,153,637
1919	1,657,652	316,364	1,974,016
1920	1,883,158	322,039	2,205,197

Only a cursory inspection of these figures is necessary to see how the production of passenger cars and correspondingly of pneumatic tires under six inches was curtailed by the war situation of 1918, and the production of trucks and truck tires stimulated. Truck tire production for original equipment has shown continuous growth during and since the war period. In 1918 it had increased to over 9½ times the 1913 production for this purpose and in 1920 to over 13½ times the 1913 production. In 1920 pneumatic tire production for the original equipment of passenger cars exceeded the previous high figure for the year 1917 by 569,464 tires, and exceeded the 1919 requirements by 902,024 tires, this being over four times the 1913 output. It is seen, therefore, that while 1,940,000 tires sufficed for new equipment in 1913, no less than 7,475,888 were required in 1917, and 8,820,788 in 1920, an increase to over 4½ times the 1913 requirements. During the past year both the greater volume of increase and the greater rate of increase have been in pneumatic tires under 6 inches, as distinguished from large pneumatic and solid tires for trucks.

As to the 1921 production of motor vehicles and tires for original equipment, estimates vary rather widely. Prophets, of course, are as fallible as those who do not venture opinions. Furthermore, the major part of all prophecies fail. However, business conditions throughout the country are such that, with an abnormal number of used cars on the market, it seems unlikely that the 1921 production of motor vehicles will exceed 75 to 80 per cent of the 1920 output, say 1,500,000 passenger cars and 250,000 trucks, the total 1,750,000 vehicles requiring 7,000,000 tires for original equipment.

TIRES IN USE IN THE UNITED STATES

Of the 9,211,295 motor vehicles registered in the United States during the calendar year 1920, some 990,000 were trucks, so that nearly 8⅓ times as many pneumatic tires under 6 inches as truck tires were in use last year, the number of each sort, exclusive of spares, being approximately 32,885,180 pneumatics under six inches and 3,960,000 truck tires. One additional tire per car would be a conservative estimate for spares, making the totals, 41,106,475 pneumatics and 4,950,000 truck tires. With 46,056,475 motor vehicle tires in use it is not surprising that some 30,000 vulcanizers are kept busy with repairs and retreading.

On the basis of 40 pounds of rubber average per car for regular equipment and one spare, a total of 368,451,800 pounds of rubber had been consumed in manufacturing the tire casings in use in the United States last year, an amount greater than the total india rubber imports of the United States for the calendar year 1918, and equal to nearly 54 per cent of the United States india rubber imports for the calendar year 1920. On the same basis, only 68,439,320 pounds of rubber had been consumed in manufacturing the tire casings in use in the entire world exclusive of the United States.

UNITED STATES TIRE EXPORTS

Export trade is becoming an increasing part of the American motor tire business, as shown by the following statistics compiled the Bureau of Foreign and Domestic Commerce.

A study of these figures reveals several facts of interest, particularly the remarkable growth of the tire exports to the entire world notably Europe, and to Oceania, Asia and Africa. The combined value of the 1920 business in the three divisions last named was nearly 50 times the value of these exports in 1913. Tire exports to Asia have increased constantly, the 1920 total being 140 times that of 1913 and 40 per cent greater than that of 1919. Exports to Oceania fell off in 1917 but the following year had nearly reached the high mark of 1916. In 1919 there was a substantial increase that continued through 1920.

North American exports were adversely affected in 1914 and 1915, but thereafter grew steadily, the 1920 business showing a large growth over 1919.

The South American trade maintained a continuous and remarkable growth from 1913 to 1920, inclusive, the value of the 1920 exports being more than 60 times that of 1913.

Exports to Africa grew steadily until 1918, when their value reached some 42 times that of 1913, but showed a falling off of about 7¾ per cent for the calendar year 1919 as compared with the fiscal year 1918. The 1920 business, however, increased to over four times the value of that in 1919.

European exports have fluctuated greatly owing to the war. In 1914 they decreased a little, but increased considerably in 1915 and in 1916 jumped to more than five times their value in 1913, after which they declined steadily, the value of the 1918 shipments being only about 74 per cent of the 1913 value. The 1919 exports, however, exceeded the banner year 1916 by more than 8 per cent, showing an increase to more than six time the 1913 value—and the 1920 business was over $18,500,000.

Total tire exports to all countries fell off in 1914, but gained in 1915, jumped during 1916 to about 4¾ times as much as in 1913, dropped considerably in 1917, but showed a noticeable gain in 1918 and have increased ever since. Automobile tire exports for the calendar year 1919 amounted to more than double the value for the fiscal year 1918, and for 1920 were over 50 per cent more than for 1919. It may be said, therefore, that despite the fluctuations of 1914 to 1917, inclusive, and the lower rate of increase last year, American automobile tire exports have shown a great and steady growth, the value of the foreign business in 1920 having increased to over eight times what it was in 1913.

AUTOMOBILE TIRE EXPORTS

Exported to:	1913*	1914*	1915*	1916*	1917*	1918*	1919†	1920†
Europe	$1,977,029	$1,764,240	$2,745,450	$10,992,184	$3,480,114	$1,460,518	$11,907,480	$18,554,782
North America	1,626,155	1,254,200	1,187,632	2,184,874	3,186,265	4,474,713	5,188,317	7,193,918
South America	100,065	115,387	214,068	1,050,398	2,596,936	3,432,181	4,986,024	6,426,412
Asia	36,212	64,173	73,430	477,895	810,300	1,194,551	2,970,464	5,220,430
Oceania	185,807	279,327	702,877	2,896,401	1,832,244	2,662,422	3,177,431	3,953,506
Africa	17,952	27,940	39,813	334,475	424,342	753,286	694,943	2,550,546
Totals	$3,943,220	$3,505,267	$4,963,270	$17,936,227	$12,330,201	$13,593,420	$28,924,659	$43,899,594

*Fiscal year ended June 30. †Calendar year.

TOTAL AMERICAN TIRE DEMAND FOR 1921

It is estimated that the 9,211,295 motor vehicles registered in the United States in 1920 will require about 32,239,532 tires annually to replace those worn out at the annual rate of 3½ tires per vehicle. To this may be added the 7,000,000 tires likely to

be required as original equipment for the 1921 production of some 1,750,000 passenger cars and trucks, making a total visible demand for 39,239,532 tires. That this total appears to be a conservative estimate is indicated by adding 22 per cent—the increase in motor car registration for the year 1920—to the estimated 1920 tire consumption amounting to 34,065,000 tires, as shown in The India Rubber World of March, 1921, page 410, which indicates a demand for 39,559,300 tires. Thus, despite the temporary sales depression of the spring and early summer, the future of the tire industry cannot be viewed with other than assurance.

A PNEUMATIC TREEING MACHINE

This machine is a great improvement on the machines using wooden feet, as these feet are made of flexible rubber, covered by leather and supported by a wooden back or leg. The rubber feet are inflated with compressed air supplied by a small air compressor and air tank. The shoe to be ironed is placed on the tree, air admitted, and the rubber foot encased in the leather casing expands to fill uniformly the shape of the last. With the release of the air the foot collapses and the shoe is readily removed. This machine does not require a change of feet for every size of shoe to be ironed, two or three shoes being treed on one size foot.—W. J. Young Machinery Co., 416 Union street, Lynn, Massachusetts.

RUBBER ACCELERATOR SERVICE LABORATORIES

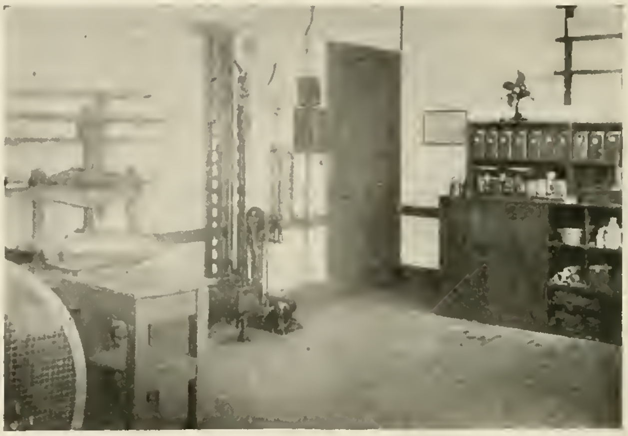
At its Perth Amboy plant, the Roessler & Hasslacher Chemical Co. maintains what might be termed an accelerator service laboratory. A number of years ago when the use of accelerators was in its infancy, this company prepared to secure exact information as to the action of its accelerators in various stocks and under widely varying conditions. It therefore engaged the services of an experienced rubber technologist and equipped a modern rubber laboratory for this purpose.

The laboratory equipment, part of which is shown in the accompanying illustrations, was so selected that all factory conditions of vulcanization could be duplicated. With this equipment it has completed elaborate series of tests on its various accelerators in standard-type formulas in comparison with many other well-known accelerating materials, and with some not so well known. The type formulas used were so selected that the effect produced by large and small amounts of active inorganic materials could be determined. As a result of these comprehensive tests, the company is able to give rubber manufacturers exact information as to the proper utilization of its accelerators under widely varying conditions.

Mixing Mill, Calender and Vulcanizers

Many rubber manufacturers have availed themselves of the service offered and have sent type, or actual formulas in which it is desired to use an accelerator. When such formulas are received, varying amounts of accelerator are added and the stock is given a range of cures for each percentage to determine the optimum cure for factory operation. The usual tests, tensile, stretch, and permanent elongation, are recorded for each cure and the results are submitted to the rubber manufacturer.

During the four years of its operation this laboratory has accumulated a vast amount of accelerator information and has made practical tests for many rubber manufacturers covering stocks varying from those for rubber bands to those for solid truck tires, many of which have resulted in a direct benefit to the rubber manufacturers. This service is offered gratis to all present and prospective accelerator users regardless of the magnitude of their output.



Compounding Bench, Vulcanizing Press and Tensile Machine

INTERESTING LETTERS FROM OUR READERS

RECEIVED THE DESIRED INFORMATION

To the Editor:

Dear Sir: We wish to thank you for your letter of May 19 and for the information contained therein. This information is just what we were anxious to get.

I have also taken steps to have this company subscribe to The India Rubber World in the very near future. I feel that you will undoubtedly be able to help us a great deal from time to time both through the periodical which you publish and by direct answer to our questions. It is very gratifying indeed to find one who is willing to give the right kind of information.

We shall look forward to receiving the sample copy which you have sent to us. Inquirer.

This letter is published to call our readers' attention to the opportunity afforded by our Information Department for reliable rubber information.—The Editor.

INTERESTED IN SELECTING WORKMEN BY PSYCHIATRY

To the Editor:

Dear Sir: Is it possible to get full details as to method employed, questions, etc., by Lieutenant A. W. Stearns, M. D., in selecting workmen by psychiatry as mentioned in your issue of May 1, 1921, page 554?

Such information would be of real value to me.

Alameda, California. A Reader.

Lieutenant A. W. Stearns is a resident of Billerica, Massachusetts, and I am sure would be very glad to be put in touch with you.—The Editor.

AMERICAN TIRE TRADE IN BRAZIL

Among exports from the United States to Brazil, during 1920, may be mentioned tires, which in that year amounted to $1,965,201 as compared with $1,018,055 the year before. This is an increase of about 93 per cent.

Repairing Rubber Gloves and Mittens—V[1]

A New and Valuable Line for Repairmen

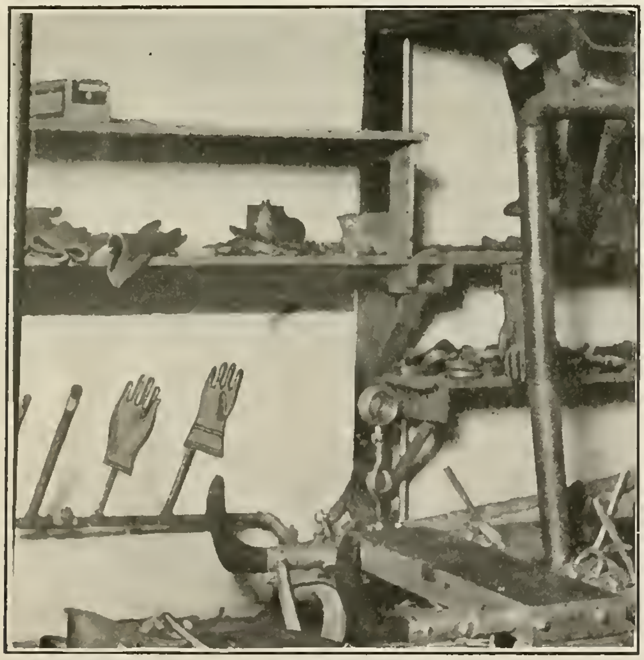
Household Gloves—Practical Suggestions—Repairing Heavy Gloves—Cement-Workers' Gloves and Methods of Repair—Electric Vulcanizer for Rubber-Glove Repair—X-Ray Gloves—Tanners' Gloves—Driving Gloves—Acid Gloves—Mercury Gloves—Cyanide Gloves—Sprayers' Gloves—Electricians' Gloves—Testing Linemen's Rubber Gloves—Rubber Mittens—Acid-Workers' Mittens—Rubber Finger Cots—Rubber Patches for Leather Gloves

HOUSEHOLD GLOVES

Little or no effort appears to be made to repair efficiently the considerable number of medium-weight dipped seamless rubber gloves worn by housekeepers, tanners, dyers, photographers, gardeners, embalmers, chemists, and others. "Household gloves," as the type is known, are made from a wide variety of gums, and the colors range from white, gray, tan, red, and brown to black. For women they range in size from 6 to 9 and for men from 9 to 12, inclusive, in full and half-sizes. They are generally snug-fitting, have tapering fingers, and, while a few styles have gauntlets, most household gloves are short with a wide wrist. For special purposes some are made with a high gloss, and one variety in gray is particularly soft and pliable. Long dipped gloves (bleaching gloves) of pure gum are often used by women to cover the hand and forearm after a preparation has been applied for whitening the skin. Such gloves come in sizes of from 6 to 10, inclusive. They are repaired in the same manner as surgeons' gloves, with thin rubber and cement, and cold-cured.

PRACTICAL SUGGESTIONS

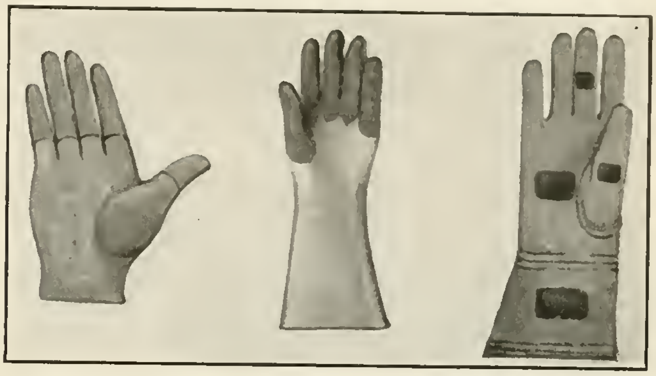
A point to remember in getting ready for repairs is that most gloves have been thoroughly coated with French talc. This



Glove Repair Unit in a Rubber Shoe Repair Shop

should be removed thoroughly, or the patch will not stick. It is also well to recall that gloves from hospitals may not have been deodorized or disinfected. It would therefore be well before handling these gloves at all to dip them into the formaldehyde solution that is mentioned in the previous article. Of course, after dipping they should be thoroughly dried before the patch is attempted. It is an excellent plan for a man doing small work, such as glove repairing, to get in touch with manufacturers of rubber stamps. They do a great variety of vulcanizing, make their own small molds and as a rule can give much information that is of value.

In order to get a good surface on the ends of fingers, some repairers have metal thimbles cast, finished and set into a hot plate.



Mended With Cots Fingers Refaced Vulcanized Patches
Three Types of Glove Repair

The ends of the fingers can then be set down into these cavities and, with the form inside, the cure is rapidly effected. For fine gloves, the apparatus used in some of the hospitals might be of value. They use the electrical immersion heater, or rather an adaptation of it, such as is used in heating a glass of water. It is indeed quite like the electric curling iron. This will cure a patch at the end of a finger very well. If one is doing a large business, however, it is not practical. Some repairers use a large bulb with a fine nozzle on the end and draw in hot air from a gas-jet to dry a small patch just as a dentist uses his small hot-air bulb for drying out a tooth cavity.

REPAIRING HEAVY GLOVES

While all types of rubber gloves are repaired in some way, those on which the most durable and efficient mending is usually done are the heavy hand coverings of which cement-workers' gloves are a general type, and in which class might be included the gloves largely worn by tanners, dyers, glass-cutters, and acid, mercury, and cyanide workers. Primarily, the incentive to repair is the comparatively high cost of such gloves. Then, too, on account of the stocky character and rich compound of which they are made, such gloves are favorite subjects for vulcanizers who can readily affix on them patches that give good service.

The heavier gloves and mittens are used as a rule in industries where the workers' hands are exposed to destructive acids or alkalies, or where there is abrasive material that tears the hands. Where only wear is to be contended with, almost any repair stock of good quality will answer. For the best work the repair should be vulcanized into place. In many cases, however, self-curing stocks will accomplish the purpose very well. Where the worker uses gloves or mittens that come in contact with acids, care should be taken to have a repair stock in which there is very little, if any, whiting or any substance that is readily attacked by acids. Where alkali is to be encountered, the man who supplies the repair stock should be notified that patching material containing substitutes cannot be used.

CEMENT-WORKERS' GLOVES

Cement-workers' gloves are made from sheets of heavy rubber compound with seams reinforced and cemented so as to with-

[1]Copyrighted by Henry C. Pearson. Continued from The India Rubber World, June 1, 1921, pages 647-648.

stand the roughest usage. They are usually of red or black rubber, are from 9 to 11 inches long, cloth-lined, and are effective in protecting the hands of cement and mortar workmen from the corrosive alkali in moistened calcined clay and limestone. So essential are rubber gloves regarded by cement workers, that gangs laboring on concrete jobs have often struck rather than work without some such protection for their hands. They are today in general use by men spreading and finishing cement on roads, bridges, mill dams, factories and nearly all large concrete jobs.

Road and building construction companies buy cement-workers' gloves in large lots and they often sustain severe losses through misuse of the gloves, or because means of repairing them are not often convenient. The gloves are usually scrapped as soon as the cement liquid begins to seep through the cracks and fissures. Yet up-to-date repair men know that there is no reason why cement-workers' gloves should be cast aside when the breaks in them are comparatively small. They can easily be put in good condition—if not too far gone—by either of two processes which have proved practicable.

METHODS OF REPAIR

One efficient method of repairing heavy gloves of the cement-workers' type is that of vulcanizing on a piece of repair stock by using short steel tubes with the ends rounded and attached to a large steam pipe. Such tubes are made with varying diameters to fit several sizes of fingers. The rent or a worn spot in a glove is first buffed clean. A patch of 1/32-inch pure gum stock of suitable size is cemented on and the hot tube taped to protect the glove finger which is slipped over it. The patched finger is also taped to give pressure for vulcanizing, and the patch is then allowed to cure for five minutes. A second patch of similar gum stock is next applied, again taped for pressure, and eight minutes allowed for curing. The repaired glove is then rinsed in cold water and finished.

By another method, equally effective, the patch is placed inside, instead of outside the glove finger, or the palm, or back, and when the job is finished, little else is noticed on the exterior of the glove other than a dark spot corresponding in size to the rent or worn place. By this process the curing is done on an ordinary steam-heated tube-vulcanizing plate equipped with screw, spring, or weighted clamps. The glove is first turned inside out and the repair spot is then buffed on an emery wheel to clean the edges of the cut. A further buffing is given with a wire brush, widening the abraded surface and producing a more or less feathered edge around the cut. A piece of 1/32-inch quick-curing (5 minutes) tube repair gum is cut to little more than fit the buffed place which is given a coat of cement.

The patch is applied after the cement is thoroughly dry. Before being placed on the hot-plate, a piece of 1/16-inch felt is laid on top of the patch to prevent bruising the rubber, and over this a small block of wood is placed, care being taken that the block does not overlap the seam at either side of the finger. The repair job is then put on the hot-plate and the clamp applied to give the desired pressure. A temperature of 298 degrees (50 pounds pressure) is preferred, as at higher temperatures the rubber is often over-cured. Practically no finishing is required on the repaired glove.

ELECTRIC VULCANIZER FOR RUBBER-GLOVE REPAIR

A portable vulcanizer for repairing the finger tips of rubber gloves utilizes an electrically-heated platen. This British invention is an oblong, low-set device with the platen set across the center, and on the platen rest the forward ends of fourteen hinged or pivoted wooden finger-trees, seven being placed at either side, the part lying on the platen being flattened. When the torn glove finger is stretched over a tree the rubber repair stock is suitably applied and the covered tree is clamped to the platen until the cure has been effected. A thermometer on the platen indicates the degree of heat. The trees not needed can be thrown back out of the way, or all can be used together in the repair of several gloves with the same heat.

X-RAY GLOVES

Rubber figures as an important factor in X-ray and radium laboratories. Heavily compounded with lead, which is opaque to the highly penetrating radiation from the Crookes-Roentgen tubes as well as that of radium, rubber enters into the X-ray protective cloth from which masks and aprons are made. The latter are reported not only to save operators from more or less harmful skin irritation, but to give long wear. Two kinds of gloves are used, both made of rubber compounded with lead, one of light weight used for handling patients, palpation, etc., and the other very heavy and used while manipulating apparatus in large-scale radiography. Of the latter little complaint is heard, but of the lighter gloves, retailing at $15 a pair in most cases, it is said that with only ordinary use they often give out in a month or two. Splitting between the fingers and quickly wearing at the tips seem to be the common troubles. It is believed that X-rays do not exert any harmful effect on the gloves, and they are seldom touched by injurious chemicals.

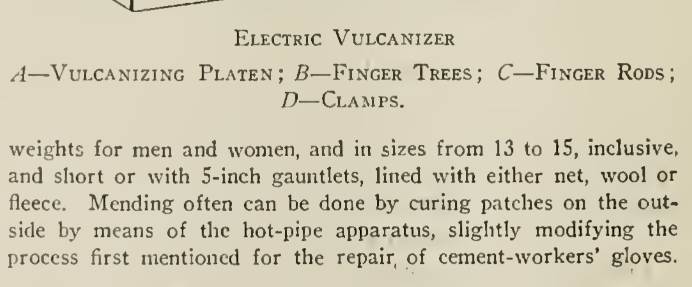
The weightier gloves, probably the heaviest gloves made, are worn when extensive radiography is done, as of the chest, abdomen, etc., and where exposure is considerable and long continued. The heavy gloves are usually 12 inches long with a cuff to protect the wrist. In the event of repairing either type of glove, the repairman would find it necessary to procure for patches, stock of the same kind used in manufacturing X-ray gloves, namely, lead-compounded, and the method of curing on patches would be similar to that employed in repairing cement-workers' gloves.

TANNERS' GLOVES

Rubber gloves for tanners are made of a stout material compounded to resist the action of most chemicals. There is an increasing demand for the gloves which are lined with heavy net as they are found much more durable than the unlined. Such gloves afford an excellent protection for the hands, wrists, and forearms of workers handling lime sulphite and caustic soda solutions used for dehairing hides, sulphuric acid solutions used for "pickling" pelts prior to tanning, and the powerful astringent solutions of oak-bark, chrome-salts, or quebracho used in tanning.

DRIVING GLOVES

Rubber gloves for driving are of fairly strong compound, and come in black, white, gray, and tan, in light, medium, and heavy



ELECTRIC VULCANIZER

A—VULCANIZING PLATEN; *B*—FINGER TREES; *C*—FINGER RODS; *D*—CLAMPS.

weights for men and women, and in sizes from 13 to 15, inclusive, and short or with 5-inch gauntlets, lined with either net, wool or fleece. Mending often can be done by curing patches on the outside by means of the hot-pipe apparatus, slightly modifying the process first mentioned for the repair of cement-workers' gloves.

ACID GLOVES

Gloves for acid-workers are made from a heavy acid-resisting black compound and are often lined with heavy net to insure

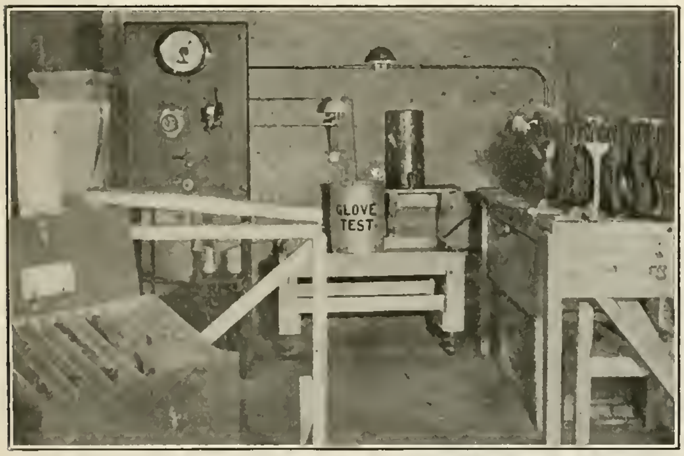
longer service. They are sold in 9 to 15-inch lengths and protect the hands, wrists, and forearms of the workers using solutions of acids and metallic salts and strong, alkaline cleansing fluids in plating, galvanizing, and other metallic and chemical operations.

MERCURY GLOVES

Gloves for mercury-workers are made in standard sizes of from 9 to 15-inch lengths of a special compound to resist the action of mercury in a liquid or gaseous state. They are used largely by smelters to protect their hands, wrists, and forearms from absorption into the system of minute quantities of the poisonous metal, which is vaporized from cinnabar and other ores by roasting. Formerly, heavy buckskin gloves were used affording poor protection to the workers. Rubber mercury gloves are also used by workers in the amalgamation process of extracting gold and silver from ores, the mercury, or quicksilver being used first to unite with the precious metals in the powdered ore and, after the excess mercury is pressed out, the remainder being volatilized with heat. Mercury-workers' rubber gloves are also much used by makers of thermometers, barometers, mercury-vacuum pumps, and other scientific instruments.

CYANIDE GLOVES

Gloves for cyanide-workers are made in black or white, usually net-lined for hard usage. The sizes range from 9 to 15 inches. The stock is heavy and specially compounded to withstand the "burning" action of strong caustic solutions used in metallurgical operations. The gloves are used to protect the hands, wrists, and forearms of mine-workers conducting the cyanide treatment of gold and silver ores, in which cyanide of potassium in solution is the active agent in dissolving and recovering the metals when crushing and mercury amalgamation cannot extract the greater part of the gold and silver content of the ores. These gloves are also used as a safeguard by workers in the supplemental treatment of ore tailings with sulphuric and hydrocyanic acid solutions. Cyanide gloves are also used in photography, electro-metallurgy, in the laboratory and in gold extraction.



Testing Electricians' Rubber Gloves

SPRAYERS' GLOVES

Gloves of the same kind as those used by cyanide-workers are now much used by orchardists in spraying trees with liquid hydrocyanic-acid gas, dilute carbolic acid, crude sulphuric acid, and cyanide of potassium solution, lime and sulphur, Bordeaux mixture, and other germicides, fumicides, and insecticides.

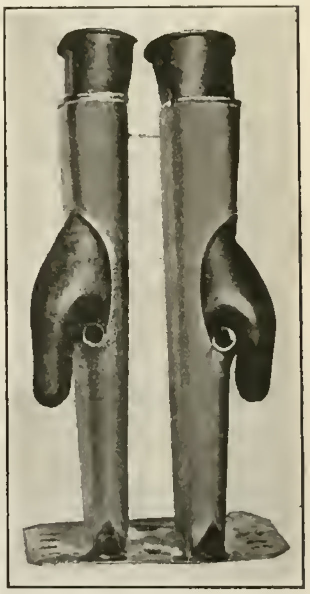
ELECTRICIANS' GLOVES

Linemen and others employed in electrical industries use heavy gloves made of pure gum, or a rubber compound that is nearly perfect as an insulator. The lighter-weight gloves are usually tested for non-conductivity up to 4,000 volts, and the gloves used on high-tension circuits are much heavier and are tested to withstand 10,000 volts. These gloves come in black, white, and maroon, in sizes from 9 to 11, short, medium, and long, some with palms and fingers reinforced. They usually give way first across the palms, due to repeated pulling on heavy wires. The method of repair is practically the same as that used in mending cement-workers' rubber gloves; and if a careful job is done, the gloves can be made quite as safe and serviceable as new ones.

Nevertheless in repairing linemen's gloves, great care should be taken, as stocks that resist electricity are an absolute necessity. If a repair man will insist on lead stock containing litharge or white lead—not any metallic substance that is a conductor of electricity—and a high quality of cement, he will be pretty safe and can do excellent work. He should be careful of red stocks, for example, as they may contain oxide of iron. At the same time, the repair man should not guarantee any such work and should insist that his repairs be tested, just as new electricians' gloves are tested.

TESTING LINEMEN'S RUBBER GLOVES

In repairing electric linemen's gloves repairmen should bear in mind that the material used in mending must be fully as good as in the glove itself and that special care should be exercised to obtain a uniform cure. Linemen's gloves above all things must be non-conductors of electricity. All rubber gloves are good insulators, but a lineman's glove must not only be of pure compound, .038 to .040-inch-thick but must also have a guaranteed dielectic strength of 10,000 volts. Each glove is tested for such resistance when bought, and later tested periodically to insure the safety of the wearers.



Copper Glove Holders

The method of testing linemen's gloves in America is simple but efficient. The glove is placed in a copper case open at top and bottom, and with an opening also at one side through which the thumb projects. The glove is then nearly filled with water. The holder and glove are next immersed in an iron bucket filled with water to within an inch of the top of the glove holder. An electrode connected with a high-tension current is placed within the water-filled glove, and the iron bucket is also put in the electric circuit. The tests include voltages ranging from one and one-quarter times the power strength of the lines on which the men ordinarily work, to the maximum of 10 milliamperes at 10,000 volts. If a glove fails to offer the proper resistance to the current it is rejected as defective.

In French tests on heavy electrical gloves the latter are sometimes filled with mercury and then immersed in a mercury-filled vessel, the resistance being measured between the mercury in the two containers. Another test is to place each glove filled with sand in a sand-filled vessel, the sand being made a conductor with a saturated solution of ammonium hydrochloride; and making voltage tests as with water or mercury.

RUBBER MITTENS

Mittens of pure gum, red, white and black, plain, or with a forefinger as well as a thumb, are used in many of the trades. Most mittens are of heavy stock and often reenforced on the thumbs and palms where wear is greatest. Mittens usually come in a single standard size, are short and long, and in three weights.

To protect the rubber surface, one style of rubber mitten has a binding to which cloth or other fabric may be cemented and sewed on whichever side the wear is most likely to occur. Some rubber mittens have net, wool and fleece lining, especially those worn by motormen and tanners, and may be worn on either hand.

Mittens may be repaired by curing on patches in much the same manner as indicated for heavy rubber gloves. In patching the palm of mittens, a flat, hollow spatula is excellent, and allows the repaired part to be firmly pressed on the hot-plate while the upper part is kept cool.

TANNERS' MITTENS

Net-lined rubber mittens are largely used by tanners in sizes from 9 to 11, and are made of a compound similar to that used in tanners' rubber gloves. For special work the mittens are made so that the wearer may use not only the thumb, but also the first and middle fingers, and they are reenforced between thumb and index finger.

ACID WORKERS' MITTENS

Acid-workers handling extra large articles often prefer to use mittens. These are made of the same material as the acid-workers' rubber gloves, are usually net-lined for rough wear, and come in sizes from 9 to 11.

RUBBER FINGER COTS

A cheap substitute for rubber gloves, and an article often preferable by reason of convenience, is the rubber finger cot or tip, as well as thumb cot. They are made in a wide variety of sizes for men and women, and the material ranges from the finest Pará tissues used by surgeons for minor operations to the light, medium, and heavy compounds used in cots worn by masons, bricklayers, oystermen, printers, photographers, and others. The fine tissue cots are usually rolled up when sold, and the heavier, or molded ones are delivered in nests of three or four, set one within another. The heavier cots are often well-reenforced at the closed end, leaving the lower part of lighter, more elastic material, so as to better grip the finger.

Equipment for Testing Linemen's Rubber Gloves

Reinforced rubber finger and thumb cots are also used by mirror-makers handling mercury and tin amalgam, as well as the substitute for the latter, nitrate of silver, now much used for coating looking-glasses. Finger cots obviate the necessity of frequent use of the irritant cyanide of potassium solution for removing the silver nitrate stains from the fingers.

Repairmen working on heavy gloves can often utilize a finger cot to take the place of part or all of a torn finger. In order to cure on such a patch, the hot-tube, with a little tapering, is necessary. A repairman with a little pains can often, by such means, practically make a new glove out of even the most dilapidated specimen.

RUBBER PATCHES FOR LEATHER GLOVES

A good opportunity for the rubber repairman lies in repairing leather gloves. A great many electric linemen who wear plain or rubberized leather gloves, over or without rubber gloves, have to discard the leather ones as soon as the slightest break appears, which usually occurs on the palm. Few leather repairmen care to mend such gloves as they cannot make a neat and satisfactory job. Using suitable cement and repair stock, or self-vulcanizing material, a rubber repairman can patch such broken leather gloves neatly and substantially.

Leather Glove Repair

RUBBER BATH MATS AND MATTING

Non-slip matting and rubber mats, usually of white, but their attractiveness being enhanced by variegated colors, are becoming popular for use in the bath, in place of linoleum for passages and around the edges of public baths. Each bath mat is supplied with eight red molded suckers fixed four on each side, to hold the mat in position when placed. The sizes are 38 by 12, 36 by 12, 36 by 10 and 34 by 10, with a thickness of ⅛-inch, in either solid or punched styles. The punched style is more popular.

Some factories buy the sheeting in rolls already punched, others buy the unpunched rubber sheeting, and calender the rubber onto cotton duck, such as is used for belting. If the material is not shrunk at the time of calendering, it will contract during the cure, and this must be allowed for. The duck is then removed from the cool material and punched tin or paper patterns of the correct size and shape are laid on the rubber and dusted with chalk or chalk and zinc oxide mixed. In the majority of cases holes are hand-punched, though there are machines available for this purpose. Holes are punched in sizes from ¼-inch to ¾-inch, with a solid edge around the mat from one to one and one-half inches wide, to prevent tearing. The ends of the mat are rounded off before vulcanizing, to prevent unnecessary waste, and the mat is then press-cured in the usual manner.—*The India-Rubber Journal*, London.

THE OBITUARY RECORD

A PIONEER TIRE MANUFACTURER

Fred W. Morgan, founder of the firm of Morgan & Wright, bicycle and later motor tire manufacturers, Detroit, Michigan, died of angina pectoris, aged 67, at his home in Chicago, Illinois, May 27, 1921.

Fred W. Morgan

Mr. Morgan was born in Kiantone, New York, March 20, 1854, and received his education at the Jamestown High School. He went to work for the Akron Rubber Works, Akron, Ohio, at the age of sixteen, and was in every sense a self-made man.

One of the pioneer business men of Chicago, Illinois, he went to that city in 1876 and built up the Chicago Rubber Works, the business growing from a small, two-story building to what was at one time the largest tire plant in the world—Morgan & Wright, Detroit, Michigan. In this business, of which he was senior partner and later president, his partner, Mr. Wright, was his father-in-law. The double-tube bicycle tire, brought out by this firm, and for which it was chiefly known, earned a fortune.

In the early days Mr. Morgan was a pioneer in the mixing of rubber. At first his experiments were conducted at home in the kitchen sink, but he soon became an expert rubber compounder and, although he retired from active business about fifteen years ago, was still experimenting with rubber compounds up to the time of his death.

Mr. Morgan stood for sterling honesty and was a fine example of the conscientious, successful business man. He told his workmen as well as his friends how to get the best out of life, and what is more, he showed them how. Strikes were never known in the Morgan & Wright plant. He mingled freely with his workmen and was the head of a big happy family. His name is known the world over, not only as a successful tire manufacturer and patentee of tire making processes and equipment, but as a great industrial leader.

In his leisure hours, Mr. Morgan was an exceptionally fine landscape artist. He painted for recreation and has many pictures of merit to his credit. A lover of the outdoors, for many years he cruised the Great Lakes on his fine steam yacht "Pathfinder." He was one of the founders and president of the Country Club of Beloit, Wisconsin, a member of the Oak Park Country Club, Chicago, Illinois; the Clearwater and Bellair Golf Clubs, Florida; Chicago Athletic Association; Chicago Yacht Club; life, governing and sustaining member of the Art Institute, Chicago, and of the Chicago Arts Club.

He is survived by his widow, Mrs. Mary A. Morgan, two daughters and two sons. Interment was in Rosehill Cemetery Mausoleum, Chicago, Illinois.

HEAD OF THE WORLD'S GREATEST WIRE MILL

Karl G. Roebling, president of John A. Roebling's Sons Co., manufacturers of insulated and other kinds of wire, Trenton, New Jersey, and grandson of the man who initiated the building of the Brooklyn Bridge, died of apoplexy on May 29 at Spring Lake, New Jersey, aged 47. Since assuming the presidency of the company in 1898, his business burdens have been very heavy and overwork had impaired his health. His untimely death, however, came as a great shock to his many friends, relatives and business associates.

Like the other members of the Roebling family, he began as a laborer and advanced from one department to another, familiarizing himself with every detail of the firm's production. He was a director of numerous other companies, including the Woven Steel Hose & Rubber Co., Trenton, New Jersey, and was a member of several clubs and commercial organizations.

Mr. Roebling is survived by his widow, three children, a brother and two sisters. Interment was at Ewing, New Jersey.

HEAD OF THE MERCER RUBBER CO.

William Henry Sayen, president of the Mercer Rubber Co., Hamilton Square, New Jersey, and president of the Valley Forge, Pennsylvania, Park Commission, died suddenly of heart disease at his home in St. Davids, Pennsylvania, on June 14, aged 73 years. Mr. Sayen had been active in business and civic welfare work until the time of his death, and had lived in or near Philadelphia, Pennsylvania, practically all of his life. He founded the Mercer Rubber Co., near Trenton, twenty-five years ago, and was active with his sons in its development. In addition he was connected with several civic and welfare organizations at St. Davids.

The deceased was born in Philadelphia in 1848 and saw active service in the Civil War as a drummer boy, being in action at the battle of Gettysburg. After the war he was made an honorary colonel. Some twenty-five years ago Mr. Sayen built one of the first bungalows in America on an island in Barnegat Bay. There "The Bold Buccaneers" were organized with the late Francis Fennimore as "pirate chief." He was a member of the Union League, of Philadelphia, and other organizations.

Besides his second wife, Mr. Sayen is survived by one daughter, Mrs. Emily Schultz, also of St. Davids, and three sons, Frederick and William H. Sayen, Jr., who were interested with their father in the Mercer Rubber Co. plant, and Osgood Sayen, who is serving with the French Army in France.

FORMER NEW JERSEY RUBBER MAN

Robert Edward Oakley, who for a number of years was associated with his brothers, Clifford H. and Lawrence M. Oakley in the rubber business, died recently at his home, 92 Dentz avenue, Trenton, New Jersey. He is survived by his widow, one son and a daughter. The interment was at Trenton.

PIONEER IN INSULATED WIRE

William L. Candee, who died April 24, at the age of 70, was one of the pioneers in the telephone industry and also an organizer and director of the Okonite Co., Passaic, New Jersey, manufacturer of insulated wire and cables. Six years ago he retired from business. In the early '90s he was captain of Company B, Twenty-third regiment, N. Y. S. N. G., resigning in 1893. He is survived by his widow, two daughters, and two sons, one of whom is W. C. Candee, of the Ackurate Rubber Co., New York, N. Y.

CITIZENS' MILITARY TRAINING CAMP

Announcement is made by the Commanding General, Headquarters 2nd Corps Area, Governor's Island, New York, that the War Department is reviving the Plattsburg idea with the following modifications:

The War Department is to pay all expenses for the successful applicants, including transportation, food, clothing, supplies needed, medical attention, dental work and entertainment. No pledge is required from anyone. All those who complete the camp will be given certificates and will be eligible for the organized reserves when they are formed. It is desired to obtain as candidates those who have had no previous military training although others will be considered.

Applications for the camp may be made at any of the branches of the Citizens' Military Training Camps Association; at any

Army post, or to any Army officer; to any Navy or Marine Recruiting Station; or direct to Major Harvey H. Fletcher, Recruiting Adjutant, Headquarters 2nd Corps Area, Governors Island, New York.

NEW TRADE PUBLICATIONS

"The Black Art of Rubber Compounding—Chat No. 5." The fifth in the series of pamphlets on rubber compounding is being distributed to the rubber manufacturing trade by Binney & Smith Co., 81 Fulton street, New York, N. Y. The current issue deals with some of the practical aspects of the application of their Micronex gas black to factory formulas, taking up the topics of moisture, mill room flying, calendering and black in tire treads.

"Fans for Efficiency," two-color folder, No. 4455, describes the Ventura fans of the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania.

Orient—Dawn is the double title of a new illustrated general and independent Dutch East Indian bi-monthly review, the December number of which has just been received.

The object of the magazine is to further a growing friendly understanding between the many nationalities represented in the Netherlands East Indies.

THE EDITOR'S BOOK TABLE

"Credits: How to Avoid Commercial Losses (Including cancellations and returns)." Pamphlet for credit men distributed free by *The Credit Guide*, 415 Broadway, New York, N. Y. Thirty-three pages, 5 by 8 inches.

In illustrating the usefulness of their own service, and in emphasizing the need of more exact and intimate knowledge of a debtor's true condition, before extending a line of credit, than is afforded by his own admissions and the information obtainable through ordinary channels, the authors point to the fact that during the past year, while the number of merchants in the country had not increased, failures, however, had increased over 400 per cent, in number and over $350,000,000 in amount. To help minimize such loss, *The Credit Guide* issues a list every week of "Credit Danger Notices," which numerous concerns testify has saved them from accepting the accounts of others who soon went bankrupt. Among the unfavorable signs listed in the reports are:

Noticeable slowing up in payments, collections filed, suits instituted for past-due accounts, habitual returning of goods, unjust cancellations, chattel mortgages on stock or fixtures, numerous inquiries received, overbuying or underselling, and caution suggested by creditors, all significant signals to a credit man and which, it is claimed, are of more value in gaging a prospective customer than old references or the reports of credit-rating agencies which lack means of "super-checking" accounts up to date.

"The Motor Truck Terminal." Bulletin No. 7. Issued by the Firestone Ship-by-Truck Bureau, Firestone Park, Akron, Ohio, 1921. Copyright by the Firestone Tire & Rubber Co. Distributed gratis. Twenty-three pages, 6 by 9.

Makers of motor trucks, and the manufacturers of rubber tires and numerous accessories, are realizing more than ever that if the Ship-by-Truck movement is to gain any considerable impetus, "free lance" operations must be regulated, if not by force of law, then by economic measures that will be quite as effective. The best corrective thus far suggested is the motor-truck terminal.

The pamphlet emphasizes the present and prospective value of transporting goods by truck, particularly with regard to speed, low cost, and flexibility. It is also shown how, with motor terminals in large cities, the confidence of consignors and consignees can be won and held by making motor terminal receipts as valuable as those of a railroad freight terminal, and how the motor terminal, through suitable insurance and business-like methods, can hold the serving motor-truck concerns to strict account and directly advance and amply safeguard the interests of shipper and receiver.

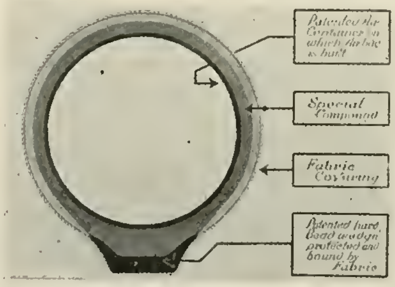
Of especial interest are the sections dealing comprehensively with the field, functions, types, organization, and operation of the motor terminal, as well as outlining its scope, solely and in interterminal cooperation, as a national industry.

"A French-English Dictionary for Chemists." By Austin M. Patterson, Ph. D., formerly Editor of *Chemical Abstracts*. John Wiley & Sons, Inc., New York. Flexible Cloth, 384 pages, 5 by 7 inches.

In this book the author has produced a companion volume to his "German-English Dictionary for Chemists," which will unquestionably meet with an equal measure of approval. The book contains over 32,000 entries covering the entire chemical field. Special attention has been paid to idiomatic phrases. All common words which are likely to appear in scientific literature are defined and terms from the new chemical warfare are included. Information on French chemical nomenclature is given in the introduction, also a few principles of grammar. Equipped with this book the reader of chemical literature is independent of any other French dictionary.

HERMETIC AIR-BAGS

The chief faults of the ordinary fabric air-bag are buckling and the short service obtained before it fails by bursting or cracking through by rough handling, owing to the rubber becoming injured by overcuring. These sources of weakness have been overcome in the constructional features of the air-bag shown herewith. Three noteworthy features of this air-bag are (1) its uniform expansion, (2) sufficient compression at the beads, (3) the low air-bag cost per tire.



Section of the Hermetic Air-Bag

The uniform and equal expansion is accomplished by building the bag upon an air-tight container of ring form similar to an inflated inner tube. A thick, heavy splice is thus produced where the ends are brought together giving at the joint much less expansion and contraction than in the rest of the bag.

Sufficient compression at the beads is secured by inserting or adding a ring of relatively hard, vulcanizable material on the inner circumference. This hard wedge not only holds the beads of the uncured tire in place, but gives to them the necessary compression during vulcanization.

The most important of all air-bag considerations is the air-bag cost per tire. Due to the simple method of manufacture, the same amount and quality of raw materials are used for producing a given size air-bag, at a much less cost than in ordinary practice. There is a further saving in cost as the present bag is built upon a tested air container originally, and is therefore perfect when vulcanized.

The factory records of a prominent tire manufacturer that uses Hermetic air-bags exclusively, shows an average of 45 cures per bag, the maximum number of cures for any one bag being 73 perfect tires. The percentage of seconds during the same month was less than 3/10 of one per cent. During the past six months the air-bag cost per tire on 33 by 4 shows a reduction or saving of more than $1.30 a tire.

The manufacture of air-bags of this construction is available to any tire manufacturer under shop license from the patentees.—Cupples Company, St. Louis, Missouri.

American Society for Testing Materials

At the twenty-fourth annual meeting of the American Society for Testing Materials held at Asbury Park, New Jersey, June 21 to 24, 1921, Committee D-13 on Textile Materials submitted the following report:

The definitions of terms relating to mechanical fabrics are offered as a plan for convenient reference to mechanical ducks in an effort to avoid confusion which now exists. At present, reference to mechanical ducks in terms of weight may mean weight per linear yard based on various widths used arbitrarily by the industries responsible for the development of these fabrics. The principal object of the proposed nomenclature is to standardize weight specifications to a square-yard basis. For the convenience of those who find it necessary to convert from the present linear-yard weight basis to the proposed square-yard weight basis, a conversion table is attached to the proposed tentative nomenclature for mechanical fabrics.

The proposed tentative specifications for imperfections and tolerances for 60-inch 17¼-ounce square-woven tire builder fabric consists of a list of tolerances to be used in connection with specifications submitted by consumers to manufacturers, and also includes a list of imperfections intended to serve as a glossary so manufacturers and consumers may be brought to a closer understanding as to the meaning of references to various imperfections in tire fabrics. While it is customary for tire fabric to be manufactured to specifications, these specifications vary considerably, according to the requirements of tire manufacturers based on their methods of operation, and an attempt to draw up definite specifications for fabrics is not considered to be desirable at this time. There has been some misunderstanding, however, between manufacturers and consumers as to allowable variations from specifications, and it is to provide basis for adjusting such conditions that these tolerances are proposed. These tolerances and imperfections have been developed by a sub-committee and are based on answers to a questionnaire submitted to tire fabric and tire manufacturing industries.

Committee D-13 through its sub-committees is engaged in the development of standards on the following subjects: test methods and measurements for fibers; test methods and specifications for yarns; specifications for fabrics; specifications for fabric-testing machines.

PROPOSED TENTATIVE DEFINITIONS[1] OF TERMS RELATING TO MECHANICAL FABRIC

Serial Designation: D — -21 T; Issued, 1921

1. The term "Mechanical Fabric" shall be understood to mean fabric manufactured to be used as an intermediate product in the making of some mechanically constructed article.

2. Mechanical fabrics shall be referred to by the following descriptive nomenclature:

(a) A word or phrase generally descriptive of the appearance of the material, or the use to which it is put.

(b) Weight in ounces per square yard. The words "oz. sq. yd." are to be written after the weight. To avoid confusion in regard to weight of material, it is suggested that immediately succeeding the square yard weight, the weight of the material on whatever basis may have been used previous to the adoption of these standards be inserted in brackets. Table I gives the conversion values of linear yard weight to square yard weight.

(c) Width in inches.

(d) Count, giving first the ends, and second the picks per inch.

EXAMPLE: Hose duck, 9 oz. sq. yd. (40 in. 10 oz.) 48 in. 28 by 18.

3. The following is a partial list of mechanical fabrics in general use:

TIRE BUILDER FABRIC. A square-woven fabric having usually 11-ply yarn both warp and filling.

TIRE CORD FABRIC. A fabric consisting of hawser cord yarn in the warp, with single yarn filling at intervals to keep warp threads together.

HOSE DUCK. A soft, plain-weave duck of plied yarns not finer than No. 8, made in weights from 10 to 24 oz. to the 40 in. width. When made of finer yarn than No. 8, it is classed as special hose duck.

TABLE I.—CONVERSION TABLE OF LINEAR YARD WEIGHT TO SQUARE YARD WEIGHT OF FABRIC

Weight, oz.	Width, inches																														
	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
8......	9.60	9.29	9.00	8.73	8.74	8.23	8.00	7.78	7.58	7.38	7.20	7.02	6.86	6.70	6.55	6.40	6.26	6.13	6.00	5.88	5.76	5.65	5.54	5.43	5.33	5.24	5.14	5.05	4.97	4.88	4.80
9......	10.80	10.45	10.13	9.82	9.53	9.26	9.00	8.76	8.53	8.31	8.10	7.90	7.71	7.53	7.36	7.20	7.04	6.89	6.75	6.61	6.48	6.35	6.23	6.11	6 00	5.89	5.79	5.68	5.59	5.49	5.40
10......	12.00	11.61	11.25	10.91	10.59	10.29	10.00	9.73	9.47	9.23	9.00	8.78	8.57	8.37	8.18	8.00	7.83	7.66	7.50	7.35	7.20	7.06	6.92	6.79	6.67	6.55	6.43	6.32	6.21	6.10	6.00
11......	13.20	12.77	12.38	12.00	11.65	11.31	11.00	10.70	10.42	10.15	9.90	9.66	9.43	9.21	9 00	8.80	8.61	8.43	8.25	8.08	7.92	7.76	7.62	7.47	7.33	7.20	7.07	6.95	6.83	6.71	6.60
12......	14.40	13.94	13.60	13.09	12.71	12.34	12.00	11.68	11.37	11.08	10.80	10.54	10.29	10.05	9.82	9.60	9.39	9.19	9.00	8.82	8.64	8.47	8.31	8.15	8.00	7.85	7.71	7.58	7.45	7.32	7.20
13......	15.60	15.10	14.63	14.18	13.76	13.37	13.00	12.65	12.32	12.00	11.70	11.41	11.14	10.88	10.64	10.40	10.17	9.96	9.75	9.55	9.36	9.18	9.00	8.83	8.67	8.51	8.36	8.21	8.07	7.93	7.80
14......	16.80	16.26	15.75	15.27	14.82	14.40	14.00	13.62	13.26	12.92	12.60	12.29	12.00	11.72	11.45	11.20	10.96	10.72	10.50	10.29	10.08	9.88	9.69	9.51	9.33	9.16	9.00	8.84	8.68	8.54	8.40
15......	18.00	17.42	16.88	16.36	15.88	15.43	15.00	14.60	14.21	13.85	13.50	13.17	12.86	12.56	12.27	12.00	11.74	11.49	11.25	11.02	10.80	10.59	10.38	10.19	10.00	9.82	9.64	9.47	9.31	9.15	9.00
16......	19.20	18.58	18.00	17.45	16.94	16.46	16.00	15.57	15.16	14.77	14.40	14.05	13.71	13.40	13.09	12.80	12.52	12.26	12.00	11.76	11.52	11.29	11.08	10.87	10.67	10.47	10.29	10.11	9.93	9.76	9.60
17......	20.40	19.74	19.13	18.55	18.00	17.49	17.00	16.54	16.11	15 69	15.30	14.93	14.57	14.23	13.91	13.60	13.30	13.02	12.75	12.49	12.24	12.00	11.77	11 55	11.33	11.13	10.93	10.74	10.55	10.37	10.20
18......	21.60	20.90	20.25	19.64	19.06	18.51	18.00	17.51	17.05	16.62	16.20	15.80	15.43	15.07	14.73	14.40	14.09	13.79	13.50	13.22	12.96	12.71	12.46	12.23	12.00	11.78	11.57	11 37	11.17	10 98	10.80
19......	22.80	22.06	21.38	20.73	20.12	19.54	19.00	18.49	18.10	17.54	17.10	16.68	16.29	15.91	15.55	15.20	14.87	14.55	14.25	13.96	13.68	13.41	13.15	12.91	12.67	12.44	12.21	12.00	11.79	11.59	11.40
20......	24.00	23.23	22.50	21.82	21.18	20.57	20.00	19.46	18.95	18.46	18.00	17.56	17.14	16.74	16.36	16.00	15.65	15.32	15.00	14.69	14.40	14.12	13.85	13.58	13.33	13.09	12.86	12.63	12.41	12.20	12.00
21......	25.20	24.39	23.63	22.91	22.24	21.60	21.00	20.43	19.89	19.38	18.90	18.44	18.00	17.58	17.18	16.80	16.43	16.09	15.75	15.43	15.12	14.82	14.54	14.26	14.00	13.75	13.50	13.26	13.03	12.81	12.60
22......	26.40	25.55	24.75	24.00	23.29	22.63	22.00	21.41	20.84	20.31	19.80	19.32	18.86	18.42	18.00	17.60	17.22	16.85	16.50	16.16	15.84	15.53	15.23	14.94	14.67	14.40	14.14	13.89	13.66	13.42	13.20
23......	27.60	26.71	25.88	25.09	24.35	23.66	23.00	22.38	21 79	22 23	20.70	20.20	19.71	19.26	18.82	18.40	18.00	17 62	17.25	16.89	16.56	16.24	15 92	15.62	15.33	15.05	14.79	14.53	14.28	14.03	13.80
24......	28.80	27.87	27.00	26.18	25.41	24.69	24 00	23.35	22.74	22.15	21.60	21.07	20 57	20.09	19.64	19.20	18.78	18.38	18.00	17.63	17.28	16.94	16.62	16.30	16.00	15.71	15.43	15.16	14.90	14.64	14.40
25......	30.00	29.03	28.13	27.27	26.47	25.71	25.00	24.33	23.68	23.08	22.50	21.95	21 43	20.93	20.45	20.00	19.57	19.15	18 75	18.37	18.00	17.65	17.31	16.98	16.67	16.36	16.07	15.79	15.52	15 25	15.00
26......	31.20	30.19	29.25	28.36	27.53	26.74	26.00	25.30	24.63	24.00	23 40	22.83	22.29	21.77	21.27	20 80	20.35	19.91	19.50	19.10	18.72	18 35	18.00	17.66	17.33	17.02	16.71	16 42	16.14	15.86	15.60
27......	32.40	31.35	30.38	29.45	28.59	27.77	27.00	26.27	25.58	24.92	24.30	23.71	23.14	22.60	22.09	21 60	21.13	20.68	20.25	10.84	19.44	19.06	18.69	18.34	18.00	17.67	17.36	17.05	16.76	16.47	16.20
28......	33.60	32.52	31.50	30.55	29.66	28.80	28.00	27.25	26.53	25.85	25.20	24.59	24.00	23.44	22.91	22.40	21.91	21.45	21.00	20.57	20.16	19.76	19.38	19.02	18.67	18.33	18.00	17.68	17.38	17.08	16.80
29......	34.80	33.68	32.63	31.64	30.71	29.83	29.00	28 22	27.47	26.77	26.10	25.46	24.86	24.28	23.73	23.20	22 70	22.21	21.75	21.31	20.88	20.47	20.08	19.70	19 33	18.98	18.64	18.32	18.00	17.69	17.40
30......	36.00	34.84	33 75	32.73	31.76	30.85	30.00	29.19	28.42	27.69	27.00	26.34	25.71	25.12	24.55	24.00	23.48	22.98	22.50	22.04	21.60	21.18	20.77	20.37	20.00	19 64	19.29	18.95	18.62	18.31	18.00
31......	37.20	36.00	34.88	33.82	32.82	31 89	31.00	30.16	29.37	28.62	27.90	27.22	26.57	25.95	25.36	24.80	24.26	23.74	23.25	22.78	22.32	21.88	21.46	21.06	20.67	20.29	19.93	19.58	19.24	18.92	18.60
32......	38.40	37.16	36.00	34.91	33.88	32.91	32.00	31.14	30.32	29.54	28.80	28.10	27 43	26.79	26.18	25.60	25 04	24.51	24 00	23.51	23.04	22.59	22.15	21.74	21.33	20.95	20.57	20.21	19.86	19 53	19.20
33......	39.60	38.32	37.13	36.00	34.94	33.94	33.00	32 11	31.26	30.46	29.70	28.98	28.29	27.63	27.00	26.40	25.83	25.28	24.75	24.24	23.76	23 29	22.85	22.42	22.00	21.60	21.21	20.84	20.48	20.14	19.80
34......	40.80	39.48	38 25	37.09	36.00	34.97	34.00	33.08	32.21	31.38	30.60	29.85	29.14	28.47	27.82	27.20	26.61	26.04	25 50	24.98	24.48	24.00	23.54	23.09	22.67	22.25	21.86	21.47	21.10	20.75	20.40
35......	42.00	40.65	39.38	38.18	37.06	36.00	35.00	34.05	33.16	32.31	31.50	30 73	30.00	29.30	28.64	28.00	27.39	26.81	26.25	25.71	25.20	24.71	24.23	23.77	23.33	22.91	22.50	22.11	21.72	21 35	21.00
36......	43.20	41.81	40.50	39 27	38.12	37.03	36.00	35.03	34.11	33.23	32.40	31.61	30.86	30.14	29.45	28.80	28.17	27.57	27.00	26.45	25.92	25.41	24.92	24.45	24.00	23.56	23.14	22.74	22.34	21.97	21.60

[1]These definitions are issued under the fixed designation D — ; the final number indicates the year of original issue, or in the case of revision, the year of last revision.

Rubber Belt Duck. A soft, plain-weave duck of plied yarns not finer than No. 8, weight ranging from 22 to 36 ounces to 42 inches width. When made of finer yarn than No. 8, it is classed as special belt duck.

Balata Belt Duck. A closely woven fabric made of hard twisted plied yarn usually made in wide widths, weight being based on the square yard.

Oil Belt Duck. A closely woven fabric of plied yarns not over No. 8, made in a variety of widths, the weight being based on the square yard.

Numbered Duck. A plain woven fabric of plied yarns ranging from coarse to fine numbers, weight being based on 32-inch width one yard long.

Army Duck. A fabric made in closely woven plied yarns, weight being based on 28½-inch width.

Single Filled or Flat Duck. A fabric made of single yarn, plain weave, the weight being based on 30-inch width.

Enameling Duck. A plain woven fabric with laid warp and plied yarn filling, weight being based on 46½-inch width.

PROPOSED TENTATIVE SPECIFICATIONS[1] FOR IMPERFECTIONS AND TOLERANCES FOR 60-INCH 17¼-OUNCE SQUARE-WOVEN TIRE BUILDER FABRIC

Serial Designation: D — - 21 T; Issued, 1921

IMPERFECTIONS

Definition

1. Imperfections shall be those defects in material and workmanship which are in large measure capable of reduction and control by supervision and which, though important, do not form an essential element of the specifications. They may be classified as such deviations from the qualitative characteristics of the perfect fabric as shall materially depreciate its commercial value.

Misweaves

2. The following imperfections are to be classified as misweaves: mispicks, double picks, floats, broken picks and ends, dropped threads, wrong draws, filling cuts, reed marks, light and heavy strips, smash.

(a) Heavy strip is a place in the fabric which contains more than the specified number of picks per inch.

(b) Thin strip is a place in the fabric which contains less than the specified number of picks per inch.

(c) Reed mark in the fabric is caused by a sprung reed in the loom during weaving and appears in the fabric as though two warp threads had been forced apart with the result that the next threads are very close together.

(d) Wrong draw is caused by drawing warp threads through wrong harness and appears in the fabric as a streak lengthwise due to the filling floating over more than one thread.

(e) A mispick is a missing or partly missing pick and appears as a streak across the width of the fabric.

Deductions

3. Misweaves may be sufficient cause for deductions if the fabric is weakened thereby either as it is or in later processes, unless the misweave is satisfactorily repaired.

Rejections

4. Misweaves are sufficient cause for rejection of a roll if they are of such extent, importance and frequency as to require cutting the fabric in four or more places per 100 yd.

Imperfect Selvage

5. Tight, loose, cut, weak and nicked or wavy selvage may be considered imperfect selvage.

Deductions

6. Imperfect selvage may be cause for deductions if it is sufficiently imperfect to cause trouble or waste of material in processing.

Rejection

7. Imperfect selvage may be sufficient cause for rejection if its extent, frequency and importance requires cutting of the fabric in four or more places per 100 yd.

Knots

8. No knots are allowable in the ply yarn except in colored identification threads and in selvage.

Deductions

9. Knots in the ply yarn may be cause for deductions. An allowance of one-quarter per knot is suggested.

Rejections

10. Knots in the ply yarn may be sufficient cause for rejection if they occur in excess of 25 knots per 100 yds. of the fabric.

[1]These specifications are issued under the fixed designation D — ; the final number indicates the year of original issue, or in the case of revision, the year of last revision.

Broken Threads

11. All broken threads should be properly repaired.

Deductions

12. Broken threads although repaired may be sufficient cause for deductions if they cause reduction of strength below the tolerance for individual tests or cause waste of material.

Rejections

13. Broken threads may be sufficient cause for rejection of a roll, if they are of such extent, frequency, and importance as to require cutting the fabric in four or more places per 100 yd.

Oil Spots

14. Oil spots or oily yarn should be reduced to the smallest possible number and if present should be thoroughly removed.

Deductions

15. Oil spots or oily yarn may be cause for deduction if of sufficient size to require the cutting and waste of fabric.

Rejections

16. Oil spots or oily yarn may be sufficient cause for rejection of a roll if they are of such extent, frequency and importance as to require the cutting of the fabric in four or more places per 100 yd.

TOLERANCES

Definition

17. Tolerances shall be the limits within which a textile must come in its specified characteristics in order that it shall constitute a good delivery on contract. They may be classified as the allowable limits of the quantitative characteristics of the fabric as defined in the specifications. The following tolerances are based upon the Standard General Methods for Testing Cotton Fabrics (Serial Designation: D 39) of the American Society for Testing Materials.[2]

Width

18. (a) No individual measurement made to determine the width of the fabric shall be more than 2 per cent over or one per cent under the specified average width.

(b) The average width determined by measurements shall be not more than one per cent over nor 0.5 per cent under the specified average width.

Weight per Square Yard

19. The weight of the fabric determined by test shall be not more than 1.5 per cent under nor more than 3 per cent over the specified weight.

Count per Inch

20. The count per inch determined by test shall be not more than 0.2 ends over nor 0.4 ends under the specified count and not more than one pick over or under for the filler.

Bow

21. The bow determined by test shall be not more than ¼-inch over or under the bow specified.

Note.—Bow should be ascertained by five determinations made throughout the roll commencing at least 10 yards from either end of roll.

Off-square

22. The allowable variation in the off-square of the fabric shall be 3 per cent over or under the specified off-square.

Gage

23. (a) The individual measurements of the thickness shall not vary more than 0.005-inch under or over the specified thickness.

(b) The average thickness determined by test shall not vary more than 0.002-inch under nor 0.003-inch over the specified thickness.

Tensile Strength

24. Individual test results on warp and filling shall be not more than 5 per cent below the specified tensile strength. The average tensile strength of the warp and the average tensile strength of the filling found by test shall be not less than the specified tensile strength.

[2]A.S.T.M. Standards Adopted in 1920.

THE "BULL GRIP" THAT STICKS AND STRETCHES

The "Bull Grip" inner tube patch equipment consists of patching rubber which is all gum, averaging 5/128 and 6/128-inch in thickness. The cement is of the best quality, packed in ¾ by 4-inch lead, clipped end tubes, with polished metal buffers 1½ inches in diameter. The manufacturer guarantees Bull Grip to vulcanize better than steam, to stretch with the tube, and not to deteriorate for a period of 12 months, the patch sticking and holding as long as the tube lasts.—Bull Grip, Inc., Atlanta, Georgia.

What the Rubber Chemists Are Doing

KEEPING QUALITIES OF PLANTATION RUBBER[1]

The conditions that have prevailed for a year in the crude rubber market have resulted in the accumulation in storage in the Far East, London, New York, and other points, of enormous stocks of plantation rubber, regarding the keeping qualities of which expert opinion is desirable.

The following expert views on this topic, therefore, have a timely interest for crude rubber producers, dealers and rubber goods manufacturers. It should be noted that the author's remarks apply more particularly to tropical conditions.

Most plantation rubber, as such, has only a short existence. Between harvest and vulcanization in the rubber factory, not more than a few years elapse, as a rule, and little is heard of serious deterioration during that time. The general conclusion is that first-grade plantation rubber stands keeping for some years very well; yet there is no doubt that even excellent rubber may completely deteriorate in the course of years. For instance, a piece of smoked sheet which had been awarded a first prize at the London Rubber Exhibition of 1911, after seven years' keeping in the tropics, had become absolutely brittle and weak by 1918, with a viscosity of only three units, while vulcanization gave an unsatisfactory spongy mass.

In actual practice the changes which take place in the product during the first two or three years are the most important. Information is still incomplete on many points, for instance, on the difference between keeping in subdued light, or in the dark, in a wet or dry atmosphere, at tropical or European temperatures, no accurate data are as yet available.

From our experience with hundreds of samples, kept at a fairly regular temperature of 27 degrees C (78.6 degrees F.) in cupboards, we may state that under such circumstances the rubber does not show appreciable deterioration in appearance. The very light color of pale crêpe becomes decidedly darker in all cases, but no other visible change occurs, provided the samples remain dry enough so that no mouldiness or spots appear.

INNER PROPERTIES

Tensile strength in many cases may remain constant for periods of at least four years. We retested many samples which after three to four years showed the same excellent strength as when tested a few weeks after preparation. Other samples, however, showed a gradual decrease. No apparent reason has as yet been discovered as to why ordinarily prepared samples should in some cases remain constant in properties, and in others show a slow deterioration.

TIME OF CURE AND SLOPE

The time of cure in a number of cases showed a decrease of five to ten minutes on keeping, but in others remained constant, or increased. The causes of such changes are not yet cleared up. Preliminary review of data indicates that where rate of cure was retarded by some cause, a decrease in time of cure gradually sets in, while rapid-curing rubber often showed an increase, so that in both cases the rate of cure, on keeping, gradually returned to more normal values.

The slope generally shows no change, or only small variations in which, so far, no regularity could be detected.

VISCOSITY

Viscosity is perhaps the figure in which a change is first to be detected. While the properties after vulcanization often remain the same for a year or more—and only begin to change by longer keeping—the viscosity often begins to decrease sooner. Most first-grade samples, crêpe or sheet, remain constant in viscosity during several months or a year, but then gradually show a decrease which seems to continue slowly on further keeping.

The above statements all relate to estate samples prepared in the ordinary manner and taken at random from the output of a large number of estates. Data on keeping qualities in general do not point to a large influence of the method of preparation on the keeping qualities of first-grade rubber. Traces of special coagulants, such as sulphuric acid or alum, were not found to cause larger changes than the ordinary dose of acetic acid; neither did exaggerated crêping cause any marked or rapid deterioration in the raw product.

PACKING AND STORAGE

Packing the rubber only when quite dry and in dry chests, taking care that the chests do not get wet during transportation or in a damp shelter, and storing the rubber in a dry place with sufficient ventilation, especially between chests and floor, are the most necessary precautions for keeping rubber, whether in the tropics or in storage in temperate climates.

[1] "Estate Rubber, Its Preparation and Testing." By Dr. O. de Vries, 1920. Abstract from Chapter 12.

EFFECT OF MOULD ON RUBBER QUALITY[1]

Factory experience has shown that wet, mouldy smoked sheet rubber almost invariably retards the rate of cure and gives quite an inferior vulcanized product. Light mould, on the other hand, very often yields a normally cured rubber, but some samples have been obtained in which even a light mould has a deleterious effect. The greatest drawback in having such material in the factory is the fact that it necessitates extra work for inspection and handling in order that it may be segregated and separately tested before it can be safely used. Heavy wet mould is not often met with, but a light mould is quite common.

Testing the effect of a heavy, wet mould presents some difficulties, as one cannot say what the quality or rate of cure of the rubber would have been had it been properly cured and free from mould, but in the case of a light mould the effect can be judged by mixing and vulcanizing separately the sound and mouldy portions of the sheets.

Results are here given on one sample which has been tested on the separated sound and mouldy portions.

	Clean	Mouldy
Time of cure (minutes)	117	132
Rate of cure (per cent of standard)	128	114

It will be seen that there is a distinct difference in rate of cure between clean and mouldy parts of the sheet. The clean part vulcanizes faster than the mouldy part. The above figures represent the mean of two independent vulcanizations which were in close agreement and are based on the coefficient of vulcanization determined by analysis. So far as can be judged, without further details of the physical properties of the clean and mouldy parts, there is little or no difference in quality between the two portions.

Except for the mouldy patches, the rubber was of normal appearance, medium shade, glossy surface, and no defects. The mouldy portions were sharply defined so that the clean and mouldy parts were easily separated. It was noticed that the mouldy parts after washing off the mould were darker in color than the remainder. A sheet wiped clean showed irregular dark patches exactly as described by Hartjens.[2] The patches were irregular in size and shape, just as are the patches of mould growth, and darker in color than the remainder of the rubber, but not less translucent.

[1] "Mouldy Sheet and the Effect of Mould on Quality." By H. P. Stevens, Bulletin of the Rubber Growers' Association, Vol. 3, No. 2, February, 1921.
[2] "Spots on Sheets," Archief voor de Rubbercultuur, April, 1920.

Hartjens varied the conditions of manufacture in order to trace the origin of these spots or patches and came to the conclusion that they could be connected with the use of sulphite and bisulphite of soda, or a combination of both. Small amounts of these chemicals seldom produce spots, but larger proportions may produce very dark and distinct spots.

It is, therefore, possible that these dark spots are in some way connected with mould growth and also with the use of sulphite and bisulphite in sheet manufacture. There are insufficient data to explain what the connection may be. Possibly the dark parts retain more moisture than the light and are therefore more prone to develop mould. In any case, the observations call for an investigation of the effect of sulphite and bisulphite on the liability of smoked sheet to go mouldy.

Sodium sulphite is used in only very small quantities to keep the latex fluid, but bisulphite is sometimes used in larger quantities to keep the sheet light in color, owing to the marked objection to so-called "oversmoked" sheet. If found that the use of bisulphite tends to cause mould it would probably be better to risk the sheet being dark in color.

It is known that bisulphite hinders the drying of crêpe rubber, that is to say, rubber so treated tends to retain moisture, and what is true of crêpe is probably true of sheet. Sheet which tends to retain moisture, even if thoroughly smoked, will tend to take up moisture again at the first favorable opportunity, and the more moisture present, the greater the liability to mould. Hence there are already definite reasons for thinking that sodium bisulphite may cause mould to develop in smoked sheet, especially in transit.

The effect of bisulphite is probably aggravated by the circumstance that so much of it is of very poor quality. It is quite likely that the sodium sulphite and other impurities are as responsible for the retention of water as the bisulphite itself, and where possibly large quantities of poor quality material have to be added to produce the necessary effect on the color, it is easily realized that the quality of the rubber and resistance to mould are impaired.

The Rubber Growers' Association recommendations for the treatment of latex and the curing of sheet rubber state that sodium bisulphite should not be used for the preparation of sheet rubber.

STORAGE OF PLANTATION RUBBER

Henry P. Stevens, consulting chemist to the Rubber Growers' Association, has recently reported on the storage of plantation rubber, of which the following conveys the principal points.

Plantation rubber does not deteriorate rapidly but is remarkably stable and little altered after long storage, provided certain elementary precautions be taken. The most important of these is protection from direct sunlight. Fluctuations of temperature have practically no effect on rubber and it is doubtful whether even tropical temperatures cause any appreciable deterioration.

In London, laboratory-stored samples of properly prepared rubber dating back ten years and more have in no instance shown any marked signs of deterioration. At the most, the surface becomes very slightly adhesive. This is by no means the case generally and many samples of rubber made eight and ten years ago cannot be distinguished from rubber made yesterday.

The peculiar property of rubber to freeze at moderately low temperatures may have given rise to the assumption that the rubber had perished on keeping. Such is not the cause, and if gently warmed at temperature under that of boiling water, rubber soon becomes flexible, elastic and translucent as originally.

When stored raw rubbers are broken down, mixed and vulcanized, they behave in normal manner. Any differences shown do not appear to be greater than in fresh samples recently imported. No difference in vulcanizing properties could be detected in this same smoked sheet, the first half of which was tested in England a year previous to the second half which was retained in the East for a year before importation for test. Old samples of plantation rubber vulcanized in comparison with current samples of the same rubber showed only such small variations as would be found with fresh consignments.

It is evident from the foregoing that deterioration need not take place when ordinary pale crêpe or smoked sheet rubber is stored for long periods under suitable conditions.

Fewer data are available as regards the lower grades, but it is probable that these will keep satisfactorily if properly cleaned and dried. But rubber which contains an appreciable proportion of organic impurity and is exposed to conditions under which putrefaction sets in, will rapidly deteriorate.

"XLO" ACCELERATOR

"XLO" is the trade designation of a recently perfected vulcanization accelerator from which excellent results have been obtained. It is specially recommended for automobile tire stocks, inner tubes and high-class mechanical goods. It is magnesiated di-phenylguanadine in the constant proportions of one-third of the former to two-thirds of the latter. From one-quarter to three-quarters of one per cent of the rubber content of a mixing are the recommended proportions of this accelerator to be used in practical work.

CHEMICAL PATENTS

THE UNITED STATES

Tire Filling Composition comprising the following ingredients and proportions: vegetable oil 74 per cent; magnesium oxide 2.2 per cent; ultramarine 2.2 per cent; litharge 2.2 per cent; oakum 1.9 per cent; chloride of sulphur 17.5 per cent.—John A. Schmidtke, Calgary, Alberta, Canada. United States patent No. 1,376,973.

Halogenated Rubber Compound, the molecular structure of which includes more than two halogen atoms and an atom of a vulcanizing agent.—Clayton W. Bedford and William J. Kelly, assignors to The Goodyear Tire & Rubber Co., all of Akron, Ohio. United States patent No. 1,377,152.

Rubber-Like Material Process, comprising macerating heating and extracting the fleshy parts of cactus, adding a catalyzer containing a mineral acid radical, concentrating the juice, adding a solution of Pará rubber, linseed oil, and a mixture of asphaltum and sulphur and boiling, drying and oxidizing the resultant mass.—John C. Wichmann, Los Angeles, California, United States patent No. 1,379,149.

Rubber-Like Material Process, comprising macerating the fleshy parts of the yucca plant, heating it above the boiling point of water, extracting the juice to which is added a catalyzer consisting of a mixture of sodium tungstate, concentrating the juice, adding a solution of Pará rubber, linseed oil and a molten solution of asphalt and sulphur, boiling the mixture under agitation, drying and oxidizing the resultant mass.—John C. Wichmann, Los Angeles, California. United States patent No. 1,379,150.

THE DOMINION OF CANADA

Acceleration of Vulcanization produced by the use of alkylated, dialyated or methylated dithiocarbamic acid.—The Michigan Chemical Co., Bay City, Michigan, assignee of Stuart B. Molony, Wellesley Hills, Massachusetts, U. S. A. Canadian patent No. 211,926.

Acceleration of Vulcanization by the use of an alkylated, methylated or mono-methyl dithiocarbamate of a metal. The Michigan Chemical Co., Bay City, Michigan, assignee of Stuart B. Molony, Wellesley Hills, Massachusetts, and Yasujuro Nikaido, Bay City, Michigan, both in U. S. A. Canadian patent No. 211,927.

Acceleration of Vulcanization by the use of the methylester of phenyl dithiocarbamic acid; the metallic salts of phenylated dithiocarbamic acid; or the metallic salts of phenyl dithiocarbamic acid.—The Michigan Chemical Co., assignee of Stuart

B. Molony, Wellesley Hills, Massachusetts, and Yasujuro Nikaido, Bay City, Michigan—both in U. S. A. Canadian patent No. 211,928.

THE UNITED KINGDOM

Preparation of India Rubber. Fresh latex is treated with an alkalized phenol, subsequently coagulated by addition of an acid or acid salt, preferably an acidified solution of magnesium sulphate. The coagulum is dehydrated mechanically. The dehydrated rubber may be softened with hot water, and then sheeted, crêped or rolled in cylinders.—S. C. Davidson, Sirocco Engineering Works, Belfast. British patent No. 159,602.

Tire Tread Composition consisting of 25 to 40 per cent raw or reclaimed rubber or mixtures, and 70 to 60 per cent carborundum or a mixture of carborundum and other abrasives with sufficient sulphur for vulcanizing.—J. R. Cooper, 46 Hatfield Road, Birchfield, Birmingham; T. E. Lockhart, Brooklyn, Henley-in-Arden, Warwickshire; and R. H. Osler, 36 Cannon Street, Birminham. British patent No. 159,608.

Devulcanizing Waste Rubber by means of an emulsoid colloid solution in water of tar, pitch resin, gum or balsam. The ground rubber is boiled up with this solution, a sulphur solvent such as turpentine and a detergent alkaline solution. The boiled rubber is washed and dried.—C. F. Willard, San Diego, California, U. S. A. British patent No. 159,987.

Rubber Compositions containing lake pigments, or fillers, such as saw-dust, leather waste, cork-dust, wool-waste, etc., which are injured by known vulcanization processes, are vulcanized in the cold by alternate treatment with sulphur dioxide and hydrogen sulphide.—S. J. Peachey, 5 Yew Tree Road, Davenport Cheshire, and A. Skipsey, Red Lea, Scarborough, Yorkshire. British patent No. 106,499.

Puncture-Closing Composition. A fluid consisting of glycerine, water and Castile soap.—C. Tuckfield, 5 Thames View, East Molesey, Surrey. British patent No. 160,505.

Fire-Proofing, Water-Proofing, and Metallizing Lace, etc., is effected by immersion of the fabrics in an emulsion of an aqueous solution of sodium biborate and sodium silicate, a solution of rubber in naphtha and amyl acetate and metal powder.—A. Norweb, 26 Fisher Gate, Nottingham. British patent No. 160,627.

Regenerating India Rubber. Ground vulcanized rubber mixed with about 10 per cent by weight of water containing two per cent of glycerine and two per cent of paraffine. The mixture is heated to reaction. O. R. Bouvery, Villa St. Georges, Allée des Muriers, and F. P. Conort, 19 rue de l'Orangerie—both in Algiers, Africa. British patent No. 160,779.

Self-Lubricating Composition for bearings, consisting of a mixture of about 100 parts new or preferably regenerated rubber devulcanized by process described in British patent No. 160,779; 200 parts graphite, and 90 parts sulphur or a metallic sulphide, molded under pressure and vulcanized at 165 to 170 degrees C.—O. R. Bouvery, Villa St. Georges, Allée des Muriers, and F. P. Conort, 19 rue de l'Orangerie—both in Algiers, Africa. British patent No. 160,780.

Retreading Tires. The treads of worn tires are exposed to a flame to desulphurize the rubber and render it sticky. A cement of rubber in carbon tetrachloride containing a small amount of sulphur is spread over the surface, and when this is dry a new tread is applied. The tire is then vulcanized as usual.—E. Nestler, Bergenfield, New Jersey, U. S. A. British patent No. 160,805.

Rubber Paint consisting of rubber added to dissolved asphalt and oleates or stearates of metals and vulcanized by means of sulphur or suitable sulphur compound and heat.—C. H. Ivinson, 72 Coombe Lane, Wimbledon, and G. S. Roberts, 74 Earls Court Road, Kensington, both in London. British patent No. 161,201.

GERMANY

Vulcanized products of great strength and extensibility are obtained by adding to the materials to be vulcanized metallic oxides or peroxides or organic or inorganic compounds which yield part of their oxygen at the temperature of vulcanization, together with aliphatic or aromatic amines or ammonia compounds or their derivatives or salts. For example, antimony pentoxide, lead oxide, or lead peroxide may be added, together with diethylamine or aniline sulphate.—Farbenfabriken formerly Friedrich Bayer & Co., Leverküsen near Köln-on-Rhein. German patent No. 328,610 February 20, 1917.

LABORATORY APPARATUS

ELECTRICALLY-HEATED WATER-BATH

The illustration shows the exterior view of a new electrically heated water-bath for laboratory use. The apparatus has a heavy copper tank, tinned on the inside with heavy asbestos outer covering. The constant temperature regulation is by means of a bi-metallic regulator giving a temperature control to about one degree C. The temperature range, without cover, is from that of the room to about 65 degrees C.; with cover, from room temperature to about 100 degrees C.—The Thermo Electric Instrument Co., Newark, New Jersey.

Small Electric Water-Bath.

LATEX AND RUBBER FROM INDIVIDUAL TREES[1]

The results given in this preliminary communication indicate that on different dates the same tree gives latex which is approximately the same in amount and in rubber content and which, when suitably treated, yields rubber showing approximately the same viscosity and vulcanizing properties (tensile strength, time of cure, slope). Different trees are found to show considerable differences in the properties of the latex and rubber which they yield. Among the 21 trees for which data are given the daily yield varies from 4 to 71 grams, the rubber content of the latex from 17 to 50 per cent, the viscosity from 14 to 90, and the time of cure from 90 to 160 minutes.

[1]O. de Vries, Archief voor de Rubber-cultuur, 4, 1920, 249,271.

ACTION OF SULPHURIC ACID ON CAOUTCHOUC[1]

Cold concentrated sulphuric acid converts raw rubber immediately into a hard, brittle mass which after several days becomes soft again. The action is accompanied by the evolution of sulphur dioxide, and the soft product becomes hard again when treated with water. Benzene solutions of raw rubber, gutta percha, and artificial dimethyl-caoutchouc H, yield white solid substances which may be powdered and constitute oxidation products of the rubber. The action of sulphuric acid and the nature of the product are controlled by the nature of the solvent, by the quantity and particularly by the duration of the action of the acid, and by the concentration and nature of the rubber.

[1]F. Kirchhof. Kolloid Zeitschrift, 1920, 27, 311-315.

ACCELERATOR PATENTS

In response to numerous requests there appears elsewhere in this issue of The India Rubber World a list of American and foreign patents on vulcanization accelerators. This list has been brought up to date and may be accepted as covering all the materials so far patented as vulcanization accelerators.

Carbons and Hydrocarbons Used in the Rubber Industry

A Study of Carbon Blacks. Oils, Fats and Waxes of Mineral Origin

By Frederic Dannerth, Ph.D.

The materials used for imparting a black color to rubber compounds are either pitches or carbon pigments. The former class includes the pitch obtained from coal-tar; blown or oxidized petroleum pitch; asphalt pitches; gilsonite products, wood pitch and stearin pitch. The carbon pigments include graphite, powdered bituminous coal, bone black, lampblack, and gas black.

The pitches, or "hydrocarbons" as they are called in the factory, are valuable chiefly because they render the compound oil-resistant and steam-resistant. At the same time they impart a good black color to the finished product, especially when used in conjunction with lead compounds. Their principal value, however, lies in the fact that compounds containing 5 and even 10 per cent of these hydrocarbons show a great resistance to aging. In other words, the material, because of its wax-like character, has mixed with the other materials of the compound in such a way that all or most of the minute pores have become sealed. The result is that the oxygen of the air cannot attack the rubber as would otherwise be the case. The *life* of the compound is prolonged, and the product maintains its good qualities long after it has left the rubber goods factory.

PART I. THE CARBONS

Of the carbon pigments mentioned above, attention should be called to the value of powdered bituminous coal as a compounding mineral filler especially adapted for steam packings. For this purpose it must be of a fineness equal to 200-mesh and preferably 300-mesh. Lampblack or oil carbon black has been used for a considerable period in compounds of all descriptions and uses, because of the fineness of its particles and the black color which it imparts. As a rule it represents the condensed soot produced when high boiling oils of petroleum and coal-tar are burned.

Gas carbon blacks are obtained by burning natural gas in such a way as to cause separation of the carbon. They have also been produced experimentally by atomizing petroleum residues in hot iron retorts. In this way the liquid is converted into a gas very rich in hydrocarbons of the ethylene series. The specific gravity of this material, after complete exhaustion of the air, was found to be 1.7290. Owing to its peculiar method of manufacture carbon produced from natural gas is practically free from oily matter and its particles are in an extremely fine state of sub-division. The melting point of carbon is above 6500 degrees F. This latter fact in itself makes it a material of preeminent importance in cases where the finished rubber product is exposed to high temperatures.

Graphite, artificially produced, has recently been considered as a compounding ingredient for the rubber industry. It was discovered some time ago that graphite can be obtained by suitable decomposition of a carbide. This artificial graphite cannot be produced by mere heating of pure carbon. The industrial process consists in using anthracite, with about 10 per cent of ash, as a furnace charge. The anthracite coal may be converted into graphite while in powdered form. A furnace 15 feet long will consume 1000 h.p. in this operation.

VALUATION OF A COMPOUNDING INGREDIENT

The questions which arise in connection with the use of carbons in rubber compounding naturally vary from one case to another, depending upon the use to which the finished rubber product is to be put. There are, however, certain points which apply in many instances, and in the case of a carbon black used for rubber compounding a complete investigation should furnish answers to the following questions which refer only to carbon black:

1. What influence does it exert on the tensile strength, elasticity, elongation before rupture, permanent set, and life, of a rubber compound?
2. How does it influence the density and toughness of the compound, and its resistance to abrasion?
3. Does it "fly" in the mixing room and is it injurious to the health of the workmen?
4. Can it be used to advantage to replace rubber?
5. What advantage has this material over zinc oxide?
6. What is the maximum amount which can be used for every 100 pounds of rubber in a rubber compound?
7. What is the maximum percentage which can be used to advantage?
8. Does the use of this black in a compound make it impossible to use any other materials?
9. In which rubber compounds can it be used to best advantage?
10. In which rubber compounds should it be omitted?
11. In what physical condition should this material be when it is delivered to the rubber manufacturer?
12. How should it be prepared at the rubber factory in order to incorporate it properly with the dough in rubber compounding?
13. What specification should a black meet if it is to be used to best advantage?
14. How much mineral matter, carbon, and oil does it contain?
15. What advantage does it offer over lampblack, or over powdered coal?
16. What is the volume cost of a rubber compound containing this material as compared with a similar rubber compound containing an equal weight of zinc oxide?
17. What defects will arise in the process of mixing or in the process of vulcanizing, if it is improperly prepared?
18. What defects will arise in the use of a rubber product containing this material, if it is not properly incorporated with the compound in the rubber factory?
19. Is this black acted on by any of the other materials used in rubber compounding?

VOLUME COST

Although rubber and the various compounding materials are purchased and sold by the pound, it will be realized on close examination that the majority of rubber products are sold on the basis of volume. For that reason, the older method of calculating costs of compounds has now been supplemented by the determination of the volume cost of the compound. As a standard of comparison one may choose one cubic foot and note the number of pounds of the material required to fill that volume. For example:

	Specific Gravity	One Cubic Foot Weighs, Pounds		Costs
Water	1.00	62.5	@ ...	.....
Rubber	0.93	58.0	@ $0.25	$14.50
Zinc oxide	5.75	360.0	@ .10	36.00
Gas carbon black	1.75	109.4	@ .20	21.90

It will be found that the cost of certain blacks per cubic foot is less than that of zinc oxide, lead oxide, magnesium oxide, iron oxide, and golden antimony.

METHODS FOR INCORPORATING BLACK PIGMENTS

The methods for incorporating gas black in rubber compounds depend upon the preparation of a "master-mix" for the purpose of removing the air from the black fluffy powder. William Geer of The B. F. Goodrich Company in 1917 obtained a United States

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[1] This article may not be reprinted without permission of the author, who reserves all publication rights.

patent[2] for the use of kerosene in connection with gas blacks. The materials which can be used to advantage in preparing a master-mix are:

1. Pine rosin
2. Petrolatum
3. Washed and dried rubber
4. Cylinder oil
5. Paraffine wax
6. Reclaimed rubber

Other reasons for preparing these master-mixes in advance of the actual rubber compounding operation are: to reduce the time required to incorporate the powder; keep the main factory mixing room in clean condition; and insure uniform distribution of the gas black in the batch.

The use of gas black produces tire compounds having a relatively low specific gravity; high tensile strength; high elongation; low permanent set; and high speed of vulcanization.

PROPORTIONS TO BE USED

In compounding rubber for auto tire treads certain carbon blacks have been used in quantities as high as 20 per cent of the total batch, but 15, 10 and 5 per cent are the quantities used in most instances for tread stocks. Five per cent in this case would mean, for example, five pounds of carbon black in a total batch of 100 pounds. In the manufacture of high-grade black steam packings it can be used to advantage in amounts up to 15 per cent. In other types of mechanical rubber goods such as railroad steam hose, belting for power transmission, and conveyor belting, blacks can likewise be used to advantage in replacing fillers of high specific gravity.

Special Mixtures. One of the more interesting experiments, for example, carried out in connection with the present investigation of carbon blacks had for its aim the preparation of a compound which could serve several purposes at one and the same time. It was, for example, found possible to produce a mixture which was quite tacky and at the same time possessed good lubricating qualities.

ANALYTICAL DATA

The laboratory information which is of interest and importance when deciding on the use of these materials for rubber compounding includes figures on:

1. Hygroscopicity.
2. Moisture content of the material as delivered.
3. Non-volatile mineral matter.
4. Acetone-soluble matter.
5. Fineness of the particles under microscope.
6. Specific gravity.
7. Cost of the material per cubic foot, based on its specific gravity.
8. Tinting strength or coloring power.

EXPERIMENTAL DATA

In order to determine the influence of gas black on the physical properties of rubber several compounds were prepared, vulcanized and tested. The results of these experiments are recorded below:

Experiment 1. A compound was prepared containing—

Rubber (plantation smoked sheets)	90.
Carbon black	1.0
Sulphur	9.0

Vulcanize at 287 degrees F. for 165 minutes.
Tensile strength of compound, 2725 pounds.
Elongation, from 1 to 9.1 inches.
Permanent set, 1 to 1.10 inches.

Experiment 2. A compound was prepared containing—

Rubber	85.5
Gas black	6.0
Sulphur	8.5

Vulcanize at 287 degrees F. for 180 minutes.
Tensile strength of compound, 2900 pounds.
Elongation, from 1 to 8.3 inches.
Permanent set, 1 to 1.14 inches.

Experiment 3. A compound was prepared containing—

Rubber	77.5
Gas black	15.0
Sulphur	7.5

Vulcanize at 287 degrees F. for 180 minutes.
Tensile strength of compound, 3260 pounds.
Elongation, from 1 to 7.6 inches.
Permanent set, 1 to 1.22 inches.

Experiment 4. A compound was prepared containing—

Rubber	61.0
Gas black	33.0
Sulphur	6.0

Vulcanize at 287 degrees F. for 165 minutes.
Tensile strength of compound, 3750 pounds.
Elongation, from 1 to 5.5 inches.
Permanent set, 1 to 1.4 inches.

This compound showed a greater tensile strength than all other mixtures which were tested. Almost equal results were obtained with a mixture containing 200 ounces of rubber plus 100 ounces of gas black.

Experiment 5. When zinc oxide was used in place of gas black, the greatest tensile was observed in a compound containing—

Rubber	56.0
Zinc oxide	37.0
Sulphur	5.0

Tensile strength of compound, 3300 pounds.
Elongation, from 1 to 7.0 inches.

REFERENCES

The following articles published in The India Rubber World, and pertaining to carbon blacks and colloid chemistry, are interesting for collateral reading: W. B. Wiegand, October 1, 1920, page 21; H. F. Schippel, January 1, 1920, page 208; E. B. Spear, September 1, 1920, page 809; G. L. Cabot, September 1, 1920, page 810.

In the *Journal of Industrial and Engineering Chemistry*: G. S. Perrott and R. Thiessen, April 1, 1920, page 324, contributed from the United States Bureau of Mines, Pittsburgh, Pennsylvania.

PART 2. THE REFINED HYDROCARBONS

Mineral Oils, Fats and Waxes. These materials are characterized by the fact that they are all "unsaponifiable" because they are derived or prepared from petroleum and other mineral products. In general it may be said that a "paraffine base" petroleum will yield solid hydrocarbons of the paraffine series, and the "asphalt base" oils are rich in asphalt, but contain no solid paraffines. Hydrocarbons of the olefine series are present in petroleums in small amounts.

Lubricating Oils. When the original crude oil is distilled there is a residue of about 12 per cent, which is known as tar. It has a specific gravity of about 0.9250 and contains lubricating oil as well as wax. The oil is separated from the wax by refrigeration, and purified by washing and distillation. Finally an oil of about "28 Baumé" is obtained. With a specific gravity of 0.886 this is also a low-viscosity lubricating oil. Cylinder oil and spindle oil are much heavier in body and have a high "fire test," flash 260 to 320 degrees C., high viscosity (100 to 230 seconds at 100 degrees C.), and low "cold test," because of the way in which they are for the most part employed.

Petrolatum is a substance resembling in a measure the greases obtained from plants. It is made from selected crude oils by careful reduction and finally, filtration through fullers' earth or bone black. Reduced oils are obtained by driving off or distilling off the light fractions of the crude petroleum without cracking. Instead of heating them by direct fire they are distilled by the aid of a vacuum and by superheated steam. Petrolatum or vaseline has been used in rubber works for softening certain gums. For example, when Pontianak is washed and dried and then cooled, it appears as a rather brittle mass, but the last parts of the water are removed with some difficulty when treating large quantities. The conversion of the ponti into a plastic mass which can be weighed off conveniently in the compounding room, is the most desired thing. To this end it is mixed with a fixed per-

[2] United States patent No. 1,245,700.

centage of petrolatum in steam-jacketed kettles or in kettles over a direct fire.

Paraffine Wax. This can be had in a variety of "melting points" between 50 degrees C. and 60 degrees C. (122 and 140 degrees F.). Its melting point will naturally depend upon the amount of volatile oils it contains. So we find that paraffine wax which has been reheated several times gradually becomes harder, owing to the fact that some of the volatile matter has been driven off. This wax has been in use for many years as a compounding material and in many cases performed the work and accomplished the results now obtained by the use of pitches. It filled the minute interstices in the rubber dough and for that reason the products which contained it withstood the action of air in a very satisfactory manner. It has also been used for waxing the outer surfaces of finished rubber products to protect them from the action of air. This applies to steam packings as well as to auto tires. Paraffine wax is also useful in compounds which must pass through the tubing machine, as it acts as a lubricant and imparts a fine surface finish to the extruded product.

Ozokerite. The principal deposit of ozokerite occurs near Boryslaw in Galicia, Austria. It consists essentially of paraffine hydrocarbons. The color of the crude material varies from yellow to black. The specific gravity varies from 0.850 to 0.890 and the melting point, according to Boverton Redwood, varies from 130 to 160 degrees C. (266 to 320 degrees F.). Owing to its specific gravity it may be freed from loose clinging mineral matter by heating in water. Ceresin is merely refined ozokerite. Two methods have been proposed for its preparation. The one is to extract the crude ozokerite with gasoline, filter and then distil off the gasoline. The other is to wash the crude ore with sulphuric acid, as is done in the case of petroleum hydrocarbons.

Montan Wax is obtained in Saxony, Silesia and Germany by extraction of the lignites with volatile solvents. Brown coal or lignite is a mineral related to bituminous coal on the one hand and wood on the other. Various substances have been extracted from it by destructive distillation. Montan wax is one of these. It has a specific gravity of about 0.950 and a melting point above 70 degrees C. (158 degrees F.). This material as well as ozokerite has been used to a considerable extent in Europe, in general for insulating compounds and in particular for compounds used on rubber-covered wire.

THE ACTION OF CERTAIN ORGANIC ACCELERATORS IN THE VULCANIZATION OF RUBBER—III[1]

By G. D. Kratz, A. H. Flower and B. J. Shapiro[2]

It has for some time been generally recognized that although aniline is effective as an accelerator in the absence of zinc oxide, diphenylthiourea functions but mildly in the absence of, and strongly in the presence of this substance. Reference to this effect has already been made indirectly in the literature several times, and recently Twiss[3] has given curves for physical test results which demonstrate quite clearly the effectiveness of diphenylthiourea as an accelerator in the presence of zinc oxide. His statement that diphenylthiourea is practically inert in the absence of zinc oxide is, however, not in accord with our findings.

In a previous paper of this series[4] we have shown that in the acceleration of the vulcanization of a rubber-sulphur mixture, the activity of one molecular part of diphenylthiourea is less than that of an equimolecular quantity of aniline, but equal to that of one molecular part of aniline and one molecular part of phenyl mustard oil.

Our former experiments, however, were confined to the determination of sulphur coefficients at one cure only. In the present instance, we desired to compare the relative effects of aniline and diphenylthiourea over a series of cures, and to effect this comparison both by means of the sulphur coefficients and the physical properties of the various mixtures and cures. Further, it was desired to compare mixtures which contained zinc oxide, as well as the rubber-sulphur mixtures previously employed.

Summarizing our results briefly, we found that, in a rubber-sulphur mixture, the accelerating effect of aniline is considerably greater than that of diphenylthiourea, when judged either by sulphur coefficients or on the basis of the physical properties of the vulcanized mixtures. In mixtures which contained zinc oxide, however, the reverse was found to be true, and diphenylthiourea was more active than aniline when judged by either of the above criteria. It was also evident that in the case of the mixtures which contained zinc oxide, although the tensile strength of the mixture which was accelerated by diphenylthiourea increased more rapidly than in the case of the mixture accelerated by aniline, the same maximum tensile strength was attained by each. The sulphur coefficients at their respective maxima were practically identical. While the maximum tensile strength of the rubber-sulphur mixture which was accelerated by aniline was the same as that obtained when zinc oxide was present in the mixture, it was attained only at a much higher sulphur coefficient. Lastly, it was also found that the tensile strengths of the mixtures that contained zinc oxide and which were accelerated by either aniline or diphenylthiourea, particularly the latter, were increased tremendously during the first part of the vulcanization, and at very low sulphur coefficients. This would indicate the possibility of certain substances (accelerators) increasing the physical properties of a vulcanized mixture without greatly affecting the sulphur coefficient.

This point is of interest as it already has been noted by ourselves,[6] Cranor,[6] and others, that with mixtures which contain zinc oxide and a strong organic accelerator, the correct (or optimum) cure is obtained at abnormally low sulphur coefficients when compared with those obtained for unaccelerated mixtures. No explanation has been offered for this phenomenon. Bedford and Scott,[7] however, regard diphenylthiourea as the aniline salt of phenyldithiocarbamic acid after H_2S has been liberated. This salt is extremely unstable, owing to the weakly basic properties of aniline, and in this respect, according to Krulla,[8] is unlike the metallic salts of the same acid. In this connection, it is particularly pertinent to note that Bruni[9] has recently found the zinc salts of the mono and disubstituted dithiocarbamic acids to be violent accelerators. It is quite possible, then, that such a salt may be formed during the vulcanization process in mixtures which contain both diphenylthiourea and zinc oxide;[10] and that, irrespective of its action as an accelerator, the zinc portion of such a salt may be responsible for the physical improvement imparted to the mixture.

Our present results, moreover, particularly when interpreted with the assistance of the excess sulphur coefficients obtained for the various mixtures at different times of cure, show that when aniline is employed as the accelerator in the presence of zinc oxide, the effect of the latter substance is manifested almost entirely in the physical properties of the mixture. When aniline is replaced by diphenylthiourea the reverse is true, and the activity of the original substance as an accelerator is greatly increased when measured by either the sulphur coefficients or physical properties. In the latter instance, then, the zinc oxide most probably either assists in the decomposition of the diphenylthiourea

[1] Presented before the Rubber Division of the American Chemical Society, Chicago, Ill., September 6 to 10, 1920.
[2] The Falls Rubber Co., Cuyahoga Falls, Ohio.
[3] Journal of the Society of Chemical Industry, 39, 1920, 125t.
[4] Journal of Industrial and Engineering Chemistry, 12, 1920, 317.
[5] Journal of Industrial and Engineering Chemistry, 11, 1919, 30; Chemical & Metallurgical Engineering, 20, 1919, 418.
[6] The India Rubber World, 61, 1919, 167.
[7] Journal of Industrial and Engineering Chemistry, 12, 1920, 31.
[8] Ber., 46, 2669.
[9] British patents Nos. 140,387 and 140,388.
[10] The action of diphenylthiourea with zinc oxide is apparently similar to the action of the natural accelerator with magnesium oxide, as pointed out in a previous paper (Journal of Industrial and Engineering Chemistry, 12, 1920, 971). In both cases the oxide serves in a contributory capacity rather than as a primary accelerator. It is obvious that no one oxide will activate all accelerators equally well.

to a more active substance, or combines with the decomposition or alteration products of the original substance with the formation of a zinc salt, which is responsible for the increase both in the sulphur coefficients and tensile strength of the mixture. Our results with aniline as the accelerator, however, do not indicate the formation of such a salt.

Thus, in the presence of zinc oxide, the activity of aniline and diphenylthiourea as accelerators appears to be of a different nature. Evidently, an acid substance, probably a thiocarbamic acid, capable of reacting with zinc oxide, is formed as one of the decomposition products of diphenylthiourea. The excess accelerating activity is attributed to this zinc salt. When aniline is employed as the accelerator, there is no evidence of such salt formation.

EXPERIMENTAL PART

The present experiments were designed to effect a comparison of the sulphur coefficients and physical properties of representative mixtures when accelerated by 0.01-gram-molecular quantities of either aniline or diphenylthiourea. The six following mixtures were employed for this purpose, and each was vulcanized for a series of cures:

A—Rubber-sulphur control
B—Rubber, sulphur, and aniline
B-I—Rubber, sulphur, and diphenylthiourea
C—Rubber, sulphur, and zinc oxide control
D—Rubber, sulphur, zinc oxide, and aniline
D-I—Rubber, sulphur, zinc oxide, and diphenylthiourea

The quantities of each substance employed in these mixtures are shown in Table I. The amounts of aniline or diphenylthiourea

Table I

Ingredient	Mixture A	Mixture B	Mixture C	Mixture D	Mixture B-1	Mixture D-I
Rubber	100.00	100.00	100.00	100.00	100.00	100.00
Zinc oxide	....	....	100.00	100.00	....	100.00
Sulphur	8.1	8.1	8.1	8.1	8.1	8.1
Aniline	....	0.93	....	0.93	....	....
Diphenylthiourea	....	....	....	....	2.28	2.28

added to these respective mixtures represent 0.01 gram-molecule of the accelerator for each 100 gms. of rubber in the mixture. Otherwise, the same general method of procedure was adopted in the course of this work as in that previously reported in Part I.[11]

The rubber used was of good quality, first latex, pale crêpe, a different sample of the lot used in our former experiments. The various mixtures were mixed on the mill, vulcanized, and tested in the same manner as before. The physical properties of the vulcanized samples were determined on a Scott testing machine of the vertical type, with the jaws opening at the rate of 20 inches per minute. A recovery period of 48 hours was allowed before physical tests were made. Combined sulphur was estimated by our method previously reported in detail.[12]

The various mixtures were vulcanized at 141.5 degrees C. for different intervals of time up to 240 minutes.[13] The sulphur coefficients and physical properties of the different cures for each mixture were determined. These results are given in detail in Table II. Generally speaking, the results obtained were in good agreement, and fairly smooth curves for physical properties were obtained.[14]

Table II

(All Mixtures Vulcanized at 141.5° C.)

Cure in Minutes	Mixture A: Sulphur Coefficient	Mixture A: Tensile Strength, lbs. per sq. in. at Break	Mixture A: Final Length at Break Per Cent	Mixture B: Sulphur Coefficient	Mixture B: Tensile Strength, lbs. per sq. in. at Break	Mixture B: Final Length at Break Per cent	Mixture C: Sulphur Coefficient	Mixture C: Tensile Strength, lbs. per sq. in. at Break	Mixture C: Final Length at Break Per Cent	Mixture D: Sulphur Coefficient	Mixture D: Tensile Strength, lbs. per sq. in. at Break	Mixture D: Final Length at Break Per Cent	Mixture B-1: Sulphur Coefficient	Mixture B-1: Tensile Strength, lbs. per sq. in. at Break	Mixture B-1: Final Length at Break Per Cent	Mixture D-1: Sulphur Coefficient	Mixture D-1: Tensile Strength, lbs. per sq. in. at Break	Mixture D-1: Final Length at Break Per Cent
30	0.794	....	....	1.126	545	1180	1.005	....	....	1.434	540	710	0.913	([1])	1210	1.603	2210	820
45	0.856	279	1250	1.317	1019	1170	1.055	306	680	1.490	1366	770	1.063	([1])	1360	1.912	2381	780
60	1.038	....	....	1.583	1228	1120	1.207	592	750	1.838	1819	770	1.335	([1])	1260	2.297	2442	790
75	1.090	494	1220	1.898	....	....	....	....	....	....	1968	750	1.609	533	1230	2.623	....	....
90	1.531	709	1150	2.482	1621	1060	1.558	1041	760	2.382	2350	720	1.953	789	1230	2.962	2730	830
120	2.089	871	1180	3.351	2046	1100	1.765	1815	780	2.801	2808	780	2.496	1053	1210	3.755	2699	770
150	2.236	1159	1130	4.033	2410	1100	2.237	1950	760	3.266	2721	770	3.109	1303	1150	4.521	2619	750
180	2.470	1521	1130	4.939	2670	1030	2.620	2032	750	4.226	2663	740	4.027	1779	1110	5.357	2020	690
210	3.179	1842	1100	5.264	2566	970	3.340	2184	760	4.806	2245	700	4.730	2021	1080	6.379	1118	530
240	3.751	2124	1060	6.268	2131	910	3.615	1978	730	5.564	1837	660	5.624	2362	1050	7.079	754	440

[1] Test pieces did not break.

CONCLUSIONS

(1) In a rubber-sulphur mixture, the activity of aniline in the acceleration of vulcanization is much greater than that of a molecularly equivalent quantity of diphenylthiourea.

(2) In mixtures which contain zinc oxide, diphenylthiourea is more active than aniline.

(3) In mixtures accelerated by aniline, either with or without zinc oxide, the same maximum tensile strength is obtained, accompanied by a higher sulphur coefficient in the absence of zinc oxide than when this substance is present.

(4) Mixtures which contain zinc oxide, and which are accelerated by either aniline or diphenylthiourea, show large increases in tensile strength in the early stages of the vulcanization.

(5) Mixtures which contain zinc oxide and which are accelerated by either aniline or diphenylthiourea, attain the same maximum tensile strength at approximately the same sulphur coefficients.

(6) There is apparently no general relation between the physical properties and sulphur coefficients of accelerated mixtures.

[11] Journal of Industrial and Engineering Chemistry, 12, 1920, 317.
[12] The India Rubber World, 61, 1920, 356.
[13] In the experiments described in Parts I and II vulcanization was carried on at a temperature of 148 degrees C.
[14] Satisfactory physical test results for representation graphically are obtainable with considerable difficulty. We have found it necessary, particularly when seeking results for stress-strain diagrams, to employ three men, one to operate the machine and two to take readings.

SHIPPING SERVICE TO RHINE POINTS RESUMED

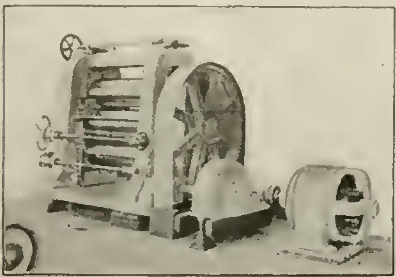
The Red Star Line of the International Mercantile Marine Co., New York, N. Y., announces resumption of its pre-war all-water service to points on the River Rhine. Transhipment via fast Antwerp steamers may be made for both incoming and outgoing traffic. Through rates will now be named and through bills of lading issued. Goods for France, Alsace-Lorraine and the district of the Saar may be shipped via Strasburg without asssessment of the French Customs surtax. Rates will also be named for rail shipments via Antwerp and Thionville to and from the Rhine Valley, Switzerland, France and inland points in Belgium for handling classes of cargo requiring rail transportation. This restores Antwerp as a shipping point for the territory in question to the same favorable position it held before the war.

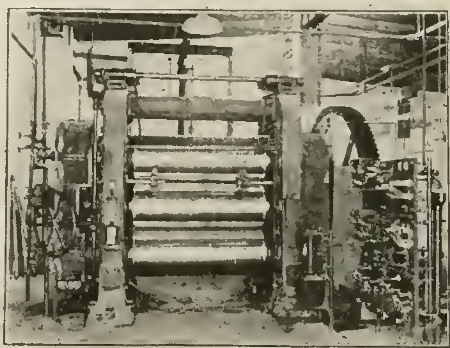
New Machines and Appliances

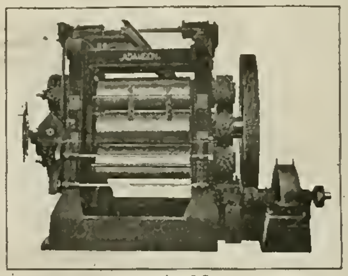
STANDARD TIRE CALENDERS

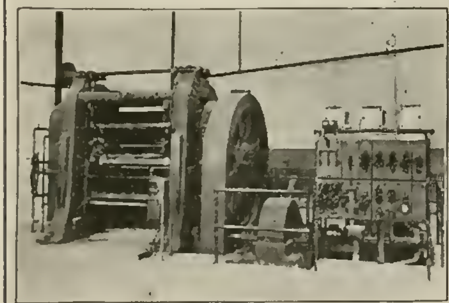
Standard calenders employed in the tire-manufacturing industry are massive machines of the 24 by 66-inch, 3-roll type, equipped with electric motor-drive and control. Tire calenders are operated on "friction" by variation in the relative speeds of the middle and bottom rolls whereby the fabric structure is filled with rubber, or on "even motion," that is, with rolls revolving at the same speed producing a smooth sheet of rubber which may be directly applied as a "skim" coating on fabric already "frictioned" or delivered of thicker gage for independent use for inner tubes, side-walls, etc.

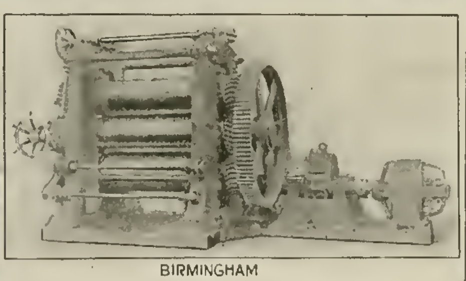
Preliminary to the calendering operation the rubber compound is warmed up on a mill and the calender rolls are heated to a temperature suitable for the compound which is then fed into the calender between the top and middle rolls. The feed-slide is known as the front of the calender.

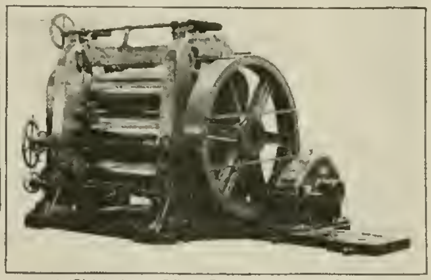

FARREL


ALLEN


ADAMSON


VAUGHN


BIRMINGHAM


WELLMAN-SEAVER-MORGAN CO.

Standard Types of 24 by 66-Inch 3-Roll Tire Calenders

FRICTIONING FABRICS

The term "frictioning" designates the process of impregnating a fabric by filling its meshes from one or both sides with rubber or composition. This effect results from a variation in the relative speeds of the middle and bottom rolls by which the rubber on the middle roll is made to revolve as a "bank" against the surface of the fabric passing through at the speed of the bottom roll. This difference in speed forces the rubber through the meshes of the fabric while the surface of the goods also gains a light coating of rubber.

The operation of frictioning is conducted as follows: The middle or drive roll is covered with a heavy coating of warmed rubber. A roll of fabric is placed in the brake-brackets at the rear of the machine and passes through the calender between the middle and bottom rolls. These rolls are adjusted with suitable interval between, to "bank" the rubber against the bottom roll. It is this revolving bank of rubber which forces the rubber into the fabric as it passes. The first friction coat practically goes entirely through the weave of the fabric and, therefore, comprises more than half the rubber applied to a fabric frictioned on both sides. After each passage through the calender the goods are rolled on a stock-shell set in the "take-up" device on the front of the machine. When coating the second side, it is necessary to wind the double-coated fabric in a liner of plain cotton sheeting to separate the tacky rubber surfaces and prevent their adhering and making the roll solid.

In friction-coating, the surface speed of the bottom roll is about 30 per cent slower than that of the middle or drive-roll to gain difference in speed for the frictioning effect.

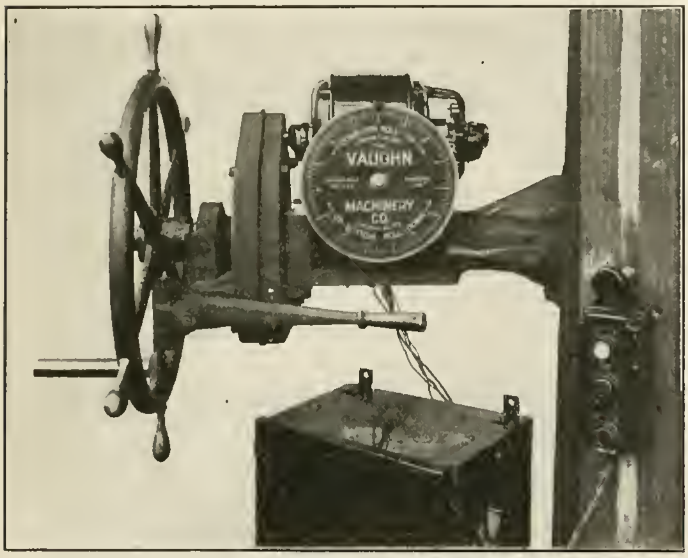
SKIM-COATING AND SHEETING

Skimming consists of laying a very thin coat or sheet of rubber on one side of the frictioned fabric to give it a smooth finish and build it up to a specified gage or thickness. This is done by passing the frictioned fabric through the calender between the middle and bottom rolls as for friction coating. In skim coating the speeds of all the rolls are the same. This condition is designated as "even motion." Thus arranged a calender will produce smooth rubber sheets of any desired thickness according to adjustment apart of the middle and bottom rolls. Arranged on even motion a calender is ready for building up to specified gage pure rubber for inner-tubes, side-walls or any other purpose requiring a smooth sheet.

MOTOR-POWER ROLL ADJUSTMENT FOR CALENDERS

Calender rolls are adjusted in relation to the intervals between them, by an arrangement of screws and gearing actuated by a hand-wheel, but a motor-driven mechanism provided with a fine indicator for effecting the roll adjustment is preferable. The accompanying illustration shows a special attachment designed for very close adjustment of the middle and bottom rolls necessary in running sheet stock to accurate gages. This mechanism is driven by a 2½-h.p. motor through a cone friction clutch. A small lever at the right operates the clutch connecting the driving shaft to either upper or lower roll adjustment as desired. The large lever at the left operates a clutch which connects the drive-shaft to either motor or hand-wheel. The hand-wheel is retained as an emergency means for operating the roll adjustment if the motor should be out of service.

The motor controller is of the automatic type operated by three push buttons which are marked "Up," "Down" and "Stop."



Vaughn Electrically-Driven Calender-Roll Adjuster

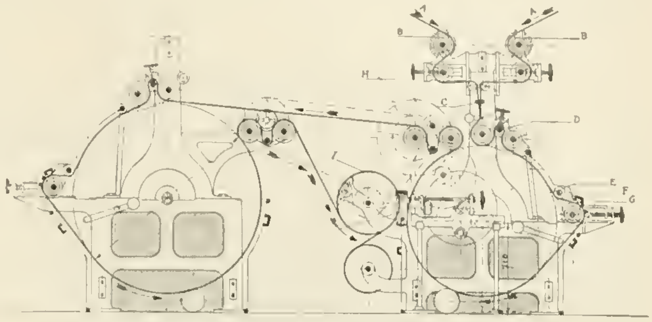
To operate the mechanism the clutch lever at the left is pulled down, thereby connecting the motor to the driving shaft. The small lever at the right is placed in the proper position for driving the upper or lower rolls as desired and the adjustment then made by pushing the proper buttons of the control. The movement of the rolls is very accurately shown by the large dial, it being easily possible to estimate a movement of one-half of one one-thousandth of an inch.

It is possible to reset the pointer on the dial at any time so that the movement of the rolls from that point can be read directly. The control for the motor is very positive so that it is possible to make accurate and small adjustments as well as larger ones. The friction drive is designed so that it will slip before the rolls are injured, should the motor be left running after they have come together.

CONTINUOUS CORD-TIRE FABRIC MACHINE

A novel machine of French design and manufacture for producing rubberized cord tire fabric without woof threads is shown in cross-section in the accompanying illustration. The course of the fabric in the making is indicated by the heavy line and arrows.

Beginning at *A* and *A'* in the figure, two chains of parallel threads of indefinite length and a width equal to that of the fabric enter the mechanism from overhead on either side of the machine. The threads of each of these chains successively alternate with the threads of the other and are then stuck together with rubber composition to make a "woofless" fabric. The proper distribution or laying together of the threads is done by threading them through combs as guides at points *B*, *B'* and *C*



The Bourdin Cord Fabric Machine

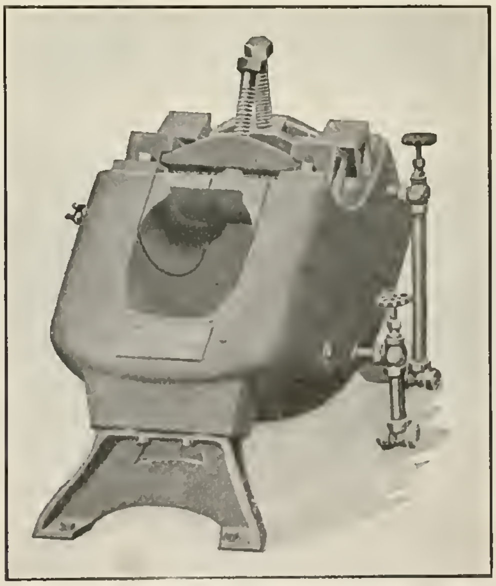
The first coating of rubber is applied at the group of water-cooled rollers *D* from which the fabric passes on in contact with the steam-heated cylinder *E*.

It then passes on to be again coated over the water-cooled roller *F* by a knife *G* the variable slope of which permits regulation of the coating. Continuing on around the drying cylinder *E* the fabric reaches the water-cooled roller *H*. From this point the other side of the fabric is similarly coated and dried in a second section of the machine. The finished fabric coated on both sides is finally wound up at *I* with a cloth liner to prevent adhesion.—Manufactured by A. Olier, 10 rue Beaurepaire, Paris, France; agents, L. J. Broche and F. Chassaing, 21 rue de la Station, Alfort (Seine), France.

AKRON RUBBERMOLD TRUCK-TIRE VULCANIZER

The Akron Rubber Mold & Machine Co., Akron, Ohio, builds a complete line of vulcanizer equipment for tire repair, including giant pneumatic truck-tire molds for 6, 7, 8, 9 and 10-inch cord tires in both flat and round tread.

The improved Type A mold has been redesigned to accommodate cord tires as well as fabric tires. This is a three-cavity outfit,



Akron Rubbermold Vulcanizer

with self-contained steam boiler, tube plate and inside patch vulcanizer attachment. Type F equipment is designed to accommodate fabric tires only. Type F is a two-cavity outfit with self-con-

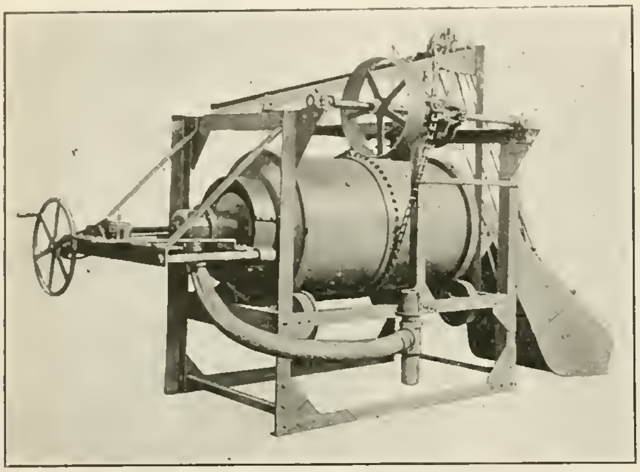
tained steam boiler, tube plate and inside patch vulcanizer attachment.

Another popular equipment is the improved Type E cavity retreading vulcanizer. This model will accommodate all makes of tires from 3-inch to 5-inch cord and fabric tires. It is a self-contained outfit.

"IDEAL" TUMBLING BARRELS

The promptness with which machines employed in other industries are adapted by rubber engineers for their special use is characteristic of the industry.

The cement mixer shown in the accompanying illustration is offered as a suggestion having possibilities as a tumbler for small



A Time-Saving Tumbling Barrel.

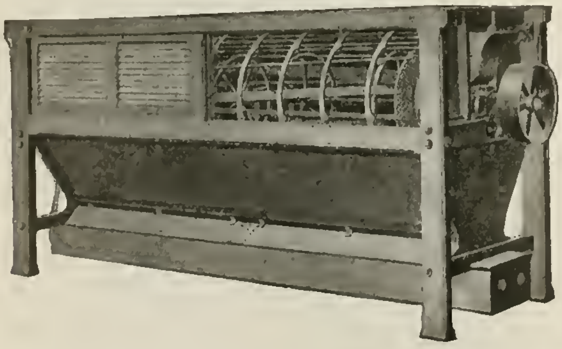
molded rubber articles because of its automatic loading and emptying features that save a great deal of labor.

The machine may be loaded and unloaded while in motion, and the time required for either of these operations is but a fraction of the time required by the old customary form of tumbling barrel.—Ideal Concrete Machinery Co., Cincinnati, Ohio.

SIFTING REEL FOR DRY COMPOUNDING INGREDIENTS

The practice of sifting compounding ingredients before adding them to the rubber mixing requires an effective mechanism that will not easily became deranged.

A special centrifugal reel for removing mechanical impurities, shown in the accompanying illustration, consists of a cylinder



Centrifugal Sifting Reel

covered with the proper mesh cloth revolving at a slow speed. The material entering the machine is picked up by beaters attached to spiders fastened to a higher speed shaft and thrown against the screen cloth, which rejects the lumps and impurities, leaving the sifted product free from the injurious material. The cloth cylinder is provided with a revolving brush to keep the meshes of the cloth from filling up. The product passing through the cloth drops onto zinc-covered cant boards and thence into the conveyor at the bottom of the machine to be delivered to an opening at one end of the box.

As it is necessary to maintain a steady, even stream of material to the reel a feeder, not shown in the illustration, is employed which can be regulated to deliver a uniform amount to the machine.

These reels are in successful operation in several of the leading tire plants.—Allis-Chalmers Manufacturing Co., Milwaukee, Wisconsin.

MACHINERY PATENTS

MACHINE FOR MAKING TIRE CASINGS

The apparatus shown in Fig. 1 is used for making the fabric foundation of a tire casing. A fabric strip formed of parallel rubber-coated cords, is wound obliquely about spaced wires *A* mounted over pairs of grooved pulleys *B*. The strip is led from a drum to reels *C* projecting from a frame, which embraces the wires *A*. The frame itself is rotated by bevel gearing *D*. It is rocked about its supporting shaft by a cam, having an adjustable connecting rod. The wires *A* are advanced through the frame by intermittent rotation of the pulley *E*. The pulley is actuated by one-way clutch members, connected to a crank disk. Between the advancing movements of the wires *A* the superposed layers of fabric are consolidated between a hammer *F* and an anvil impelled by tappet mechanism. The tension roller *G* is arranged in the lower run of the wires and is mounted on a block having an adjustable spring which fits between a fixed bracket and a hand-wheel on the stem of the block.

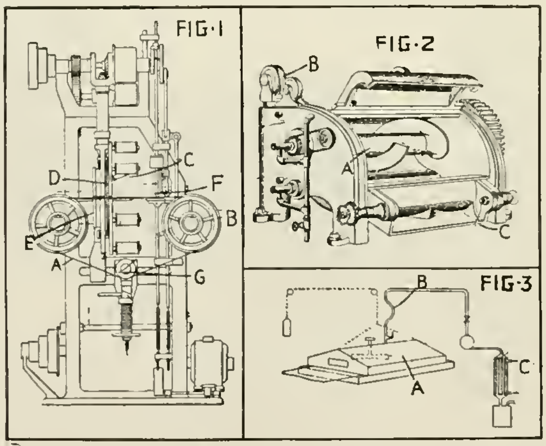


Fig. 1. Tire Casing Machine—Fig. 2. Automatic Enclosed Mixer—Fig. 3. Solvent-Recovery Apparatus.

A hand-operated ramp is used for lifting the tension roller out of action, and for varying the spacing of the wires the pulleys *B* are threaded on the bosses of the pulleys *E*. A spacing plate is arranged between the wires.—British patent No. 150,717.—A. Wolber, Levallois-Perret, Seine, France.

AUTOMATIC MACHINE FOR MIXING RUBBER

The mixer shown in Fig. 2 consists of a cylindrical casing containing a rotary member *A* mounted in bearings and provided with two or more helical blades of opposite twist, with gaps left between the ends of the blades. Thus the material is forced along towards the end of the chamber, then passes through a gap and is forced by the other blade to the other end of the chamber, and so on. Each of the blades has its edge beveled, so that the mixture which is forced outwards by the surfaces of the blades, is smeared against the inner surface of the chamber.

The mixing chamber and the interior of the rotatable member may be heated or cooled by steam or water supplied through pipes. The door of the mixing chamber hinges at the bottom

and is closed by a fluid-pressure cylinder, the piston of which is connected to the door by a flexible member *B*.

The ingredients to be mixed with the rubber are contained in a drum, mounted on revoluble members indicated by *C* in the recess of the door. In use, a filled drum is placed in position and the door closed. When the pigments are to be introduced into the mixing chamber, the ends of the drum are removed and the contents allowed to pass into the chamber. The eccentric mounting of the drum assists in shaking out the material.—British patent No. 150,269.—A. P. Lohmann, Akron, Ohio.

APPARATUS FOR RECOVERING VOLATILE SOLVENTS

This machine is shown in Fig. 3, in greatly reduced proportions. The rubber material under treatment is covered with a closely fitting hood, through which air is drawn. The air within the hood is agitated by a fan in order to improve its evaporating efficiency, and then passes to a condenser. The hood *A*, in which the fan is mounted, has a counterpoise, so that it can be easily raised. The air is withdrawn through a flexible tube *B* provided with a cut-off valve connected to the starting lever of the machine. The air passing through the hood *A* to the condenser *C* may be compressed. The condenser tubes may be of circular cross section provided with hexagonal baffles, on a central rod, to collect the liquid.—British patent No. 141,210.—D. V. Plumbridge, Holmewood, South Kilworth, Warwickshire, England.

OTHER MACHINERY PATENTS

THE UNITED STATES

No. 1,376,463 Air-bag for vulcanizing. I. K. Rystedt, Dayton, O.
1,376,579 Tire-casing-inspecting apparatus. E. Ramsdell, Cleveland, O.
1,377,133 Tire-repair vulcanizer. L. Jacobson, Chicago, Ill., assignor to G. B. Cooper, Cleveland, O.
1,377,212 Fabric-smoothing machine. R. McClenathen, Cuyahoga Falls, and J. Noall, Akron—both in Ohio, assignors to Kelly-Springfield Tire Co.
1,377,214 Steam connection for hollow tire-core. T. Midgley, Hampden, assignor to The Fisk Rubber Co., Chicopee Falls—both in Massachusetts.
1,377,845 Machine for repairing clincher rims of vehicle wheels. L. C. McDonald, Page, Neb.
1,378,172 Apparatus for curing tire casings. F. J. Gostlin, assignor by direct and mesne assignments to The Star Rubber Co.—both of Akron, O.
1,378,678 Indented mold for tubes and tires. I. S. Hoffmann, Columbus, O.
1,379,169 Machine and method for inserting inner tubes into casings. N. D. Chellis, Erie, Pa.
1,379,203 Tire mold. C. P. Mundale, Seattle, Wash.
1,379,369 Tire-bead cementing apparatus. W. C. Stevens, assignor to the Firestone Tire & Rubber Co.—both of Akron, O.
1,379,391 Vulcanizing pad. F. A. Brown, assignor to the G. & J. Tire Co.—both of Indianapolis, Ind.
1,379,397 Vulcanizing air-bag for tire repair. O. W. Dolph, Los Angeles, California.
1,379,447 Repair vulcanizer. E. D. Hostler, I. J. Hamiel and C. H. Mather, all of Tipton, Ia., assignors of ½ to said Hamiel and ¼ to said Mather.
1,379,597 Selvage trimmer. R. S. Trogner, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.

REISSUES

15,099 Wrapping-machine folder. W. C. Stevens, Akron, O., assignor to Pierce Wrapping Machine Co., Chicago, Ill. Original patent No. 1,196,044, dated August 29, 1916. Divided; original patent No. 1,243,357, dated October 16, 1917.

THE DOMINION OF CANADA

211,157 Apparatus for manufacturing high-pressure expanded vulcanized rubber. C. L. Marshall, London, Eng.
211,238 Tire-making machine. The Goodyear Tire & Rubber Co., assignee of W. B. Harsel, executor of estate of E. Nall, deceased—both of Akron, O.
211,239 Tire-making machine. The Goodyear Tire & Rubber Co., assignee of W. B. Harsel and E. A. Nall—all of Akron, O.
211,241 Rubber-slicing machine. The Goodyear Tire & Rubber Co., assignee of E. A. Nall, executrix of estate of E. Nall, deceased—both of Akron, O.
211,245 Tire-turning device. John Bertram & Sons Co., Limited, Dundas, Ont., assignee of F. Southwick, Kansas City, Kans., U. S. A.
211,297 Tire-repair vulcanizer. H. K. Wheelock and F. A. Weller, both of Los Angeles, and W. R. Fountain, Oakland—both in Calif., U. S. A., each assignee of ⅓ interest.
211,298 Tire-repair vulcanizer. H. K. Wheelock and F. A. Weller, both of Los Angeles, and W. R. Fountain, Oakland—both in Calif., U. S. A., each assignee of ⅓ interest.
211,627 Tire mold and clamp. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of H. V. Lough, Hartford, Conn., U. S. A.

NEW ZEALAND

43,358 Tire repair vulcanizer. W. M. Early, Wellington, N. Z.

THE UNITED KINGDOM

159,456 Tire inflater. L. Pickrell, 108 Church street, Edmonton, London.
159,630 Machine for winding balls of elastic thread on a core for making golf-balls, etc. C. H. Gray, India-Rubber, Gutta Percha & Telegraph Works Co., Silvertown, London, and J. Hubbard, 35 Norfolk Road, Seven Kings, Essex.
159,631 Tension device for elastic thread winding machine used in manufacture of golf balls. C. H. Gray, India-Rubber, Gutta Percha & Telegraph Works Co., Silvertown, London, and J. Hubbard, 35 Norfolk Road, Seven Kings, Essex.
159,993 Apparatus for filling rubber solution into rubber flasks for use as cores of golf balls. C. H. Gray, India-Rubber, Gutta Percha & Telegraph Works Co., Silvertown, London.
160,007 Machine for cutting cloth, sheet rubber, etc. W. Hamilton, Lindum street, Rusholme, Manchester.
160,032 Apparatus for making tires. Dunlop Rubber Co., Limited, Dunlop House, Albany street, Regent's Park, London, and C. Macbeth, Fort Dunlop, Erdington, Birmingham.
160,169 Apparatus for rolling freshly coagulated rubber. Société Anonyme Compagnie des Caoutchoucs de Padang, 7 rue des Italiens, Paris. (Not yet accepted.)
160,268 Apparatus for molding rubber for vulcanizing. A. Mond, 19 Southampton Buildings, Chancery Lane, London. (The Miller Rubber Co., Akron, Ohio, U. S. A.)
160,670 Apparatus for joining ends of solid rubber tires having an embedded helical wire core into the meeting ends of which a metal rod or pin is fitted. J. H. Bolwell, 421 Gloucester Road, Horfield, Bristol, and A. G. Barrett and J. C. Burton, Post Office Place, Leicester.
160,753 Door for autoclaves, etc. Naamlooze Vennootschap Hilversumsche Ijzergieterij en Machinefabriek voorheen Ensink & Co., Hilversum, Holland. (Not yet accepted.)
161,009 Device for repairing tire-treads. W. B. Burke, 215 St. Clair avenue, Cleveland, Ohio, U. S. A.

GERMANY

DESIGN PATENTS ISSUED, WITH DATES OF ISSUE

775,343 (October 31, 1919.) Apparatus for making impervious tubes by drenching tube fabric with a rubber solution. Fa. Wilhelm, Korting, Barmen.
775,391 (March 29, 1921.) Machine for stamping combs. Fa. Eduard Meek, Pforzheim.
775,567 (April 4, 1921.) Steam holder of metal for vulcanizing apparatus with riveted vulcanizing plate. Fleming & Cie., G. m. b. H., Charlottenburg.
775,863 (April 2, 1921.) Doubling knife for machine for cutting combs. Victor Müller, Forsthaus near Krefeld.

PROCESS PATENTS

THE UNITED STATES

No. 1,377,729 Applying lubricant to tire casings. W. F. Ray, Chicago, Ill.
1,378,064 Forming dentists' molds in flexible cup and expanding sides of cup to remove. G. E. Terranova, New Haven, Conn.
1,378,523 Forming hollow rubber articles having relatively infusible insert bedded therein. F. A. Cigol, Paterson, N. J.
1,379,598 Air-bag and method of wrapping. R. S. Burdette, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.

REISSUES

15,108 Manufacture of sponge rubber non-pneumatic balls. Kinsuke Fukuda, Tokio, Japan. Original No. 1,320,221, dated October 28, 1919.

THE DOMINION OF CANADA

211,240 Production of lampblack. The Goodyear Tire & Rubber Co., Akron, O., assignee of W. K. Lewis, Cambridge, Mass., U. S. A.
211,290 Manufacturing pneumatic-tire casings. E. Hopkinson, New York, N. Y., assignee of J. L. G. Dykes, Chicago, Ill.—both in U. S. A.
211,367 Producing tire armor of rubber and fabric. A. E. Jennings, Owensboro, Ky., U. S. A.
211,435 Manufacture of stretchless corded belting. The Lambert Multiplus Co., assignee of H. M. Lambert—both of Portland, Ore.
211,600 Manufacture of fabric tires. H. Stanyon, Toronto, Ont.
211,914 Vulcanization of rubber articles. The B. F. Goodrich Co., New York, N. Y., assignee of H. D. Ayres, Akron, O.—both in U. S. A.

THE UNITED KINGDOM

160,367 Manufacture of fabric tires. A. C. Schwartz, 2050 Woolworth Building, New York, New York, U. S. A.
161,156 Production of zinc oxide. New Jersey Zinc Co., 160 Front street, New York, N. Y., assignee of J. A. Singmaster, Palmerton, Pa.—both in U. S. A. (Not yet accepted.)

GERMANY

DESIGN PATENTS ISSUED, WITH DATES OF ISSUE

776,521 (March 3, 1921.) Method of stopping joints of rubber hose. Hermann Falk, Schweinfurt.

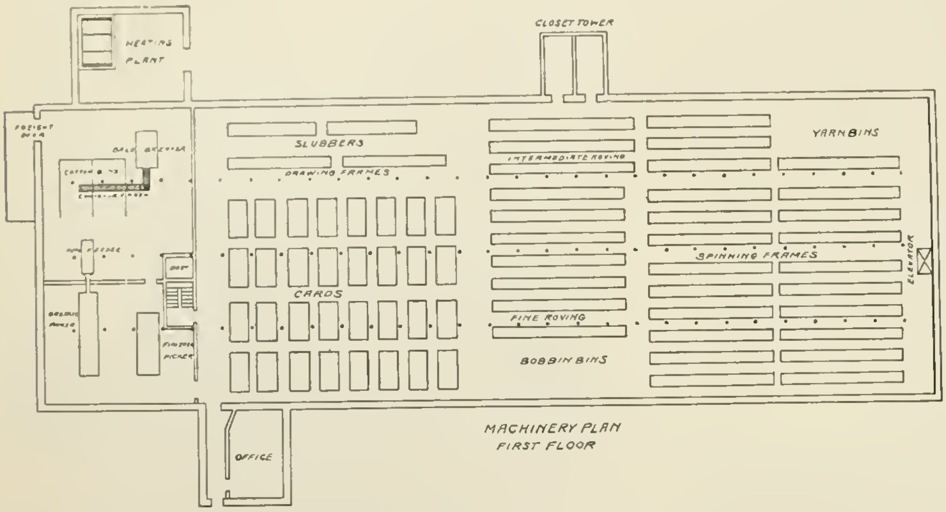
LUBRICATING TIRE MOLDS

A very convenient and satisfactory means of lubricating tire repair or other rubber molds is by means of a pad of cheese-cloth which has been well-saturated with melted cocoa butter and replaced with a fresh pad at frequent intervals.

The Planning of a Cotton Mill for Tire Fabrics

By G. Joseph Nord[1]

There is no iron-clad rule that can be laid down as to the proper design of a cotton mill manufacturing tire fabrics, as this is a comparatively new branch of the textile industry in which there has been a wide departure from the conventional methods in the manufacture of cotton goods. Each manufacturer or engineer usually has his own ideas as to the construction of the mill building, the type or make of machinery and its position in the mill.



First-Floor Plan of a Tire Fabric Mill

To familiarize the reader with what is considered a practical lay-out of a modern tire fabric plant, I will give a description of a 5,000-spindle mill designed to produce 23 by 5 by 3-cord fabric and 23 by 23 builder fabric.

There are several important matters that should be carefully considered at the outset in connection with planning a cotton mill; some of these are the following:

1. The class of goods to be made.
2. The size of the mill, as determined by the number of spindles.
3. The machines necessary to be operated in connection with this number of spindles in order to produce the goods desired.
4. The space that this machinery will occupy.
5. The extra expense to be incurred in addition to the building and equipment of the mill—the land to be purchased, tenement houses to be erected, capital to be left for the operation of the mill, etc.
6. The total cost of the undertaking.

It is important, therefore, to plan each of the foregoing subjects and have specifications for them submitted to the proprietors or directors before commencing to plan the building.

MILL BUILDING

For a 5,000-spindle mill a two-story building about 80 feet wide and 250 feet long is most practical so as to eliminate as far as possible the use of artificial light.

The more recent designs of mill buildings are of reinforced concrete which are superior to the ordinary type of slow-burning construction. This type of building, if used with steel sash and doors, is ideal for cotton manufacturing, as it gives an abundance of light and an unyielding floor for machinery, the latter being a very important factor in keeping machines in line and thereby increasing their life and efficiency.

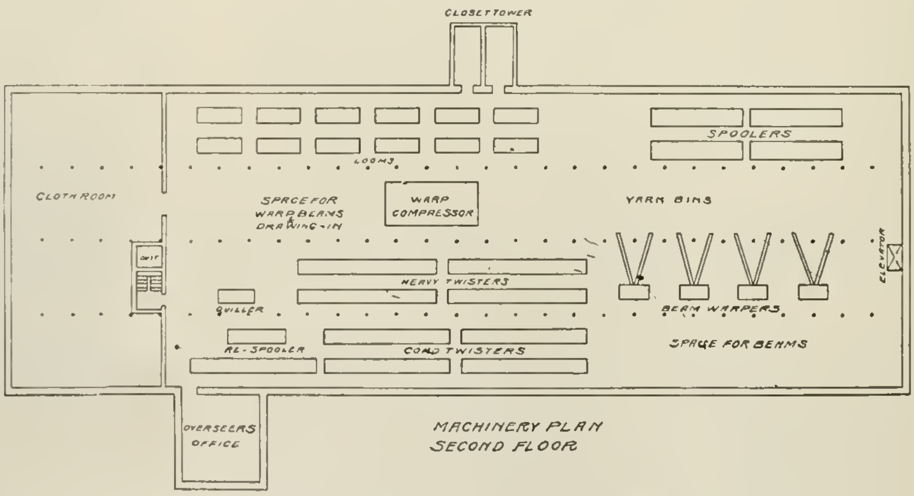
POWER, HEAT AND LIGHT

Electrical power is generally found to be more economical and the individual drive, being no longer an experiment on textile machinery, makes this form of drive the most practical and efficient.

A successful heating system for a textile mill must be constructed of the best of material and well put together. It must be elastic and easily controlled; have abundant reserve capacity; be compact, durable and easily accessible for repairs.

The condition of the atmosphere in regard to moisture or humidity is an important feature, and in addition to the necessary warmth, a certain amount of water must be carried in suspension in order that the materials in process may be in the proper condition. One of the most valuable improvements along this line during recent years has been the use of automatic regulation in connection with a humidifying apparatus. Uniform moisture at all times is an absolute necessity, and, of course, without automatic regulation this is not possible. Humidity not only saves a big loss in weight, but also makes better running work which in turn lessens the cost of production.

Electric lighting, of course, is the best system, and any good industrial lighting unit is suitable as long as care is taken so that there is no casting of shadows.



Second-Floor Plan of a Tire Fabric Mill

FIRE PREVENTION

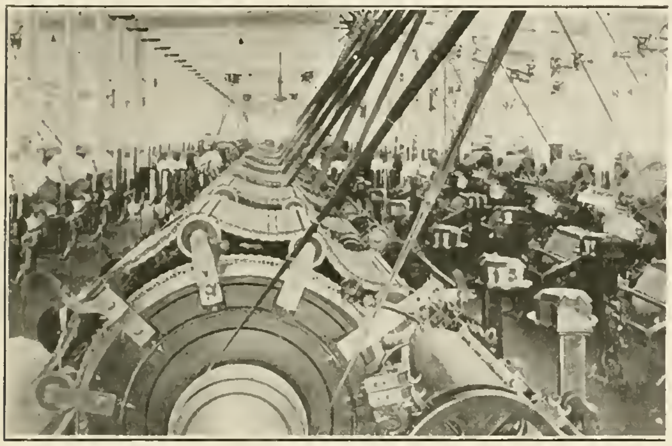
It is very important that a mill should be so constructed as to minimize the risk of fire, and so equipped that a fire may be extinguished at the earliest possible moment. At the present

[1] Consulting Textile Engineer, Columbus, Ohio, and Atlanta, Georgia.

time the prevention of fire in textile mills has been reduced to a science, and the number of serious fires in mills is only a small percentage of the number that formerly occurred. An approved sprinkler installation is an absolute necessity to the modern mill.

PLANNING THE MILL

To explain the method of planning the lay-out of a mill, a standard tire fabric mill for the production of carded cord and builder fabric will be taken as an illustration, and the details of the machinery equipment worked out with reference to this particular type of mill. The size of the mill to be 5,000 spindles and to produce 4,000 pounds of cord fabric and 4,000 pounds of builder fabric.



Card Room

The requirements here call for No. 23 cord yarn to be twisted 11 ply for both warp and filling and to be woven 23 sley (warp ends) and 23 picks to the inch for builder fabric. The cord fabric to be made of No. 23 yarn to be twisted five ply and cabled three ply and woven with 27 ends per inch of warp and single 23s filling and woven with 2½ picks per inch.

The counts or numbers of the yarn to be made in this case are already known as 23s; and for making this yarn the following machinery is required:

MACHINERY REQUIRED

PRODUCTION AND SCHEDULE OF PICKING AND CARDING MACHINERY

For Blank Cotton Mills Company
Installment of 5020 Spindles.
Yarn No. 23. Warp. No. 23/5/3. Filling. August. No. 23.
Production. 8000 Lbs. of Goods per Week of 48 Hours.

No. of Machines	PICKING AND CARDING MACHINERY	Speeds	Pounds Per Spindle	Lbs. per Week, Total Production
1-40"	No. 4 Bale breaker	....	....	10,600
1-40"	2 Beater breaker lapper	....	....	10,182
1-40"	1 Beater finisher lapper	850	....	9,978
32-40"	Rev. flat cards 27" doffer 12" cans...	165	300	9,379
16	Deliveries, 1st Drawing 6 into 12" cans..	250	614	8,259
16	Deliveries, 2nd Drawing 6 into 12" cans..	250	614	8,259
2	Slubbers, 12x6 bobbin 48 spindles — 96 sp.	600	110	
3	Inter. 10x5 bobbin 96 spindles = 288 sp.	800	31	
7	Fine 8x3½ bobbin 152 spindles = 1,064 sp.	...	8	8,512
	Remarks: 2 cards grinding.			
	SPINNING AND WEAVING MACHINERY			
22	Ring frames, ways 3¼" ga. 2" s. 228 sp.	8,000	1.63	8,200
4	Spoolers 5½" ga. 6" traverse	....	2.16	8,640
1	Quiller 20 sp. each	....	....	....
4	Warpers 480 spools each 6x4" spools	....	2.16	8,640
5	Twisters 4½" ga. 3½" ring 168 sp. 840 spindles	4,176	5.	4,200
2	Twisters 7" ga. 5½" ring 120 sp. 240 spindles	2,400	18	4,320
2	Twisters 5½" ga. 4½" ring 120 sp. 240 spindles	2,400	22	4,400
1	Respooler, 40 spindles 6½" ga.	....	....	....
1	72½" cord loom	120	4,000	4,000
10	72½" automatic tire fabric looms	115	400	4,000
1	Warp compressor, complete	....	....	....
1	Inspecting machine	....	....	....
1	Curtis & Marble calender	....	....	....

Great care should be taken in the selection of the machinery. This is not a matter to be attempted by inexperienced persons, but is a task in which the services of an expert are of the utmost value.

Mill Supplies. For the successful operation of each department of the mill, tools and other supplies are necessary. These generally consist of cotton bale scales, picker lap scales, roving cans, bobbins, spools, skewers, harnesses, heddles, reeds, shuttles, picker sticks, leather pickers, harness and lug straps, and the various miscellaneous supplies such as belting, oil, trucks, etc., as used in most every manufacturing plant.

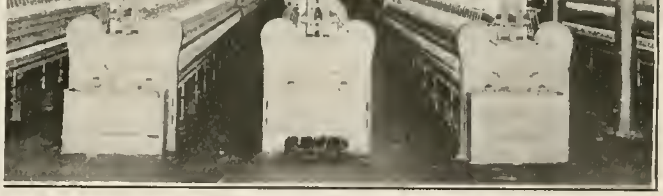
ROUTING THE COTTON

Bale Breaking. When the cotton comes to the mill it is in the familiar bales of commerce, 500 pounds to the bale. After being opened the cotton is fed to a machine known as the bale-breaker. Here the matted cotton is loosened and torn into small bunches, which are delivered to the "feeder."

Auto Feeding and Breaker Picking. The feeder is an automatic machine containing a series of pin-studded flats which deliver the bunches of cotton in regular quantity over a conveyor apron into the next machine, known as the breaker picker. This machine gives the cotton a severe beating by means of two revolving shafts on which there are mounted two and three rows of arms. These shafts revolve from 850 to 1,000 times a minute, so that the cotton gets a certain number of blows per inch. The result is that the sand and other foreign matter in the cotton loosen and leave the staple in tiny tufts. These are caught up by air suction and delivered to the next part of the machine, where they receive another beating, to remove persistent dirt, and are then rolled together in a great downy sheet on a rod. This sheet is known as lap.

Finisher Picking. Four of these laps are fed into the next machine, known as the finisher picker. It beats the cotton some more, and the four laps come out a further purified single lap, which looks like cotton batting.

Carding. After all these beatings, one might think that no dirt would remain, but there are still some particles of leaf, seed pods, etc., clinging fast. So another machine, known as the card, is designed to the task of removing the remaining impurities, and of loosening and separating the fibers, so that they can be drawn parallel with each other. The card has two big drums, each covered with a wire-studded cloth and revolving so as barely to miss touching one another. There are some 72,000 of the projecting wires to every square foot and no fiber has a chance to escape its combing. The fiber leaves the big drums in a thin sheet (web) about 40 inches wide, and is then passed through a set



Spinning Room

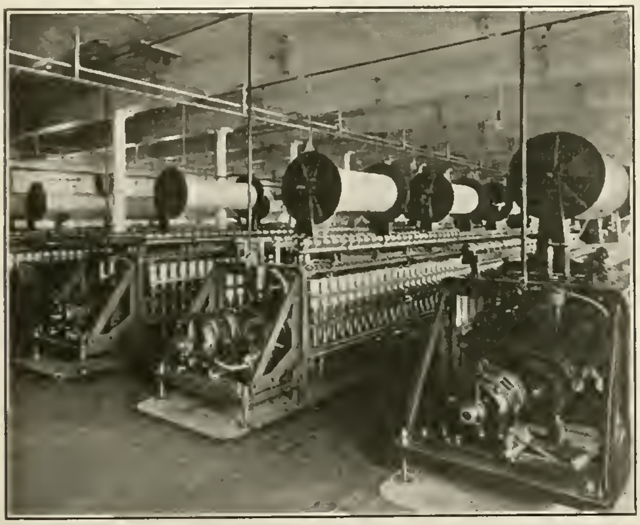
of reducing rolls which convert it into a rope about an inch in diameter, known as a "sliver." This is coiled in a large fiber or roving can 36 inches high and 12 inches in diameter.

Two-Process Drawing. The next step is to put the sliver through the drawing frames. Six slivers as they come from the card are combined into one in the first frame, which consists of a series of rolls, the last pair of which revolve six times as

fast as the first pair, thus making the slivers that come out of the frame six times as long but of the same diameter as the ones that went in. Six of these latter slivers are fed into the second drawing frame and transformed into one. All that has been lost in diameter heretofore has by now been gained in length. But at this time the sliver is only a mass of parallel fibers and has no strength whatever. The succeeding two operations are intended to give it a certain amount of twist, so that the fibers will cling together, while the size is reduced.

Slubber. In the first of these operations final slivers from the drawing machine are fed into a machine known as a slubber. It takes these and simultaneously twists and stretches them into one strand, much longer, but with a diameter reduced to that of a clothes line; this it winds on a headless-spool bobbin, known as the slubber bobbin, the resulting material being called roving.

Intermediate and Fine Frames. Two strands of this roving from the slubber are next twisted and stretched into one,



Westinghouse Electric & Mfg. Co.

Twisters Individually Driven by Motors

which is wound on bobbins of the intermediate frames. Two of these intermediate rovings in their turn are twisted and stretched into a final roving, which has about the diameter of a wrapping string.

Ring Spinning. Two of the bobbins containing the final roving are now set up on the creels in the spinning frame. These strands of roving go through a trumpet and then through a set of rolls running at different speeds, which still further stretch it until it becomes the size of yarn wanted. Next it passes through a small steel ring, called the traveler, which runs at a very high speed on a ring, in the center of which is the fast-revolving spindle. From the traveler the yarn is wound on the bobbin on the spindle and gets the required twist.

Spooling. The bobbins of single yarn are then taken from the spinning frame and put on the spooler. Here the yarn is wound on large spools that hold about a mile of thread.

Warping. After the single yarn is wound on the spools, several hundred of the latter—according to the number of ply to be twisted—are set in a frame known as the warper creel. These threads are all wound, side by side, on a big reel, known as a warper beam.

Twisting. This warper beam, by means of a traveling crane, is placed above the twister frame. The object of the twister is to form the ply yarn by inserting a sufficient amount of twist in the required direction and to wind the resulting yarn on a twister spool, which must be of large size to reduce the amount of knots, which are not permissible in tire fabrics.

The principle on which the ring twister is constructed and operated is to pass the yarn from a creel to delivery rolls and twist it by passing it through a traveler that is revolved rapidly around a ring, by means of a rotating spindle carrying the spool. The difference between the circumferential speed of the spool and the speed of the traveler causes the twisted yarn to be wound on the bobbin. The twister closely resembles the ring spinning frame, a large number of parts and motions of which are duplicated.

The ring sizes vary according to the number of ply yarn desired. For 23/5/ ply a 3½-inch ring is standard and for cabling 23/5/3 ply a 5½-inch ring is standard. For 23/11 ply the 4½-inch ring is almost universally used.

The Warp Compressor for Direct Beaming. To make a piece of builder tire fabric 60 inches wide requires 1,380 warp threads. So, 1,380 spools of twisted yarn are placed in a creel (similar to the warper creel). The yarn is unwound and passed through the compressor rolls and then wound around the loom beam, where it is ready for drawing in, which is the process of threading the harnesses. For tire fabric, two harnesses are required, which consist of wires or twine cords, each with an eye in the middle. Each alternate thread goes through an eye of one harness, and the others through the corresponding eye of the other harness.

Weaving and Finishing. The harnesses and warp beam are now placed in the loom and the threads drawn around the take-up roll in front of the loom, and the cloth is now ready to be woven.

There are other auxiliary machines, as the quiller, which winds the filling yarn onto the quill. This is put into the shuttle, which is thrown from side to side, the operation being known as picking.

From the loom, the fabric is taken to the inspection table, then to the burler, where all loose ends are cut off, all bunches and knots removed, ends sewed in and oil spots removed. Next, the fabric is taken to the brushers, where it is thoroughly brushed, and finally it is steamed and calendered, wrapped in paper and burlap, and shipped.

THE INTERNATIONAL B. F. GOODRICH CORPORATION

The announcement of the organization of The International B. F. Goodrich Corporation marks another widening of the field of activities of the big rubber manufacturing concern which recently rounded out its fiftieth year.

The B. F. Goodrich Co. made its first entry into foreign markets more than twenty years ago, during the latter part of which time the growth has been rapid. Its products have been introduced into every civilized country on the globe and indeed have been and are being used in out of the way lands which are just beginning to feel the first influences of civilization.

The new company, which has just been incorporated under the laws of New York with a capital of $10,000,000, will represent The B. F. Goodrich Co. in foreign countries. It will take over the parent company's interest in factories (with selling organizations) located in France and Japan, as well as its selling subsidiaries in Great Britain, Italy, Spain, South Africa, Straits Settlements and Porto Rico, acquiring distributers in all foreign countries. It will handle all the products of the parent company—tires for automobiles, trucks, motorcycles and bicycles; rubber footwear; conveyor and drive belts; hose and packing; water bottles and surgical rubber goods; in short, all of the thousands of different products now being made by The B. F. Goodrich Co at the Akron, Ohio, factories will come within the scope of the new company which will, in addition, produce and sell products in France and Japan.

The aggressive and progressive sales methods of the parent company and its subsidiaries have established a great volume of foreign business and its steady and rapid increase has made necessary an organization like The International B. F. Goodrich

Corporation, through which will be effected centralization of all these foreign activities. With the new company as selling representative of the parent company, as well as producing in France and Japan, the entire foreign operations of the Goodrich interests will be directed from Akron.

The directors of the new company are: B. G. Work, W. O. Rutherford, H. K. Raymond, L. D. Brown, H. Hough, W. C. Arthur, C. B. Raymond, F. C. Van Cleef and W. C. Geer, of whom the first six named constitute the Executive Committee.

The officers are: B. G. Work, president; W. C. Arthur, vice-president; F. C. VanCleef, secretary; L. D. Brown, treasurer; H. Hough, comptroller; F. E. Titus, director of sales, and W. H. Allen, director of manufactures. The actual operation of the affairs of the new company will be directed by W. C. Arthur, vice-president, formerly assistant secretary of The B. F. Goodrich Co., with whom will be directly associated F. E. Titus, formerly foreign sales manager of The B. F. Goodrich Rubber Co., who will have general direction of sales, and W. H. Allen, formerly assistant superintendent and technical director of The B. F. Goodrich Co., who will have general direction of manufacturing activities of the subsidiaries of the new company.

The New York offices of the new company will be located at 1780 Broadway. The administrative and operating offices will be located at Akron, Ohio.

THE INTERNATIONAL ACCEPTANCE BANK

Financial doctors have prescribed many remedies and industrial experts have outlined many plans for the rehabilitation of "Sick Europe." Some are of proved value, some are novel and may merit at least a fair trial, and many are manifestly impractical or impossible. One of the most reasonable projects which may be justly placed in the first class, is that which the International Acceptance Bank, recently organized in New York, plans to put into effect to facilitate the handling of foreign trade in this country. The new institution is officered by a group that includes many of the ablest bankers, industrial leaders, and experts on business conditions in not only the United States but the world. Conspicuous among them is Charles B. Seger, president of the United States Rubber Company, and who is a member of the board of directors of the new bank. Paul M. Warburg, former vice-governor of the Federal Reserve Board, and an internationally-recognized authority on business and credits, is chairman of the board. Other directors are Daniel G. Wing, president of The First National Bank of Boston, who is vice-chairman of the new bank's board; F. Abbott Goodhue, president; Newcomb Carlton, president of the Western Union Telegraph Co.; and Felix M. Warburg, of the international banking firm of Kuhn, Loeb & Co.

Charles B. Seger, a Director of the International Acceptance Bank

The primary purpose of the International Acceptance Bank is stated to be the development of sound, scientific methods of handling general trade between this and foreign countries. Inasmuch as credit has played and probably always will play a very considerable part in international commerce, all merchants and financiers realize that one of the prime essentials for the early reestablishment of satisfactory mercantile relations with the war-spent nations of Europe is an ample line of credit with all reasonable safeguards for the seller of merchandise on this side of the Atlantic. It is the aim of the new bank to provide such accommodation for responsible foreign buyers and to supply merchants and manufacturers on this side of the sea with proper protection for the accounts of the overseas purchasers. Imports and exports will be financed, bankers' acceptances handled, foreign money dealt in, and foreign exchange transacted on the broadest possible scale.

"There is nothing odd or strange about our plan," said a representative of the new bank. "We shall simply draw on the European banks that are affiliated with us, and they in turn will draw on us. They will accept our drafts and we shall accept theirs, and we both shall sell such vouched-for drafts in the open market. We shall try in every fair way to facilitate trade between this and other countries, and we are confident that we can do this in a very considerable degree. But while we shall be alert and enterprising, we shall in no way depart from any of the principles of sound and conservative banking."

The new bank will not maintain agencies of its own in various foreign trade centers, thus avoiding a large overhead, but will have all its dealings with representative banks abroad that have become stockholders. Stock-owning banks are located in Canada, Belgium, Holland, Great Britain, Sweden and Switzerland, as well as in Birmingham, Boston, Chicago, Cleveland, Detroit, Kansas City, Los Angeles, Minneapolis, New York, Philadelphia, Portland (Oregon), Providence, San Francisco, Seattle, St. Louis, and Youngstown, Ohio. This number may before long be largely increased and the service and helpfulness of the International Acceptance Bank correspondingly enhanced.

RUBBER TRADE INQUIRIES

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

(876) A reader asks for the address of the manufacturer of "Rexhyde" glue.

(877) Inquiry is made for the addresses of importers of transparent nipples.

(878) Request is made for the address of the British manufacturer of "Ablutonic" rubber sponges.

(879) A correspondent desires the addresses of manufacturers of clincher and straight-side beads for fabric and cord tires.

(880) A manufacturer requests addresses of concerns making removable rubber heel pads for wear inside shoes.

(881) The addresses are desired of the manufacturers or dealers in the following named vulcanization accelerators: "Adco," "Annex," "S-4-S," and "T. N. X."

(882) A wholesaler and manufacturers' agent requests the adress of a concern handling the French toy known as "Le Roquet," a metal dog's head made to bark by pressure on an attached rubber bulb.

(883) Inquiry is made for a chemical to put in rubber cement to make balloons heavier with fewer dippings.

(884) A request had been received for the addresses of manufacturers of pure rubber cement, preferably pale-blue.

(885) A reader asks for the addresses of manufacturers of calendered cloth used in the manufacture of dress-shields.

(886) A correspondent inquiries where bathing-cap or toy-balloon rubber can be obtained by the yard.

(887) Inquiry is made for the addresses of manufacturers of sponge rubber.

(888) A reader desires the address of the manufacturer of a machine for trimming off the overflow on molded nipples.

(889) A correspondent requests the address of the manufacturer of Day's rubber protector for trousers.

(890) A manufacturer desires the address of manufacturers of doubling calenders used for uniting rubber sheets.

(891) A manufacturer of rubber nipples asks how to make them bloom.

(892) Information is requested concerning the source of supply of "Wasatch," said to be a compounding ingredient.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS

Addresses may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or from the following district or cooperative offices. Requests for each address should be on a separate sheet and state number.

District Offices.	Cooperative Offices.
New York: 734 Customhouse.	Cleveland: Chamber of Commerce.
Boston: 1801 Customhouse.	Cincinnati: Chamber of Commerce; General Freight Agent, Southern Railway, 96 Ingalls Building.
Chicago: 504 Federal Building.	Dayton, Ohio: Dayton Chamber of Commerce.
St. Louis: 402 Third National Bank Building.	Los Angeles: Chamber of Commerce.
New Orleans: 1020 Hibernia Bank Building.	Philadelphia: Chamber of Commerce.
San Francisco: 307 Customhouse.	Portland, Oregon: Chamber of Commerce.
Seattle: 848 Henry Building.	

(34,941) A merchant in Sweden desires to communicate with firms dealing in automobiles, motorcycles, and accessories. Catalogs requested.

(34,947) A commercial agent in Ireland desires agency or commission for the sale of druggists' sundries.

(35,037) A mercantile firm in Denmark desires to secure an agency for the sale in the Scandinavian countries of both pneumatic and solid tires for automobiles and trucks.

(35,046) A commercial agent in Spain desires to secure the representation of firms for the sale of rubbers.

CURBING TIRE "SECONDS" SALES

Tire dealers in California who sell only "firsts" may soon invoke the aid of the courts in enforcing a new state law (Senate No. 917) to curb the activities of unscrupulous second-hand tire men who are said to palm off a great many repainted tires as new. While the law is designed to cover all kinds of dealings in second-hand, defective, or imperfect merchandise, and requires all such goods to be properly branded, tire dealers claim that in spirit and letter it especially protects "straight-shooters" in their line from fraudulent operators who have cut considerably into legitimate business in all the large cities on the Coast. The measure was actively supported by the advertising clubs of the state, which claim that California is the first of the forty-eight states to enact such legislation for the safeguarding of buyers.

BANKRUPTCY SALE OF THE FORT WAYNE TIRE & RUBBER MANUFACTURING CO.

The Fort Wayne Tire & Rubber Manufacturing Co., Fort Wayne, Indiana, that went into voluntary bankruptcy last April, will be sold at private sale on July 5 to the best bidder. The factory occupies 2½ acres adjoining the New York Central railroad and the Fort Wayne and Northwestern Interurban Line. The plant comprises a three-story pressed brick building and three one-story out-buildings, equipped with machinery for the production of 300 to 500 tires and tubes a day. The property is appraised at present values as follows: land $16,400; buildings, $137,500; machinery, equipment and inventory, $110,000.

FINAL DECLARATION OF THE EIGHTH NATIONAL FOREIGN TRADE CONVENTION

The National Foreign Trade Council is directed by the best business minds of the country in the advancement of American trade in foreign markets. The rubber industry is ably represented on the council by E. H. Huxley, president of the United States Export Co., New York, N. Y.

E. H. Huxley, Member of the National Foreign Trade Council

At the meeting held in Cleveland, Ohio, May 4-7, 1921, a national program for American trade during the coming year was adopted, the special features of which are as follows:

1. Increased imports into the United States.

2. The drawing upon surplus American investment funds in order to furnish long-term credits to foreign buyers.

3. Immediate creation of financial institutions under the Edge Law to extend such long-term credits.

4. Pending the revival of world commerce, the laying up of such of our government-owned merchant marine as cannot be chartered on a bare-boat basis or on time charter to private operators.

5. Revision of our shipping laws, which subject American vessels to a competitive disadvantage estimated at 5 per cent on the capital investment.

6. Uniformity of state laws affecting marine insurance companies.

7. Adequate international machinery for the enforcement of awards of commercial arbitration; and application of standardization to products not already so protected.

8. Adoption of revised and uniform commercial letters of credit and ocean bills of lading.

9. Maintenance of interest in American foreign trade, even though it shows no profit for the moment; and remembrance that in many cases it will cost much more to regain in the future a business lost now through lack of courage and foresight.

10. A bargaining tariff.

11. A reorganization of the foreign service of our government, which will provide for unified control, and a permanent career to be started at a National Foreign Service Training Academy.

12. The passage of the China Trade Act, which will permit the formation of American companies to trade in China on a plane of tax equality with competitors of other nationalities.

13. The change in our taxation laws which will free Americans living abroad from paying taxes upon income derived from within the foreign country of residence.

14. Adequate support for those departments of the government which participate in the development of our foreign trade.

15. The revision of our revenue laws necessary to permit the negotiation of a parcel post convention with Cuba.

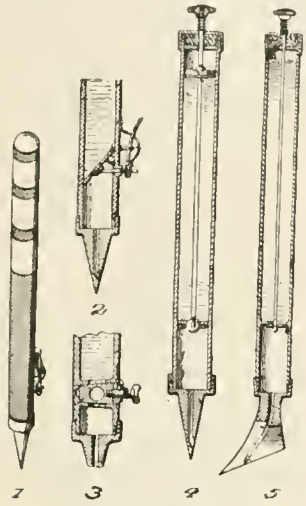
16. The wider use of foreign trade news by our press.

17. The expansion of systems of international telegraphic communication under American control and operation.

New Goods and Specialties

UP-TO-DATE MANICURING

The manicure maid, with her trim array of little jars and bottles, may now be up-to-date with the latest instrument for her assistance. It consists of a hard rubber tube, something like that used for fountain pens, provided with a hollow interior for liquids, a plunger for operating, and a valve for regulating the amount of liquid let out through the opening at the point. In different modifications the views shown illustrate: (1) perspective of complete manicuring instrument with cone-shaped point; (2) sectional view through lower portion, showing valve; (3) modified form of valve; (4) sectional view showing valve open; (5) modified form of instrument with curved point.



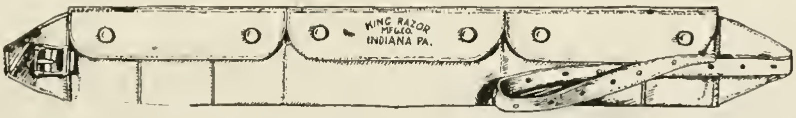
Hard Rubber Manicuring Instrument

The ordinary method of procedure is to wrap a small piece of cotton around the tip of an orange-wood stick, dip it in the particular medicament, and apply it to the cuticle at the base of the finger-nail. To keep this cotton moist it must be dipped frequently into the liquid or ointment and the amount taken up cannot be accurately regulated.

This device is intended to substitute the orange-wood stick and facilitate the application of medicaments by providing means for both controlling the flow and supplying them in regulated quantities as needed.—United States patent No. 1,365,883, Martha V. Bauer, 2443 18th street, N. W., Washington, D. C.

RUBBER-LINED MONEY-BELT

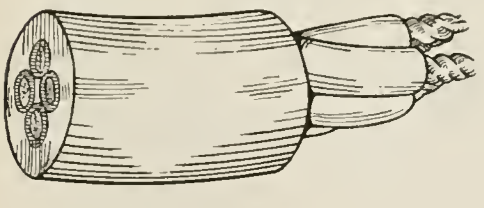
The utility of safety belts with rubber-lined pockets was so well proved during the war that they are still popular. Another style is illustrated here which has three divisions of equal width, covered by snap-fastened flaps. One of these divisions, in turn, is redivided into three smaller pockets, and another part into one small one and one of medium size. The belt fastens with the customary strap and buckle.—King Razor Manufacturing Co., Indiana, Pennsylvania.



Safety Belt with Pockets of Different Sizes

BRITISH SOLID RUBBER CABLE

What the manufacturer designates a solid rubber trailing cable is shown here. The conductors are insulated in the usual manner with the required grade of rubber to meet standard electrical tests. The covering of solid rubber is then put on as a protection. This type of cable is used largely on wharves, docks, and in mines for traveling cranes and portable electrical machinery and apparatus where it is subjected to considerable rough usage and sometimes has to stand the strain of being walked on.—W. T. Henley's Telegraph Works Company, Limited, Blomfield street, London Wall, London, E. C. 2.


Solid Rubber Trailing Cable

COMBINATION WINDOW WASHER AND DUSTER

Housekeepers who have been worrying about the new law which requires windows to be cleaned by window-cleaning men instead of the house worker will be delighted with the new window washer and duster which eliminates sitting outside the window. The washer is equipped with a rubber squeegee which cleans and dries the window in a most satisfactory manner, working on the outside while the operator stands inside the room. Attaching a cloth to the end makes a long-handled duster for ceilings, walls, floors and corners. The adjustable joint in the pole makes it adaptable to circumstances.—Perfect Window Washer & Duster Co., Inc., Amsterdam, New York.


The Perfect Window Washer and Duster

ELECTRICAL BEAUTY DEVICE

An appliance intended to improve the complexion, fill up wrinkles or hollows, and stimulate the scalp is "La Vida" vibrator. This device gives 7,200 vibrations a minute and does not slacken speed under pressure, the manufacturer claims. It is built for the natural alternating current, 100 to 125 volts, for 25, 30 and 60 cycles. It can be used for bodily massage as well as for the complexion and scalp. The appliance is fitted with a rubber suction cup and contains no motor to get out of order. It attaches by the usual cord to any light-socket.—The Adbro Manufacturing Co., Pittsburgh, Pennsylvania.


"La Vida" Vibrator

CROSS-STRAP SANDAL FOR SUMMER

Fleet feet running up and down the beach or over velvety lawns, in summer, will look both comfortable and sensible wearing the cross-strap rubber-soled sandal known as the "Fenway." Mothers will find them practical and long-wearing if they let their children give them a trial.


"Fenway" Cross-Strap Sandal

This sandal is made with an upper and straps of brown duck and the straps and top are bound with white. The white flange sole is extra thick and there is a spring heel to meet the demand for comfortable, sensible footwear for beach and country wear. These sandals are made for both misses and children

and are new this year, but already their popularity is noticeable.—Hood Rubber Products Co., Inc., Watertown, Massachusetts.

RUBBER LAUNCHING DEVICE FOR TOY AIRPLANES

A novelty that will please the boy interested in aeronautics is a launching device for his airplane, that will make it fly farther and protect it from damage by careless handling.

Air Gliders

It consists of a band of rubber attached to two sticks. These sticks are placed upright in the ground, the length of the band apart. After the motor of the airplane is wound, the end of the plane is hooked over the band of the launcher, and pulled backwards towards the youngster, as far as it will go. When released, the contraction of the rubber shoots the plane forward in an upward position. Not only does it enable the boy to fly his plane farther, but it greatly aids the inexperienced to properly launch such a toy without injury.

The launchers are made in two sizes. The smaller consists of only one stick with a looped band attached. Very thrilling loop-the-loops can be made with this size. The double motor type has twin propellers of bent wood, enameled a bright red. The planes are of balsa wood, well-varnished, and the frame is of blue lacquered wood. The motor threads are of Pará rubber. The average small boy with one of these toys considers it the king of kings, for the plane twenty-eight inches long is claimed to fly 1,800 feet.—Broadfield Toy Co., Hempstead, New York.

IDEAL FASTENING FOR TOBACCO POUCHES

The "Locktite" tobacco pouch is made in suede, calf, buckskin, pigskin, silk and assorted grain leather to meet the tastes of the most fastidious mortal. The pouch is lined with rubber which keeps the contents moist. The metal top locks and unlocks by the simple expedient of pulling the tip across the top. This patented fastening is similar to that used on the "Jiffy-Lock" bathing bag described in The India Rubber World, August 1, 1919.

"Locktite" Tobacco Pouch

The opening can be adjusted so that a small amount of tobacco will drop into the cigarette paper, or can be opened to full extent to permit the insertion of the pipe to be filled. When closed, no tobacco can sift out. The pouch is made in sizes to fit the pocket.—The F. S. Mills Co., Inc., Gloversville, New York.

STYLES IN GERMAN RAINCOATS

It was about 50 years ago that Germans first tried to make raincoats themselves. The rubberized fabrics for the purpose had to be imported from England and the garments produced were far from satisfactory, particularly because it was the aim of manufacturers to quote prices as low as possible, with little regard for quality. However, by degrees the quality was improved and before the war the industry had made great headway; there was a lively demand for the German article both at home and abroad. During the war, lack of material caused a set-back; at present difficulty is still experienced in obtaining the necessary raw materials, but in spite of this a satisfactory variety of stuffs and models is shown by local manufacturers. It is claimed that in workmanship and style the German article can successfully compete with the product of any foreign country. The models below (Imperator Regenmäntel) give an idea of what the Germans are making in the way of raincoats. All the models shown by different manufacturers are made to be worn open or buttoned closely about the throat. They come in rubberized and impregnated

Late German Raincoat Models

fabrics and are also used for sports and as spring or fall coats. One line of raincoats, known as "Waterline-Mäntel," is made of cloth impregnated by a special process, and it is claimed that they equal the well-known Burberry coats.—Firma Hartman & Klempner, Rosenstrasse 16, Berlin C., Germany.

METALLIC REINFORCED FABRIC PNEUMATIC TIRE

The carcass of this tire is composed of two layers of cords over which the radial chains embedded in the rubber are laid, completely covering the carcass. The breaker strip is built up of two layers of cord fabric embedded in rubber and interposed between the tread and the chain. It is claimed that the riveted chain armor does not reduce the resiliency below that of the ordinary fabric tire. The feature of this tire is that it is absolutely unpuncturable. The tire can be retreaded and if any of the chains have been damaged they can be replaced at the time of retreading, as each length from one bead to the other is independent. It is claimed that the Gautier tire is able to resist an internal pressure up to 4,000 pounds per square inch, to carry a much bigger load, and to outlast any fabric type.—C. M. Gautier, 14 Unwin Mansions, Queen's Club Gardens, West Kensington, W. 14, England.

Gautier Armored Tire

BABY ON PNEUMATIC TIRES AND MAID UNTIRED

Even the baby must ride on pneumatics these days. The baby carriage equipped with pneumatic-tired, ball-bearing wheels was sure to come, and the tire used by the pioneer manufacturer in this direction is illustrated here. It has a practical non-skid tread and in appearance resembles a bicycle tire but, of course, is smaller. The designer of these carriages considered the baby's comfort in providing the pneumatic tire, but also thought of the one who must push the carriage and added the ball-bearings which make it glide along easily with only slight pressure.—The American-National Co., Toledo, Ohio.

Baby Cab Pneumatic Tire

CORD TIRES FROM COAST TO COAST

The development of the cord tire during the last few years and its demonstrated popularity has resulted in the establishment of factory facilities for making high-grade cord tires in all parts of the country. A few of the newer ones are shown here.

The Knox cord tire is the product of a new factory opened last year to manufacture both cord and fabric tires and red and gray tubes of the best quality.—The Knox Tire & Rubber Co., 10 East Chestnut street, Columbus, Ohio.

The "Savage" cord tire comes from the Pacific Coast. It is oversize, hand-built from 17¼-ounce Sea Island fabric and the best quality plantation and Pará rubber. There is a cushion skim between the plies of fabric and a specially-woven breaker strip and breaker cover, giving practically a double cushion.—The Spreckels "Savage" Tire Co., San Diego, California.

The "Autocrat" cord tire is particularly massive, has a mileage strip that insures long life, and a double grip to prevent skidding.—McClaren Rubber Co., Charlotte, North Carolina.

The Amazon cord features a new tread design with wider non-skid lugs This tire is made in all popular sizes including the 30 by 3½ clincher for Ford and other light cars.—The Amazon Rubber Co., Akron, Ohio.

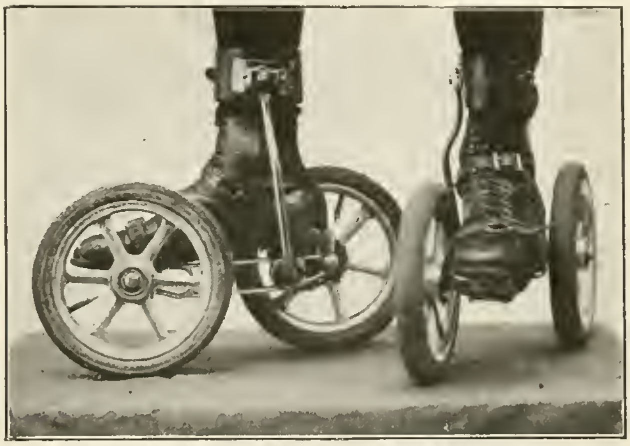
Knox "Savage" "Autocrat" Amazon Star "Holyoke"

The Star cord also presents a new tread in black and is fully ten per cent oversize, with extra heavy clincher. It is 30 by 3½ but inflates to 31 by 3.85 inches.—The Star Rubber Co., Akron, Ohio.

The "Holyoke" cord comes from New England and is made in one of the newer factories there, from the company's own formulas, in its own molds.—New England Tire & Rubber Co., Inc., Holyoke, Massachusetts.

THE CLARK PEDMOBILE

As seen by the illustration, the pedmobile is a specialized vehicle for road use. It is neither a small bicycle nor a large pair of skates, yet either term is partially applicable to its description.



Pneumatic-Tired Skates

It is light and portable like a pair of roller skates, weighing from four to six pounds, yet it glides over the roadway as smoothly as a bicycle.

The pedmobile is mounted on Palmer cord tires, either single or inner tube, with detachable casings which are used at 100 to 125 pounds inflation pressure. Even at this pressure there is enough flexibility to permit easy steering which could not be done were solid tires used.

Another important feature of the pedmobile is the band brake device that is effectively operated by a forward pressure of the leg below the knee.—Clark Pedmobile Corporation, 60 Grand street, New York, N. Y.

Activities of The Rubber Association of America

AUTHENTIC RUBBER INFORMATION, HOOVER'S PLAN

The Board of Directors, in conjunction with the regular monthly meeting held at Washington June 2, conferred with Secretary of Commerce Hoover, relative to his plan for coöperating with trade organizations representing the basic industries of the United States, in gathering authentic information concerning their inventories, production, sales, production capacity, etc.

The plan may be described briefly as follows:

1. Increased efficiency with respect to the commercial activities of the Department of Commerce in foreign markets, this work to be aided by the employment of specialists in the Department who will have a thorough knowledge of the needs of the key industries.

2. Collection and compilation of data indicating current conditions in the basic industries relating to raw material stocks, production, inventory and sales of finished goods, etc.

3. Assist business in simplification of products for the purpose of bringing about maximum economy in production and distribution.

The directors indicated to Secretary Hoover their willingness to coöperate in this plan, and later conferences will be held between the Department and the various divisions and committees of The Rubber Association.

MEETINGS

The Executive Committee of the Tire Manufacturers' Division held an important meeting at Hotel Traymore, Atlantic City, New Jersey, on June 15. Optimism regarding the future of the tire industry was the key-note of the meeting.

The Executive Committee of the Foreign Trade Division met at the Yale Club, New York, on June 17.

The Cycle Tire Manufacturers' Committee held a meeting in the Association offices on June 22.

The Board of Directors met at the Union League Club, New York, on June 24.

DIVISIONS AND COMMITTEES

The following is a list of the committees and divisions which compose The Rubber Association and conduct its general activities. Any member who is not affiliated with the division in which he belongs should communicate with the Secretary.

- Tire Manufacturers' Division:
  - Technical Committee.
  - Cycle Tire Manufacturers' Committee.
- Traffic Committee.
- Mechanical Rubber Goods Manufacturers' Division.
- Mechanical Goods Specification Committee.
- Rubber Sundries Manufacturers' Division.
- Rubber Reclaimers' Division.
- Rubber and Fiber Sole Manufacturers' Division.
- Rubber Clothing Manufacturers' Division.
- Rubber Proofers' Division.
- Foreign Trade Division.
- Hard Rubber Manufacturers' Division.
- Footwear Division.
- Industrial Relations Executive Committee.
- Tax Committee.
- Crude Rubber Committee.
- Publicity Committee.
- Cost Accounting Committee.

PROPOSED LEGISLATION RESTRICTS ILLINOIS TIRE INDUSTRY

Senate Bill No. 352 introduced by Senator Kessinger in the Illinois General Assembly April 13, provides that: It is unlawful to sell or offer for sale within the State of Illinois, a motor vehicle tire unless it is marked with letters and figures at least one-eighth of an inch in height showing the month and year of manufacture. The Act does not, however, prohibit the sale or offering for sale of any tire held within the state by any person at the time the Act goes into force. The fine for violation of the proposed Act is not less than $5 or more than $50.

REPORTS OF THE TRAFFIC COMMITTEE

The following changes in ratings on liquid rubber cement will be made effective on or about July 20, 1921. The old and new ratings follow:

	Classes					
	Official		Southern		Western	
Rubber Cement:	Old	New	Old	New	Old	New
In glass or earthenware packed in barrels or boxes	1	1	1	1	1	1
In metal cans or tubes in barrels or boxes	2	2	2	2	1	*2
In bulk in barrels, L. C. L.	3	3	4	*2	1	*2
In bulk in barrels, carloads, min. weight, 30,000 lbs	3	*5	4	4	1	*4

*Change from present rating.

CHANGE OF RATINGS IN SOUTHERN TERRITORY

Following the ruling of the Official Classification Committee, the Southern Classification Committee, representing carriers south of the Ohio and Potomac Rivers, and east of the Mississippi will accept shipments of rubber shoddy (reclaimed rubber) in rolls and slabs to and between points in the South, in less than carload lots.

The present rating on rubber composition tiling to and between points in Southern Classification territory is in carloads, second class, with minimum carload weight of 30,000 pounds. The Southern Classification Committee has arranged for a reduction in the carload rates to fourth class with the same minimum carload weight.

FEDERAL HIGHWAY LEGISLATION

Members are urged to give careful consideration to the highway legislation proposed in the House and Senate of the United States.

The Townsend Bill, S-1355 now before the Senate, not only proposes financial aid to the states in constructing units in the national highway system but it also insures national interest in the work through a Federal Commission that will execute the provisions of the law.

The Dowell Bill, H. R. 5693 now before the House, proposes provisions similar to those of the Townsend Bill except that the commission form of administration is not advocated and the application of Federal aid to state roads is permitted without regard to the necessity for such roads or their relation to a comprehensive interstate system.

It is believed that the Townsend Bill will be considered favorably in the Senate, but there is a possibility that the Dowell Bill may be successful, which would result in a compromise measure and probably the defeat of the commission form of administration and control.

TWENTIETH ANNUAL SUMMER OUTING

The twentieth annual summer outing of The Rubber Association of America will be held at the Seaview Golf Club, Absecon, New Jersey, Thursday, July 21, 1921. A special train will be operated by the Pennsylvania railroad between Absecon and New York to convey the members of the Association and their guests to and from those points. Golf tournaments, tennis matches, trap shooting, baseball, swimming, etc., will, as usual, be provided. Detail announcements concerning the outing and the various contests will be distributed to all members.

J. V. Mowe, Chairman,
W. J. Kelly,
Outing Committee.

News of the American Rubber Industry

NEW INCORPORATIONS

Alfreu Covered Wire Co., June 30 (New York), $15,000. A. Gleckel, 149 Stagg street; F. Romph, 277 Menahan street; J. H. Johansen, 147 Scholes street—all of Brooklyn, New York. Principal office, Brooklyn, New York. To manufacture insulated wire, etc.

Allied Rubber Cos., Inc., The, February 14 (Maryland), 500,000 shares of stock without par value. W. Leary, 2539 Kenilworth Road; J. A. Curtis, Schofield Building—both of Cleveland, Ohio; L. E. Mihm, Calvert Building, Baltimore, Maryland. Principal office, 450 Leader-News Building, Cleveland, Ohio. To manufacture, buy, sell and generally deal in rubber and gutta percha.

Alto Rubber Co., Inc., June 3 (New York), $6,000, 600 shares no par value. R. Schlissel, 465 East 167th street; H. Hewitt, 333 West 21st street, both of New York City; S. Moore, 179 Jefferson avenue, Brooklyn—both in New York. To manufacture rubber glue, chemicals, varnish, etc.

Atlantic Stamp & Stencil Works, Inc., June 21 (New York), $5,000. M. & B. Moss, both of 584 Decatur street. L. Moss, 97 Hale avenue—both in Brooklyn, New York. To manufacture rubber stamps, etc.

Augorcon Co., The, April 28 (New Jersey), $1,000,000. D. L. Gordon, 27 High street; T. A. Hopkins, 230 High street—both of Passaic, New Jersey; J. F. Connolly, 731 Atwell avenue, Providence, Rhode Island. Principal office, 625 Main avenue, Passaic, New Jersey. Agent in charge, D. Gordon. To manufacture rubber and other materials.

Azif & Honig Tire Co., Inc., June 18 (New York), $30,000. M. and E. K. Azif; S. G. Honig—all of 974 St. Nicholas avenue, New York, N. Y. To manufacture tires, etc.

Bedford Auto Rim Co., Inc., May 23 (New York), $100,000; C. Z. and F. Weiner, both of 520 Lafayette avenue, Brooklyn; I. S. Natkin, 8902 107th street, Richmond Hill—both in New York. Principal office, Brooklyn, New York. To manufacture tires and rims.

Berry-Gorman Tire & Rubber Co., March 24 (Oklahoma), $150,000. H. Gorman; W. C. Berry; H. H. Hensley—all of Tulsa, Oklahoma. Principal office, 209 East Second street, Tulsa, Oklaboma. To buy, sell and deal in tires and automobile accessories, etc.

Champion Manufacturing Co., March 25 (North Carolina), $50,000. K. B. Nixon, president; B. C. Lineberger, vice-president; M. M. Rudisill, secretary and treasurer. Principal office, Lincolnton, North Carolina. To manufacture and distribute automobile tire patches.

Climax Rubber Co. of New Jersey, May 24 (New Jersey), $1,000,000. W. J. Gilberds, 1 Hall Block; W. S. Rexford, 5 Hall Block—both of Jamestown, New York; J. P. Tarr, 1207 Firemen's Building, Newark, New Jersey. Principal office, 1207 Firemen's Building, Newark, New Jersey. Agent in charge, J. P. Tarr. To manufacture, purchase and sell rubber goods.

Coast Rubber Importers, Inc., March 7 (California), $50,000. H. Rassmussen, Alameda; G. Kells, San Francisco; J. V. Quigley, Oakland—all in California. Principal office, San Francisco, California. To import rubber and build factories for making rubber goods.

Cotton States Rubber Mfg. Co., May 11 (Georgia), $500,000. J. B. Anchors; R. W. Ragin; G. J. Reuter—all of Atlanta, Georgia. Principal office, Atlanta, Georgia. To manufacture and sell all kinds of mechanical rubber goods.

Culp, Inc., George K., March 17 (Delaware), $5,500,000. G. K. Culp, president; C. C. Dobbs, treasurer. Principal office, 56 West 45th street, New York, N. Y. To supervise and finance the production of "Culp" tires.

Daggett Co., Inc., H. A., May 26 (New Jersey), $100,000. C. A. Cole, Hackensack; R. A. Van Voorhis, 77 Oak street, Jersey City—both in New Jersey. A. R. Oakley, Pearl River, New York. Principal office, 15 Exchange Place, Jersey City, New Jersey. To deal in crude rubber, gutta percha, etc.

Exclusive Rubber Clothing Co., Inc., May 24 (New York), $5,000. S., J. and L. Inker—all of 934 East 181st street, New York, N. Y.

Friant Rubber Co., C. H., March 19 (Maryland), $50,000. C. H. Friant, president; C. P. Thompson, vice-president; A. T. Knieling, secretary and treasurer—all of Baltimore, Maryland; C. Hess, Jr., vice-president, Philadelphia, Pennsylvania. Principal office, 417 West Franklin street, Baltimore, Maryland. To deal in rubber goods.

Goodyear Tire & Rubber Co., The, May 12 (Ohio), $41,010,000 capital stock and 1,500,000 shares no par value. H. B. Manton, D. E. and G. R. Hill, S. H. Miller and F. A. Seiberling. Principal office, Akron, Ohio. Reorganization.

Gordon Pen Corporation, William, May 20 (Delaware), $1,000,000. Delaware agent, United States Corporation Co. To manufacture stylographic and fountain pens.

Hones Tire & Auto Repair Co., Inc., June 21 (New York), $10,000. C. A. and C. J. Hones, both of Baldwin; R. L. Rogers, 234 Franklin street, Hempstead—both in New York. Principal office, Baldwin, New York.

Hoosier Rubber Co., March 15 (Indiana), $150,000. T. Nicar, president; G. B. Britton, secretary; N. V. Robertson, treasurer. Principal office, Mishawaka, Indiana. To manufacture "Service" rubber heels.

Houston Wheel Sales Corporation for New York and New Jersey, March 8 (New York), $10,000. J. M. Grant, president; C. A. Holstein, vice-president; H. S. Gay, vice-president; A. S. Jameson, secretary; J. P. Trant, treasurer—all of 120 Broadway, New York, N. Y. Principal office, 120 Broadway, New York, N. Y. To sell the Houston puncture-proof pneumatic wheel.

International B. F. Goodrich Corporation, The, May 21 (New York), $10,000. B. G. Work, president; W. C. Arthur, vice-president; F. C. Van Cleef, secretary; L. D. Brown, treasurer; H. Hough, comptroller; F. E. Titus, director of sales; W. H. Allen, director of manufactures. Principal office, 1780 Broadway, New York, N. Y. To manufacture and sell tires, rubber footwear, surgical rubber goods, etc.

Lake Erie Rubber Products Co., March 4 (Ohio), $50,000. L. H. Irwin, president; J. W. Lawrence, vice-president, treasurer and general manager; M. Jenkins, secretary. Principal office, 632 Frankfort avenue, N. W., Cleveland, Ohio. To distribute tires, etc.

Lambert Trublpruf Cord Tire Co., March 9 (California), $10,000. R. H. Ingram, president; A. V. Ingram, vice-president; R. L. Hepler, secretary and treasurer. Principal office, 1408 Market street, San Francisco, California. To distribute tires, etc.

Paul Rubber Co., April 4 (North Carolina), $250,000. M. L. Miller; W. J. McDaniel; E. C. Brainard—all of Salisbury, North Carolina. Principal office, 310 Wallace Building, Salisbury, North Carolina. To manufacture tires and other rubber products.

Pneumatic Rubber Heel Corporation of America, May 19 (Delaware), $250,000. W. Webster; H. F. Herbermann; B. Lockwood. To manufacture rubber soles.

Puncture Proof Tube & Supply Co., April 18 (West Virginia), $100,000. W. R. L. Croft, Christiansburg, Virginia; W. A. Creager; R. W. Newton, both of Northfork; T. Miller, Elkhorn; J. J. Huddleston, Algoma—all of West Virginia. Principal office, Northfork, West Virginia. To manufacture automobile tubes and other rubber products.

Ruberoid Co., Inc., June 11 (New York), $5,000. H. Abraham; H. F. Gillespie; F. Jellenik—all of 95 Madison avenue, New York, N. Y. To manufacture roofing, insulating materials, etc.

Security Rubber & Belting Co., March 1 (Illinois), $100,000. H. E. Dennie; C. M. Burnam; I. W. Mowrey—all of Chicago, Illinois. Principal office 2837 South La Salle street, Chicago, Illinois. To distribute rubber belting.

Universal Tire Co., January 7 (Delaware), $7,500,000. G. W. Odell, president; J. G. Burns, vice-president; R. Ackerman, treasurer; S. G. Murphy, secretary. Principal office, Philadelphia, Pennsylvania. To manufactue and sell, through its own chain stores, automobile tires and tubes.

Universal Tires Limited, March 8 (Canada), $50,000. L. M. Lymburner, president; E. P. Bertrand, secretary and treasurer; G. Bertrand; F. H. Lymburner; M. Lussier; directors. Principal office, 209 Park avenue, Montreal, Quebec, Canada. To distribute Kelly-Springfield tires.

Wire Cord Co., May 26 (Delaware), $1,000,000. T. L. Croteau; M. A. Bruce; C. H. Maxwell—all of Wilmington, Delaware. Delaware agent, Corporation Trust Co. of America, duPont Building, Wilmington, Delaware. To manufacture and deal in crude rubber, gutta percha, etc.

DIVIDENDS DECLARED

Company	Stock	Rate		Payable	Stock of Record
Apsley Rubber Co.	Pfd.	3½%	s.a.	July 1	June 27
Boston Woven Hose & Rubber Co.	Com.	1½%	q.	June 15	June 1
Boston Woven Hose & Rubber Co.	Pfd.	3%	s.a.	June 15	June 1
Brunswick-Balke-Collender Co.	Pfd.	1¾%	q.	July 1	June 20
Canadian General Electric Co.	Com.	2%	q.	July 1	June 15
du Pont de Nemours & Co., E. I.	Com.	2%	q.	June 15	June 4
du Pont de Nemours & Co., E. I.	Deb.	1½%	q.	July 25	July 9
General Electric Co.	Com.	$2	q.	July 15	June 8
General Electric Co.	Stk.	2%	s.a.	July 15	June 8
Kelly-Springfield Tire Co.	6% Pfd.	$1.50	q.	July 1	June 17
United Shoe Machinery Co.	Com.	$0.50	q.	July 5	June 14
United Shoe Machinery Co.	Pfd.	$0.37½	q.	July 5	June 14
Westinghouse Electric & Manufacturing Co.	Com.	2%	q.	July 30	June 30
Westinghouse Electric & Manufacturing Co.	Pfd.	2%	q.	July 15	June 30

AKRON RUBBER STOCK QUOTATIONS

The following are closing quotations of June 18, supplied by The App-Hillman Co., Second National Building, Akron, Ohio:

	Bid	Asked
American R. & T. Co., com.	..	40
Amazon Rubber Co., The	..	15
Firestone T. & R., com.	50	55
Firestone T. & R., 6% pfd	75	79
Firestone T. & R., 7% pfd	55	60
General T. & R. Co., The, com	..	200
General T. & R. Co., The, 7% pfd	75	85
Goodrich, B. F., The, com	31	33
Goodrich, B. F., The, pfd	66	70
Goodrich, B. F., The, 5-yr. 7% notes	89	90
Goodyear T. & R. Co., The, com	8	8½
Goodyear T. & R. Co., The, 7% pfd	22½	23½
India T. & R. Co., com	..	90
India T. & R. Co., 7% pfd	60	70
Mason T. & R. Co., The, com	11	13
Mason T. & R. Co., The, 7% pfd	45	50
Marathon T. & R. Co., com	2½	3½
Miller Rubber Co., The, com	40	50
Miller Rubber Co., The, 8% pfd	45	52
Mohawk Rubber Co., The	..	95
Phoenix Rubber Co., com	..	15
Phoenix Rubber Co., pfd	..	80
Portage Rubber Co., The, com	3	8
Portage Rubber Co., The, 7% pfd	5	12
Republic Rubber, com	¼	⅜
Republic Rubber, 7% pfd	5	9
Republic Rubber, 8% pfd	3	4
Rubber Products Co., The	..	50
Standard Tire Co., com	..	90
Standard Tire Co., pfd	..	85
Star Rubber Co., com	..	90
Star Rubber Co., 8% pfd	..	100
Swinehart T. & R., com	20	40
Swinehart T. & R., 7% pfd	..	70

NEW YORK STOCK EXCHANGE QUOTATIONS

June 22, 1921

	High	Low	Last
Ajax Rubber Co., Inc.	22	21¾	22
The Fisk Rubber Co.	12¼	11⅝	12
The B. F. Goodrich Co.	30¼	29½	30
The B. F. Goodrich Co., pfd.	66½	66½	66½
Kelly-Springfield Tire Co.	37¼	31¾	36½
Keystone T. & R. Co., Inc., The	9½	9⅛	9½
Lee R. & T. Corporation	48	47⅛	47¾
United States Rubber Co.	58	55⅛	57
United States Rubber Co., 1st pfd.	93	91⅝	92

SALES MANAGER, KELLY-SPRINGFIELD TIRE CO.

John Vaughan Mowe, general sales manager of the Kelly-Springfield Tire Co., New York, N. Y., was born at Oconomowoc, Wisconsin, in 1875. Following his graduation from high school in 1893, he entered mercantile business as stockyard representative for a firm manufacturing wooden ware.

John V. Mowe

His first association with the rubber industry was with the Firestone Tire & Rubber Co., for which firm he served eight years as branch manager at Detroit, Michigan, also traveling extensively throughout the United States and becoming well acquainted with tire dealers. In 1913, he resigned to join the Goodyear sales force as special representative, doing special work among the branches, and selling to large manufacturers. Two years later, he was appointed assistant general sales manager of the Kelly-Springfield Tire Co., in which capacity he also traveled extensively, especially the western territory. Last year he was promoted to general sales manager, succeeding Otis R. Cook, who continued with the company as a director.

Outdoor sports claim Mr. Mowe's spare moments, and his clubs include the Lawrence Park Golf Club, Detroit Athletic Club and Lotos Club of New York City.

SMITH CHEMICAL & COLOR CO., INC., MOVES TO NEW QUARTERS

The Smith Chemical & Color Company, Inc., has removed from 116 Nassau street to 257-259 Water street, New York, N. Y., where the enlarged offices and warehouses are located. Here the company will be able to give more efficient service to users of rubber chemicals, colors and pigments. A laboratory is now being equipped in the new building, where all products will be tested, matched and reported upon.

Casper Smith, president and general manager of the company, has been largely instrumental in promoting the development of the company, and is very popular in the trade.

A SWINDLER ANNOYS NEW YORK RUBBER TRADE

An imposter purporting to be Osman Shaw, of Francis Shaw & Co., Limited, Manchester, England, is operating in New York City, and members of the rubber trade are warned to be on their guard. The imposter does not call at the office of the intended victim but telephones requesting a business meeting at some prominent hotel. This being denied, considerable persistence is shown, but the matter is dropped if a meeting at the hotel cannot be arranged. Amedee Spadone, assistant secretary of the Gutta Percha & Rubber Manufacturing Co., 126 Duane street, knew that Mr. Shaw was in England, confirmed the fact by cable and ignored the swindler.

THE RUBBER TRADE IN THE EAST AND SOUTH

By Our Regular Correspondent

NEW YORK

The executive offices of the Powertown Tire Sales Co. have been removed from Buffalo to 253-259 East avenue, Rochester, New York. The Buffalo office, 955 Main street, is being continued as a factory branch, with George H. Holmes as manager. This company reports an encouraging growth in its volume of sales, each month this year showing an increase over the previous month. N. D. Johnson is president.

At a recent meeting of the stockholders of the Hudson Tire & Rubber Corporation, Yonkers, N. Y., the following officers were elected: William M. Doucette, president; Harry B. Seymour, vice-president and treasurer; Ulrich Wiesendanger, secretary. The three directors of the company were reelected. The firm was incorporated April 19, 1920, with a capitalization of $1,000,000. New factory buildings, now under construction, will be completed this summer.

Because of increasing business the Hewitt Rubber Co., Buffalo, N. Y., recently moved its eastern district branch from No. 245 to Nos. 236-238 West 55th street, New York, N. Y. At this branch they intend to carry a larger stock, not only of tires, but also of various mechanical goods. J. R. Benedict, eastern district manager, will make his headquarters here.

The Tropical Rubber Co., Inc., 365 Broadway, New York, N. Y., has entered into contract to purchase a $100,000 bond issue of the Smith Rubber & Tire Co. The recently completed plant of the latter firm is located at Garfield, New Jersey. The $100,000 issue in question is secured by a mortgage and deed of trust on the plant, equipment and business of the Smith Rubber & Tire Co. The officers of the Tropical Rubber Co. are: George V. S. Williams, president; H. W. Van Alen, treasurer; F. C. Woods, secretary.

Instead of sales manager, as was recently stated, Lowell H. Low has been appointed branch manager of the Swinehart Tire & Rubber Co., 631 West 57th street, New York, N. Y. The general offices of the company are at Akron, Ohio.

The New England Tire & Rubber Co., is now maintaining at 43 East 47th street, New York, N. Y., a factory branch, under the name of the Holyoke Cord Tire Co. The company claims that its prospects for the future are excellent, judging from its business of the last three months. S. R. Huntley is general manager.

The Nathan Novelty Manufacturing Co., incorporated as the Nathan Anklet Support Co., has increased its capital from $18,000 to $150,000. Edwin B. Nathan is president of the company. The offices are at 55 Fifth avenue, New York, N. Y.

The New York office of Fred Waterhouse Co., Limited, at 82 Wall street, is in charge of J. C. Holmes as manager. The business is entirely confined to crude rubber and is operated on a commission basis. Mr. Waterhouse, who has been in this country several weeks, left late in May for Singapore via Honolulu, Hawaiian Islands.

Stephen M. Mullin, under the firm name of S. M. Mullin & Co., has established a crude rubber brokerage business at 35 Nassau street, New York, N. Y. Mr. Mullin is familiar with all branches through fifteen years of active experience with various large importers and dealers. For a time he acted as New York agent for one of the foremost shippers in Amsterdam, Holland, and subsequently managed the affairs of Hammesfahr & Co., crude rubber brokers.

John M. Ball, formerly chemical engineer with the Manhattan Rubber Manufacturing Co., Passaic, New Jersey, has taken up sales work with the R. T. Vanderbilt Co., 50 East 42nd street, New York, N. Y., manufacturer of compounding ingredients for the rubber trade.

The firm of Mac Namara & Wadbrook, Inc., 136 Liberty street, New York, N. Y., crude rubber brokers, will be dissolved, and Alfred B. Mac Namara and Elston E. Wadbrook will continue in business at the same address, but as separate individuals.

The Achilles Rubber & Tire Co., Binghamton, New York, is now running full force as it has been for three years past. A new power house is now under construction, and new vulcanizing and shipping rooms and a warehouse are to be added, increasing the capacity next year to 1,000 tires a day.

PENNSYLVANIA

As advertising and sales promotion manager Andrew W. Crawford has become connected with the H. H. Robertson Co., First National Bank building, Pittsburgh, Pennsylvania. Mr. Crawford has had previous experience in sales and factory work with several other companies.

The Firestone Tire & Rubber Co., Akron, Ohio, has placed L. L. Evans in charge of truck tire sales at Philadelphia, Pa.

Incorporated for the purpose of repairing tires and selling rubber goods, the New Kensington Tire & Rubber Co., 735 Fifth avenue, New Kensington, Pennsylvania, was organized August 17, 1920, with a capitalization of $10,000. The officers are: A. E. Greenwald, president; Charles E. Moore, vice-president; H. S. Douglas, secretary and treasurer; Fred La Mountain, manager.

C. E. Pumphrey, formerly sales manager of The McGraw Tire & Rubber Co., has become sales manager of the Corona Cord Tire Co., East Butler, Pennsylvania, manufacturer of cord tires and inner tubes marketed exclusively through wholesale channels. Mr. Pumphrey's experience in the tire business dates from 1910, when he was with the Goodyear selling organization.

A wireless communication service for the transaction of company business is being established at the several plants of the Westinghouse Electric & Manufacturing Co. Service between the plant at East Pittsburgh, Pennsylvania, and the foundry at Cleveland, Ohio, was formally opened on May 31, and stations are being installed at the Newark, New Jersey, and Springfield, Massachusetts, works.

SOUTHERN NOTES

The Sterling Carbon Co., Inc., Shreveport, Louisiana, reports that the present officers of the company are: O. A. Wright, president; N. C. McGowan, vice-president and treasurer; E. J. McGowan, Jr., secretary. The firm was chartered October 17, 1919, under the laws of Louisiana. The company's plant is located at Sterlington, in that state.

The recently erected plant of the Louisiana Carbon Co., near Monroe, Louisiana, on the Missouri Pacific railroad, is now in full operation. The company manufactures carbon black, gasoline and other by-products from natural gas. The company was chartered August 6, 1920, with the principal office at Clarksburg, West Virginia. The authorized capital stock is $100,000. The officers are as follows: Lynn S. Hornor, president; H. G. Evans, vice-president; Percy Byrd, treasurer; Philip P. Steptoe, secretary, and G. A. Williams, general manager.

PURCHASE OF NEW CASTLE RUBBER CO.'S PLANT

The New Castle Rubber Co. at New Castle, Pennsylvania, was purchased May 27, at receiver's sale, by R. C. Ellsworth of Akron, private secretary to F. A. Seiberling, former president of The Goodyear Tire & Rubber Co. It is reported that Mr. Ellsworth bid in the plant as the representative of Mr. Seiberling, who also attended the sale. The plant is valued at over $500,000. The sale price was $103,500.

F. A. Seiberling held a controlling interest in the New Castle Rubber Co., purchased over a year ago. It is stated that the purchase of the plant through Mr. Ellsworth does not mean that Mr. Seiberling will again become actively engaged in the rubber industry. The New Castle plant underwent extensive development a year ago and now includes two large factory buildings, new modern office buildings, several dwellings and seven and one-half acres of ground.

THE RUBBER TRADE IN NEW JERSEY

By Our Regular Correspondent

MISCELLANEOUS NEW JERSEY NOTES

The New Jersey Fire Chiefs' Association has endorsed a standard thread for fire-hose couplings in order that one municipality may aid another in case of fire. The hose with a diameter of 3 1/16-inches and with 7½ threads to an inch, which is said to be the standard set by the United States Government, was selected.

The Firestone Tire & Rubber Co., which sold its modern three-story and basement building at Broad and Kinney streets, Newark, to the Federal Drug Co., will use the upper floors of the building as a distributing and service station for Northern New Jersey. This arrangement will cover a period of seven years.

The United Auto Stores, Inc., will shortly open a branch at Burlington, with John K. Gunn as manager. The company operates a chain of forty-five stores in various parts of the country and handles standard tires and automobile accessories.

The Lambertville Rubber Co., is operating only on part time. The boot department is being run but three days a week, while men are employed in the main calender room five days a week. The department where balls are made has been closed and there are but few at work in the rubber-band room.

The New Jersey Rubber Co., Lambertville, manufacturer of reclaimed rubber, is running on part time only. The concern is owned by the E. H. Clapp Rubber Co., of Boston.

The plant of the Stockton Rubber Co., Stockton, New Jersey, which went into the hands of a receiver some time ago, has been closed.

Joseph H. Dwork, inventor of an automobile tire for which he received 2,500 shares worth $25,000 from the Ideal Wheel & Tire Co., Newark, New Jersey, organized for the manufacture of the product, will receive $2,000 for his interest. In an opinion filed by Vice-Chancellor Backes, it appears that Dwork is entitled to the fund remaining after creditors have been paid by the receiver. Charles Frankel. The firm became insolvent some time ago. A war embargo on rubber prevented exploitation of the invention, it was said, and the company turned to the repair of tires instead. It was contended that Dwork was not entitled to a dividend on the surplus because the patent was not assigned. Dwork was originally half-owner of the company.

TRENTON NOTES

The Miller-Steiner Rubber Co., of 678-694 North Olden avenue, has recently been incorporated with an authorized capitalization of $100,000, divided into 1,000 shares of the par value of $100. The incorporators are George W. Page, 1438 Brunswick avenue; John H. Miller, 1845 Greenwood avenue, and Julius D. Steiner, 101 West End avenue. The new company has taken over the plant of the Olden Rubber Co. Operations will begin shortly upon completion of alterations and installation of new machinery. Mechanical rubber goods and specialties will be manufactured. Mr. Miller, president of the company, will also be general manager, and will be assisted by Mr. Steiner. Both have had extensive experience in the rubber industry, having been connected for a number of years with the Empire Rubber & Tire Corporation and other rubber plants. Mr. Page, who is one of the Trenton city commissioners, holds an inactive interest with the company. The

Olden Rubber Co. was organized several years ago by Israel H. Albert.

The scrap rubber plant of Samuel Kravitz, New and Union streets, was recently destroyed by fire, causing a loss of about $30,000 Spontaneous combustion is the cause advanced for the blaze, the fire having started in bales of rubber at the foot of the elevator shaft.

Colonel Washington A. Roebling, who recently passed his eighty-fourth birthday, has been elected president of John A. Roebling's Sons Co., Trenton, N. J., wire rope manufacturer, succeeding his nephew, Karl G. Roebling, whose obituary appears in this issue. Colonel Roebling has long been identified with bridge construction. His most notable achievement was the completion of the Brooklyn Bridge.

Joseph S. Papier, who conducts two automobile tire stores in Trenton, has purchased the building he occupies at 15 East Front street and will greatly enlarge the place. Mr. Papier is the Trenton representative for the Pennsylvania vacuum cup and Lee puncture proof tires.

The Thermoid Rubber Co. has erected a frame office adjoining its plant on East State street, Trenton, to make more room for the additional force. The company was its own contractor and builder.

The Hamilton Rubber Manufacturing Co. is installing larger and heavier machinery at the plant in East Trenton, in an addition 36 by 6 feet being erected for the purpose.

The property now occupied by the Universal Tire & Tube Market, 249 North Broad street, Trenton, has been sold and the concern is seeking new quarters.

W. E. Saunders, of the Essex Rubber Co., Trenton, recently addressed the members of the Trenton Shoe Club. He explained to them the manufacture and uses of rubber as applied to shoes and the various processes through which rubber passes before it is finally made into soles and heels.

MISCELLANEOUS NEW JERSEY NOTES

The Sterling Tire Corporation, Rutherford, New Jersey, has recently opened a direct factory branch at 1509 South Michigan avenue, Chicago, Illinois. At this plant a full stock of tires and tubes will be carried, and an attempt will be made to reach from this point the entire West. Elmer Williams will have the supervision of the branch and will act as western sales manager. Mr. Williams was formerly district manager for the Rubber Corporation of America at Chicago, Illinois.

THE RUBBER TRADE IN RHODE ISLAND

By Our Regular Correspondent

REDUCTIONS in manufacturers' tire and tube prices, ranging from 10 to 25 per cent according to the grade and make, have caused a price readjustment among the retailers and dealers here that has been very noticeable. As these revisions bring tire costs to the consumer almost to a level with the pre-war schedules, there has been a very perceptible stimulation of business. Not only has there been a noticeable increase in sales but the dealers are showing a disposition to stock somewhat more heavily than has been the case before in many months.

Relative to the boot and shoe industry, little can be said. There is no market and all the mills are either shut down entirely or running on such a short schedule as to be practically nil. This is the rule rather than the exception and there is apparently little prospect of any material betterment for some time to come. Several of the larger plants have endeavored to operate on a short schedule so as to maintain the unity of the working forces, but this has been found to be utterly impossible.

The plants that are producing druggists' supplies, novelties and other articles of rubber are doing something although not being operated to the full capacity of their equipment. But even with these departments there is comparatively little enthusiasm and the operations are almost hand to mouth, orders being cleared up almost as rapidly as they are booked.

With this lethargy in rubber manufacturing lines a corresponding dullness is carried into the textile and fabric plants that furnish these goods for various purposes of the rubber industry. Some of the mills that are producing textiles for tire fabrics are moderately busy but none are being operated to a sufficient degree to burden them to any extent. There is a generally optimistic feeling among these manufacturers although it can hardly be called very enthusiastic. A general revival in other businesses would unquestionably be substantially reflected in an increased activity in the tire business and its accessories and supplies. Everybody is ready and waiting and the millennium cannot come too quickly to suit both employer and employe.

The American Wringer Co. deficit of $317,998.64, reported recently by the Industrial Trust Co., Providence, as receiver for the wringer corporation, brought no pleasure to the latter's stockholders. It was the first statement after the appraisal of assets and liabilities of American Wringer as of January 26, 1921, the date of the appointment of the Industrial Trust as temporary receiver. The plant and inventory were revalued by Lockwood, Greene & Co. as of January 26 and the items approved were $306,059.22 below their original book values. The wringer concern's condition is not as favorable as was hoped by the more sanguine among its stockholders and friends.

Total claims of merchandise creditors filed at the time the statement was made up aggregated about $600,000, and outstanding creditors' claims on notes held by banks foot up about $835,000. It will require a later report for the consideration of and decision on the claims of creditors. Also, there are accrued taxes and wages to be satisfied. Orders booked for wringers were about one-third normal for the first four months of the present year. The company's installment business, perhaps, was not a happy idea, and there was much of it, and too little working capital.

Following are the principal items of the balance sheets of American Wringer, as of January 26, 1920 (furnished by the company itself), and as of January 26, 1921 (furnished by the receiver). On the former date the assets and liabilities balanced at $2,471,027.37 and on the latter at $2,944,563.82. Real estate, machinery and fixtures were given separately, a year ago, and "bunched" this year. The capital stock remained at $1,750,000. "Patents, trade marks and good will" would not seem to be very valuable as a market asset to a concern thus situated, but comparison of the items selected, as below, may be of interest:

	January 1, 1920	January 26, 1921
ASSETS		
Plant, etc.	$823,253.51	$940,852.00
Merchandise	934,157.79	1,027,133.02
Cash	95,766.31	165,479.35
Investments	153,215.75	22,705.00
Notes Receivable	37,059.11	41,181.04
Accounts receivable	312,569.19	300,779.92
Patents, etc.	110,978.71	111,257.21
LIABILITIES		
Accounts payable	$126,277.37	$342,865.24
Notes payable	475,000.00	842,000.00
Surplus	90,000.00	*317,998.64

*Deficit.

The company had, as of January 26, 1921, contingent liabilities of $95,470.95 for notes discounted and its "cash" includes $10,362.15 on deposit in Europe, at par of exchange.

John F. Sweeney, for 32 years with the American Wringer Co., Woonsocket, and for the past six months plant manager, severed his connection with that corporation on June 10. He has been succeeded by George R. Keltie, the following notice having been posted, signed by William G. Roelker, secretary of the Industrial Trust Co., receiver for the American Wringer Co.: "George R.

Keltie has this day been appointed plant manager. George Schlosser will continue in charge for the receivers."

Mr. Sweeney had served in many capacities, both in the clerical and administrative departments of the company. He entered its employ as a clerk in the office force and for 16 years was manager of the cost department. In 1916 he was in charge of the mechanical roll department and was also purchasing agent. He was promoted to assistant plant manager in 1918, a position which he filled until his appointment as manager on January 1, 1921. For many years he was one of the executive assistants of the late Michael Flynn, general manager. The new plant manager has been employed at the plant for about a year in an executive capacity.

Closing exercises of the Americanization School at the factory of the National India Rubber Co., at Bristol, were held at 4 o'clock in the afternoon, June 15, in the conference room of the plant. The exercises were in charge of Miss Marguerite L. MacDonald, one of the teachers. The pupils to the number of 115 were present. An excellent program of vocal and instrumental music and recitations was rendered by the pupils. In the evening the pupils and guests enjoyed a complimentary entertainment at the rooms of the Y. M. C. A. The program included six reels of patriotic and instructive pictures, as well as comedy films and vocal and instrumental music. A collation was served and the latter part of the evening was devoted to dancing in the gymnasium.

At the Revere Rubber Company plant on Valley street on the evening of June 7 a presentation was made by the Colt plant employes to the factory manager, John J. Shea, on the occasion of the anniversary of his fiftieth birthday. The presentation consisted of a gold Waltham watch and a bouquet of fifty roses. The employes assembled in the cafeteria immediately after work and sat down to a buffet luncheon served by the factory steward. Seated at the head table with Mr. Shea were George W. Seiberling, of Detroit, general factory manager of the United States Tire Co.; Dr. E. Meyer, consulting chemist; Arthur Carr, factory manager of the Revere Rubber Co., mechanical division; J. T. Brogden, superintendent of the Revere Rubber Co.; F. O. Miles, treasurer of the Revere Rubber Co.; A. P. Delahunt, treasurer of the Colt plant, and W. T. Mead, engineer.

The presentation was made on behalf of the employes by Walter C. Eaton, Mr. Shea responding. Brief remarks were made by Messrs. Seiberling, Carr, Brogden, Mead, Miles and Delahunt and Dr. Meyer. The luncheon was followed by dancing. The committee in charge of the arrangements comprised L. B. Martin, superintendent; George V. Burgess, divisional superintendent; Gus Mix, divisional superintendent; Richard Newsmith, mechanical engineer; Samuel Reed, cashier; Miss M. Kilroe and Miss E. Moore; Oliver Hopkins, industrial relations manager; S. D. Johnson, employment manager, and Walter C. Eaton, chief cost accountant.

Out of the several hundred old graduates who returned June 15 to attend the 131st annual commencement exercises at Brown University interest centered in two, both of whom have served as Chief Executive of two of the most important states in the Union. One of them, Secretary of State Charles Evans Hughes, gave the glamor of renewed achievement to his fellows of the class of '81. The other, the Honorable Augustus O. Bourn, of Providence, president of the Bourn Rubber Co. and a former governor of Rhode Island, came as the only representative of the class of '55, the oldest that responded to the roll-call. Both men have helped mold the history of their country, the first as a jurist and the most important officer in the President's Cabinet; the second as a boy soldier in Dorr's Rebellion (Rhode Island's political war), who later guided his native state through trying days.

Michael J. Bowes, who has been with the Lawrence Felting Co. for 26 years, and for the last few years superintendent of that company's mills at Millville, has tendered his resignation to the United States Rubber Co., operating the Millville plant, which was originally the Bannigan & Bowes Felting Co., formed in 1876. The late William Bowes, father of Michael Bowes, was the first superintendent. Francis Sage, of the Hastings (Michigan) Wool Boot Co., succeeds Mr. Bowes.

THE RUBBER TRADE IN MASSACHUSETTS

By Our Regular Correspondent

With the tire buying season in full swing, automobile manufacturers stimulating new business by generous price reductions, and tire manufacturers selling at the new list prices, which represent reductions of 10 to 20 per cent, the tire demand is now fair and improving. Production averages about two-thirds normal with a few plants very close to normal production.

Apart from the seasonable demand for jar rings and garden hose, business in mechanical rubber goods continues quiet and will pick up only with a resumption of general manufacturing. This applies particularly to belting and packing. Stationers' sundries are affected somewhat by the same causes. The demand for insulated wire has been satisfactory because of the great amount of extension work deferred by the war.

The proofing trade is quiet, especially auto-top material, although it is anticipated that increasing sales of cars will enlarge the demand. The call for raincoat materials is better. Druggists' sundries sales are improving, but large orders cannot be expected until fall, when jobbers generally replenish their stocks. While reclaimers view the falling crude rubber market with some uneasiness, they find that compounders still prefer for certain purposes some of the well-known brands of reclaim with which they are familiar, and anticipate an increasing demand as rubber goods manufacture returns to normal. Moreover, they believe that a rise in crude rubber prices when general buying commences, after stocks and commitments have been exhausted, will favor them. Business in heels and soles is good, and in these much reclaim is used.

The canvas footwear season is at its height and the demand most gratifying. Manufacturers report constant small orders from jobbers and large dealers which call for all that can be produced. In rubber footwear there is little activity.

A shortage of light rubber footwear this coming winter is predicted by those in close touch with the trade. Retailers are not placing future orders as usual, but are relying upon jobbers to carry their stocks for them. Jobbers, however, are not inclined to carry more than minimum stocks this year, and their orders to manufacturers are smaller than ordinary. Manufacturers are not inclined to carry sufficient stocks to overcome the strong buying aversion of both retailers and jobbers, and are making up few goods in excess of actual orders despite the certainty that the situation will create a shortage.

The same conditions existed to a lesser degree regarding canvas footwear during the normal season for accumulating stocks, with the result that a shortage is already being felt in the more popular numbers, while most manufacturers have orders for all the canvas footwear that can possibly be produced for the balance of the season.

Rubber footwear conditions are more acute, however. Normally it takes about nine months to manufacture the rubber footwear used in three months. Were every retailer to order at once for normal requirements, it would still be impossible to meet the demands of a winter of average severity, and another mild winter is hardly to be expected. While the abnormal weather last winter left retailers with some stocks of rubber footwear on hand, one good storm in December would exhaust them.

Owing to tight money, the burden of financing footwear stocks has been passed along to the manufacturer, and as he cannot bear it in full and alone, all suffer in loss of business while a considerable percentage of the buying public must go without the protective footwear it wants and needs. Merchants with the foresight to stock amply will probably reap a harvest this coming winter.

BOSTON NOTES

The Associated Tire Corporation, 1041 Commonwealth avenue, Boston, has become Massachusetts distributer for Kenyon cord tires, manufactured by the C. Kenyon Co., Brooklyn, New York. Sales already run ahead of the most sanguine expectations.

Free service, free storage and free delivery are features of the day and night quick service being rendered to patrons at the large service station of the Grow Tire Co., 323 Columbus avenue. Experts are ready to advise regarding every tire difficulty. A business man may drive his car to the service station in the morning. A chauffeur will drive him to his office while his tires are being changed, and later when ready, his car will be sent to his office at his convenience.

The Burditt & Williams Co., 160 Federal street, has become factory distributer for the Ashland cord tire.

The Detroit Waterproof Fabrics Co., of Detroit, Michigan, has opened a Boston office at 166 Essex street, in charge of John H. Foster, formerly in the Boston office of the United States Rubber Co.

J. E. Driscoll of Savannah, Georgia, has recently become a vice-president, handling sales, with H. T. West Co., 148 State street, Boston, Massachusetts. Mr. Driscoll was formerly, for many years, manager of the domestic department of the American Naval Stores Co. H. T. West Co. handles naval stores, petroleum products, linseed oil and supplies for technical industries.

The New England distributing point for the Achilles Rubber & Tire Co., Binghamton, New York, is now located at 679 Beacon street, Boston. Max Leitman is in charge.

On the evening of May 26 about 125 employes of the United States Rubber Co. offices in Boston held a dinner and dance at the Hotel Westminster. George Bailey was toastmaster and the speakers included John White, James Ryan, Charles Abbott and J. J. Brady. The firm was represented by William North, general manager, and M. R. Coe. Department bowling prizes were awarded.

MISCELLANEOUS MASSACHUSETTS NOTES

The Middlesex Rubber Co., Reading, which was incorporated late in March with a capital of $50,000, has occupied the plant formerly operated by the McTernen Rubber Manufacturing Co., and is making druggists' sundries, automobile inner tubes, and rubber bands. George E. Jeandheur, at one time superintendent of the Mayflower Rubber Co. plant, is president and treasurer, while Michael Culliney is vice-president.

With 27 per cent of the population of Massachusetts foreign born, progressive industrial establishments have seen the need of Americanization work among employes and met it. Among the concerns which recently held special closing exercises for their English and citizenship classes were the American Rubber Co., Cambridge, and the General Electric Co., West Lynn. It has been gratifying to note at those exercises the apparent readiness with which graduates use our language and the marked progress in writing ability.

Believing that the only way New England can maintain her industrial leadership is to lead in the field of human relations, a conference of executives and managers was held on May 17 at the Copley Plaza Hotel to discuss employe representation plans. Some two hundred plant representatives were present to listen to five plans in successful operation, to ask questions and join in the general discussion.

Richard H. Rice, general manager of the Lynn plant of the General Electric Co., summed up the case for employe representation. Industrialists of the future, he declared, would bless those who had blazed the way in this movement for a closer relationship between employer and employe. The good results achieved through it for his company justified him in advising others to adopt similar measures.

Other speakers told how employe representation had enabled the companies to reduce wages and to readjust rates in keeping with the industrial depression and the reduced cost of living, with the consent of the workers and without the slightest friction—something that would not have been possible, it is believed, without such a system. There was also evidence that it had resulted in increased production, elimination of waste, and a general improvement in the morale of the working force.

The full bench of the Supreme Court recently ordered the Commonwealth of Massachusetts to refund to the Hood Rubber Co., Watertown, the sum of $2,250, which the court decided was illegally exacted in payment of excise taxes. The company changed its common stock of par value into an equal number of shares without par value. The tax commissioner then fixed par value for the latter and assessed an excise tax. The court holds that the unissued stock of no par value does not constitute an increase of capital and is not subject to excise tax.

MEETING OF THE RUBBER SECTION—NATIONAL SAFETY COUNCILS

The National Safety Council Convention will be held in Boston, September 26 to 30 inclusive. The sessions of the rubber section will be held September 28, 29 and 30, inclusive, in the historic State House in Boston, one of the most famous buildings in America. The tentative program is as follows:

FIRST DAY

1. Address of welcome by the chairman, E. H. Fitzgerald, Federal Rubber Co.
2. "Standard Statistics of the Rubber Industry," by Ray Watson, The Goodyear Tire & Rubber Co. Discussion.
3. "Fire Hazards and Static Electricity." Discussion.
4. General discussion on new ideas to promote safety in the rubber industry.

FIRST DAY EVENING

Luncheon. Toast master, Harrold T. Martin. The speaker is to be one of the most prominent men in the rubber industry. Special entertainment also to be provided.

SECOND DAY

1. Talk by one of the foremost rubber chemists in America. Subject to be selected. Discussion.
2. "Keeping a Rubber Factory Clean." Discussion.
3. Practical plans for medical supervision in rubber plants. Discussion.

THIRD DAY

1. Reports of Committees: Engineering Committee, C. B. Mitchella, The B. J. Goodrich Rubber Co.; Health Hazards Committee, C. F. Horan, Hood Rubber Co.; Membership Committee, E. W. Beck, United States Tire Co.; Program Committee, S. M. Schott, Morgan & Wright; Standards and Statistics Committee, Ray N. Watson, The Goodyear Tire & Rubber Co.
2. Talk by J. D. Anderson, factory manager, The Fisk Rubber Co. Subject: "Safety from the Factory Manager's Viewpoint."
3. Reclaiming plants and their efforts towards safe operation.

THE GOOD ROADS ESSAY CONTEST

Interest in the "Good Roads and Highway Transport" national essay contest for the Harvey S. Firestone scholarship appears to be greater this year than last, and it extends to all states and territorial possessions. In some states it is believed that 90 per cent of the high school pupils will submit essays, while many schools are making these essays the basis of final examinations

in English. The essays will be graded by local high school principals and state committees the same as last year. Essays may, however, be submitted direct to the Highway and Highway Transport Education Committee, Willard Building, Washington, D. C., if no local committee for grading the essays exists.

PRESIDENT OF THE GOODYEAR TIRE & RUBBER CO.

Edward G. Wilmer, who succeeds Frank A. Seiberling as president of The Goodyear Tire & Rubber Co., Akron, Ohio, under the recent reorganization plan, was born in Milwaukee, Wisconsin, thirty-eight years ago and is unmarried. He studied law at George Washington University, Washington, District of Columbia, but never engaged in the active practice of law after obtaining his degree.


Edward G. Wilmer.

Mr. Wilmer started his business career in the legal department of one of the Schlesinger companies, where he rose rapidly to personal adviser and legal representative of the late Ferdinand Schlesinger, of Milwaukee, Wisconsin, one of the most prominent figures in the American iron, steel and chemical industries. For the past twelve years Mr. Wilmer has been actively associated with a group of the Schlesinger companies controlling many subsidiaries, in all of which parent companies he held the office of vice-president. These include the Steel and Tube Co. of America, a consolidation of a dozen large concerns; the Newport Co., one of the largest chemical concerns in the world, and the Milwaukee Coal & Gas Co., which supplies gas to the city of Milwaukee.

For several years Mr. Wilmer has been engaged in reorganizing large companies. He is regarded as one of the keenest of the younger American business executives, particularly in financing, and his accession to the presidency of the second largest rubber company in the world is recognition of this remarkable ability. It is also significant of the entrance of the vast Schlesinger interests into a new field and a financial participation in the reorganization of the Goodyear company. With an assured free hand in the management, he will occupy a very prominent place in the rubber industry.

Mr. Wilmer's confidence in the future is concisely expressed in a simple statement made on assuming the presidency. Said he: "The entire Goodyear organization has shown unusual courage and efficiency in meeting all the recent difficulties. I am entirely satisfied with qualities so displayed, and with such an organization as this I firmly believe we are now ready for a complete come-back."

THE RUBBER TRADE IN OHIO

By Our Regular Correspondent

The footwear season which has just closed was most satisfactory to Akron manufacturers in spite of the rather untoward reports regarding the industry in other sections of the country. Tabulations for the season have not been completed and figures are not available, but those closely connected with this feature of the industry believe that if the fall and early winter present seasonable weather the first of the coming year will find the books at least 100 per cent normal. The stocks of the dealers are reported to be comparatively low and although buying has been very good it is believed that the coming of cold weather will find much mail order business on its way to the factories from the dealers.

Druggists' sundries sales are gradually improving, according to available reports. The improvement lacks any spectacular features and is following along the lines noted in other industries. The season for actual placing of large orders does not come until fall, when the jobbers place their largest orders. Jobbers, however, are reported not to be heavily stocked with goods, and therefore the Akron druggists' sundries companies, including Goodrich, will be surprised if the coming season is not at least a fair one.

The future of mechanical goods depends largely upon the improvement in general business because these departments are closely interlocked with the larger manufacturing industries. The resumption of steel manufacture, the settling of labor and railroad freight rate questions, which are the large issues of the day, will mean that the general tone of business will improve and be reflected rapidly in the mechanical goods departments of the rubber companies.

While the news which developed in the Akron rubber factories toward the end of May lacked the optimistic tone which it carried during the first part of the month, June has been an entire reversal of this development. The opening of the month saw some changes which it was generally believed would inaugurate a new era of depression, but as the days and weeks went by reports from the various companies took on a more optimistic tone, until it is generally believed that the industry is on a firm keel and that sailing will be smooth in the future.

The Miller Rubber Co. has made some adjustments in office personnel and has announced that the factory will continue on a basis of 3,000 tires a day until fall, unless a change in business conditions makes it necessary.

At the Firestone plant it is officially stated that production is now between 17,000 and 18,000 tires a day and that if any reduction is made it will not take place on the basis of information now at hand. Few of the 47 automobile manufacturers who purchase original equipment from Firestone have materially decreased their commitments to date, it is stated. Some readjustments have been made in the Firestone office personnel in line with those made in other factories and some men have been laid off in the mechanical departments, but outside of this the forces are as they were in May.

The General Tire & Rubber Co. is running along at the same production point, although figures have not been given out. It is a conservative firm and was comparatively little affected by the big period of depression. It is generally believed that the price of General stock on the market reflects the condition of the company.

At the Goodrich plant, where salary and personnel adjustments have been under way, business remains very much as it was at the first of the month, which means a decrease from the peak reached during the middle of May. However, the adjustments have been to a large extent in the offices, while the production department has remained much the same. There has been no wholesale reduction in factory forces, as far as can be determined.

The B. F. Goodrich Rubber Co. announces the appointment of E. H. Fitch as director of sales, Diamond Rubber Co., with Ralph McPeake as his assistant. L. A. McQueen, formerly in sales promotion work, is now assistant advertising manager. T. A. Bennett has been given charge of Goodrich mechanical sales with E. R. Miller as his assistant.

A remarkable record for long-continued service is that furnished by three brothers, for many years employed by The B. F. Goodrich Co., Akron, Ohio. Perry and Lee Hall were first

employed by the Goodrich company in 1887. The first-named of the two is now manager of one of the plant departments. The third brother, Ira, has been with the company for twenty-five years. These men have seen many changes in their particular industry, while their united record, in years, represents almost a century of service.

Among the resignations from the Goodrich company is that of E. P. Rowen, formerly manager of Diamond tire sales, and also that of M. E. Fassnacht, formerly service manager.

E. C. Tibbitts, who for twenty-four years has been connected with Goodrich advertising, has accepted a position with the Wm. H. Rankin Co., Chicago, Illinois, as central western manager. Mr. Tibbitts will have personal charge of the Goodrich account as handled by the Rankin company, and will have headquarters in Akron.

F. O. Slutz, formerly manager of railroad sales, has been transferred to the tire department and will report to H. C. Miller, director of tire sales.

MASON ISSUES FAVORABLE REPORT

The Mason Tire & Rubber Co., Kent, Ohio, a short distance from Akron, has issued a series of reports regarding its business which have the most optimistic tone of any statements given out in Akron for several months. While the company did more than $7,000,000 worth of business last year, expectations based upon the present output of the plant, together with its output history thus far this year, leads officials of the company to believe that business this year will be in excess of $10,000,000. The balance sheet as of the first of May showed quick current assets of $3,340,000 as against current liabilities of $433,000, being a better than "four to one" condition.

While production of cord tires during the first weeks in June was larger than at any time in the history of the company, it is expected that the final figures on June production will be at least 100 per cent larger than production during the same month last year, when business as a whole was at peak. Sales for May of this year were in excess of those of May of last year. It is believed that by the end of the present month the company will have worked off the last pound of high-priced rubber and will begin July on rubber which costs an average of 16 cents a pound. Its fabric is manufactured in its own mills at Kent and consequently the company was not caught with large fabric commitments last year.

The company has practically stopped the manufacture of fabric tires except in Ford sizes, having turned attention primarily to the manufacture of cords. The same action has been taken as regards the manufacture of tubes. The company makes only a jet black tube, having discontinued entirely the production of grey and red tubes. At the present time arrangements are being made to discontinue the manufacture of a plain solid tire and to concentrate on cushion and slotted types of heavy duty solid tires.

The first part of July will probably see the absorption of the Mason Plantations Co. by The Mason Tire & Rubber Co. completed. The stockholders of the plantations company were given the privilege of converting their stock into rubber stock, and although no announcement has yet been made it is generally believed that the transfer suggestion has met with universal favor among the stockholders. When the amalgamation has been carried through, approximately $4,000,000 of liquid assets will be added to the company.

GOODYEAR ANNOUNCES NEW TIRE PRODUCTION SCHEDULE

The Goodyear Tire & Rubber Co. announces that the new production schedule will be 26,000 tires a day, and as soon as man can be obtained, the factory will be placed on a basis of three eight-hour shifts. This is due, not only to increases in dealers' orders, which have continued to grow for the past three weeks, but to unexpected increases in orders from automobile manufacturers.

When it was announced that 1,500 men were wanted immediately at the Goodyear factory it was believed to be impossible to find so many experienced men in the city. Goodyear started to rehire former employes the third week in June and the announcement that at least 1,500 more were needed came on June 23, following a conference between factory officials and E. G. Wilmer, the new president. Mr. Wilmer startled those who did not already know of the increase in orders by stating that it will soon be possible to go to 25,000 or 26,000 tires a day.

Goodyear's rapid recuperation is primarily due to the fact that during the worst days of the depression advertising was continued as before; and that the salesmen were recently placed upon a new working basis whereby they either produced results or resigned.

MILLER AND FIRESTONE PLAN INCREASED PRODUCTION

Although the same increases are not expected from the other companies it is known that Miller is contemplating an increase and Firestone has placed the small-tire production department on a basis of two nine-hour shifts.

Although it had been anticipated that automobile manufacturers' commitments at the rubber plants would be decreased with the reported decrease in automobile sales, yet this has not developed and in some instances facts have been just to the contrary. This is reflected in the orders to the Firestone Tire & Rubber Co.'s rim plant, which is now being operated at two-thirds capacity with 350 men. The plant makes more than 60 per cent of the automobile rims of the country, and during the past week the increased production at some of the automobile centers, especially at Flint, Michigan, has been definitely reflected at the rim plant.

AKRON NOTES

A price reduction on all types of truck tires is announced by The Goodyear Tire & Rubber Co., effective on June 20. These reductions will complete the stabilization of tire prices through the entire Goodyear line, following the reduction in price on all kinds of automobile casings and tubes announced last month. There will be an average reduction of 23½ per cent on 6, 7, and 8-inch cord pneumatic truck tires. The reduction on all Goodyear S.V. solid tires will average 12 per cent, and on all cushion tires there will be an average reduction of 10 per cent. The prices on pneumatic truck tires over eight inches, and on the new All-Weather tread solid tires have also been reduced to some extent.

The Goodyear Tire & Rubber Co. board of control has been replaced by George E. Einbecker, of Milwaukee, Wisconsin, who has assumed the office of comptroller under the new management. In the reorganization Shelby A. Falor, four years a member of the board of control, resigned and has become president of the Universal Drug Co., of Akron. W. D. Shilts, formerly a member of the board, has become assistant secretary of the company and H. B. Hamlin and W. D. Oburn, other members of the board, remain with the company.

Frank R. Griffin has been appointed assistant to the manager of the advertising department, in the division of domestic advertising, of The Goodyear Tire & Rubber Co.

Edward G. Wilmer, president of The Goodyear Tire & Rubber Co., has leased the A. H. Marks homestead in Akron and will live there for the summer with his New York business associates.

R. E. Wollcott, assistant credit manager, and Charles H. Waterman, purchasing agent, of The Miller Rubber Co., have resigned.

C. E. Wagner, export manager of The Miller Rubber Co., attended the International Trade Conference at Mexico City, beginning June 20, in the interests of his firm. He was also a delegate of the export managers' group of the Cleveland Chamber of Commerce, and of the Akron Chamber of Commerce.

James W. O'Meara, of the advertising department of The B. F. Goodrich Rubber Co., has resigned, effective July 1, and has not announced his future plans. For the past six years Mr. O'Meara had charge of the company's news service for newspapers and magazines.

J. H. Appleby, for many years connected with the St. Louis and Kansas City, Missouri, branches of the Firestone Tire & Rubber Co., has been promoted to the firm's force of special motorcycle tire representatives.

John D. Hess, Jr., has been promoted to manager of pneumatic tire sales for the Firestone Tire & Rubber Co, with headquarters at Akron. Starting with the company nine years ago as salesman at Detroit, Michigan, he has successfully filled the position of branch manager at Cleveland, Ohio, special representative to truck manufacturers, district manager on the Pacific Coast, and assistant to the western sales manager. He has been afforded an opportunity to study tire merchandising under all local conditions throughout the country and has gained a wide acquaintance in the tire and allied industries among whom his promotion is welcomed as well merited.

John D. Hess, Jr.

On account of ill health, O. L. Weaver, who was connected with The Star Rubber Co., Akron, Ohio, since its organization, has tendered his resignation. The office of sales manager, formerly held by Mr. Weaver, will be assumed by A. G. Partridge, who is also vice-president of the company. Mr. Partridge was previously vice-president and general sales manager of the Firestone Tire & Rubber Co., Akron, Ohio.

Dr. W. C. Geer, of The B. F. Goodrich Co., with Mrs. Geer, has left for Europe where they will travel for the next month.

Councilman Gus F. Kasch has proposed that monuments to the originators of four world industries in Akron be erected in Akron. Among them is a monument for Dr. B. F. Goodrich, the originator of the rubber industry on its present basis. The others are for the originator of the Chautauqua plan, cereals and the founder of the sewer pipe industry. Thus far Mr. Kasch's plan has not gone beyond suggestion.

Harry Quine, for several years connected with the lecture department of The Goodyear Tire & Rubber Co., has resigned to accept a position with the National Highway Council in Washington, D. C.

P. B. Martins, for more than 5 years manager of the safety department of the Firestone Tire & Rubber Co., has resigned.

The past presidents of the Chamber of Commerce, many of whom are directly or indirectly connected with the rubber industry, entertained the Italian Commission on electrification of Italian industries and railways at the City Club the latter part of May. The commissioners visited the Ohio Insulator Co. at Barberton, part of the Akron district, and The B. F. Goodrich Co. during the day before coming to the chamber dinner. They asked that Akron men assist Italy in building up its industries by the extension of credit and by actually going to Italy to give assistance.

Leroy R. Reifsnider is president, E. C. Shaw, formerly vice-president of The B. F. Goodrich Co., is vice-president, and Paul Held is treasurer of a new $2,000,000 building and loan association which has been organized and will open for business within a month. It is believed by the organizers that more money will be available for home building with the decrease in returns for rubber stocks.

Walter T. Akers has been named receiver for the B. & W. Rubber Co., one of the smaller and newer rubber companies of Akron. Louis W. Bogner, factory superintendent, filed the petition for receivership, alleging that the company owed him $2,019, which, under the administration previous to the receivership, had been lost. He also charged that the plant had been operated only a few months and was closed about September 1, 1920.

Little definite progress has been made in solving the difficulties of the Interlocking Cord Tire Co., Akron. The plan whereby the creditors were to be paid off within a year with money to be made by the company operating the plant was not accepted by the court under which the receiver was appointed. The receiver has asked that the stockholders pay the portion of their stocks which remained due, and the court ordered that the final payments on the stocks be made. Whether the stockholders will finally be able to obtain sufficient money to operate the plant and raise the receivership is a matter of doubt in Akron.

The employes of The Goodyear Tire & Rubber Co. gave a farewell party to their former chief, F. A. Seiberling, at the Goodyear Auditorium which he built for them, and it was one of the most touching scenes ever enacted in Akron. His brother Charles was presented with a loving cup, while a similar fund raised by the employes for Mr. Seiberling will doubtless be used to purchase additional equipment for the Children's Hospital.

MISCELLANEOUS OHIO NOTES

The Hercules Rubber Corporation reports a change of address from 908 Union Central Building to 922 Race street, Cincinnati, Ohio.

Dexter C. Hathaway, branch manager at Cleveland, Ohio, has been appointed to the assistant sales managership of The McGraw Tire & Rubber Co., East Palestine, Ohio. Temporarily he will continue to supervise the affairs of the Cleveland branch to which he has devoted himself since his affiliation with the company almost a year ago.

THE RUBBER TRADE IN THE MID-WEST

By Our Regular Correspondent

MID-WEST RUBBER MANUFACTURERS' ASSOCIATION

At the June 14th meeting of the Mid-West Rubber Manufacturers' Association, a stirring short talk was given by Ensign Roger V. Flory, of Chicago, attorney for the American Legion, in which he said, "The American Legion is taking the place of the G. A. R. in keeping alive and continuing the proper observances in patriotic matters," and urged that ex-service men be given preferential employment as a matter of patriotic duty.

The board of directors' meeting was presided over by George B. Dryden, who gave a very interesting review of the mechanical goods industry and expressed his opinion that the bottom price may not yet have been reached but nevertheless it is not a bad time to buy rubber. He believes that factories now given up entirely to the manufacture of tires and tubes should give more attention to other lines of manufactured rubber goods, as the possibilities of rubber manufacture have nowhere near reached the limit.

The following speakers were called upon and responded briefly: J. H. McGrory, Katzenbach & Bullock; O. L. Heath of The Barrett Company; C. H. Taveniere, Fred Stern & Co.; C. Stitt, A. Daigger & Co.; W. E. Wrisberg, Newsom Valve Co.; D. L. Spraker, Kokomo Rubber Co., and E. H. Bohlman, Cupples Company.

Sydney J. Roy, Hannibal Rubber Co., Hannibal, Missouri, gave a splendid talk on tires. He insisted that tires must be well made; they have been sold too cheaply, but an honest product must be turned out; the tire industry must be put on a solid foundation and fictitious adjustments eliminated. Mr. Roy pre-

dicted the greatest business the world has ever known after industry had passed through the present depression. Following Mr. Roy's talk, Thomas Follen discussed the question of foreign exchange.

The principal speaker of the day, Edward S. Babcox, Editor of the *India Rubber Review*, was detained at home and his address was read by the Secretary. It dealt with the plan of Herbert Hoover, Secretary of Commerce, to inaugurate a system of basic Federal-collected statistics that would constitute a great stabilizing influence if put into operation.

The meeting unanimously adopted the following resolutions:

Be it *Resolved*, by the Mid-West Rubber Manufacturers' Association, at the regular monthly meeting luncheon, Chicago Athletic Association, June 14, 1921, that the plan of Herbert Hoover, Secretary of Commerce for basic, Federal-collected statistics is hereby endorsed, and that the Mid-West Rubber Manufacturers' Association urge upon congressmen that they vote for the appropriation of $600,000 requested by Mr. Hoover to carry on this work.

Be it *Resolved*, by the Mid-West Rubber Manufacturers' Association, at the regular monthly meeting luncheon, Chicago Athletic Association, June 14, 1921, that all members of Congress be sent a bulletin of this Association carrying a resolution endorsing the plan of Herbert Hoover, Secretary of Commerce, for Federal-collected statistics.

MISCELLANEOUS MID-WESTERN NOTES

The Essenkay Products Co. has leased three buildings at 2601-9 Cottage Grove avenue, Chicago, Illinois, and plans to spend $15,000 in alterations. The present city sales and service department, now at Michigan avenue, will also be moved to the new quarters. F. D. Mayer is president of the company.

The Bennett Elastic Web Co., Chicago, Illinois, which was incorporated under the laws of Illinois, February 9, 1920, capitalized at $50,000, on December 20, 1920, increased its capital stock to $75,000. The incorporators of this company, which manufactures elastic web products and textiles, are all residents of Chicago and are: C. F. Bennett, W. B. Bennett, Benson Landon, Robert N. Holt, and Benson Landon, Jr.

H. O. Smith, who recently assumed control of the Racine Auto Tire Co., Racine, Wisconsin, is a veteran in the rubber industry. He was one of the organizers of the Indianapolis Rubber Co., and the G. & J. Tire Co., both of Indianapolis, Indiana. While president of these two companies, which later were merged with the Rubber Goods Manufacturing Co., Mr. Smith became identified with the Premier Motor Manufacturing Co. and served as its president. As one of the employer members of the National War Labor Board, Mr. Smith also played his part during the war.

The Standard Underground Cable Co., Westinghouse Building, Pittsburgh, Pennsylvania, has purchased approximately thirteen acres in the northwestern industrial section of St. Louis, bounded by Kingshighway Boulevard and Slevin, Geraldine, and Brown avenues, where it is proposed to erect, in the near future, a thoroughly up-to-date plant for the manufacture of insulated wire and cables. The buildings, several separate and complete units of brick concrete and steel, will comprise a weatherproof wire and cable factory, a copper-wire drawing mill, a magnet wire department, etc. The floor area will cover about four acres. Joseph W. Marsh is president of the company.

The Wishnick-Tumpeer Chemical Co., Chicago, Illinois, will place three automobiles at the disposal of members of the Mid-West Rubber Manufacturers' Association during the Pageant of Progress Exposition to be held on the Municipal Pier in Chicago from July 30 to August 14. Members of the company will act as guides and chauffeurs. Appointments may be arranged by mail.

Charles Piez, president of the Link-Belt Co., Chicago, Illinois, and former director-general of the United States Shipping Board Emergency Fleet Corporation, addressed the Engineering Advertisers' Association of Chicago at the Great Northern Hotel on June 7, his subject being "Advertising and Selling from the Executive Viewpoint."

Harry E. Geib has been appointed manager of the Chicago, Illinois, office of A. Schrader's Sons, Inc., Brooklyn, New York. Mr. Geib has been with the Schrader forces over five years and his exceptional executive ability has won him rapid advancement. He is particularly well-equipped to render to customers that efficient service characteristic of the Schrader house.

The Furness Corporation, 343 South Dearborn street, Chicago, Illinois, has at Clarksboro, Mercer County, Pennsylvania, what engineers claim to be the largest deposit of high-grade fuller's earth yet discovered in this country. Tests show it to equal any of the bleaching clays imported from England and heretofore held as standard. The company has begun the development of its holdings, which consist of 270 acres, a mill with a daily capacity of 60 tons having been established. Excellent shipping facilities and low cost of mining enable the product to be put into the Chicago market at a very reasonable price.

The stockholders of the International India Rubber Corporation, South Bend, Indiana, at their annual meeting held in January, voted that the name of the company be changed to Odell Rubber Co. The principal product of the company is "Odell" cord tires.

Building operations have commenced on the new $1,000,000 tire plant of the Wildman Rubber Co., at Bay City, Michigan. The site is on a tract of 63 acres just south of Salzburg. The building under construction is of reenforced concrete, 365 by 161 feet, three stories and basement, and will have a daily capacity of 2,500 tires and 5,000 Wildman self-sealing inner tubes. It is hoped to begin production before the end of the year.

THE MOST WESTERN TOY BALLOON FACTORY

One of the new and flourishing rubber industries on the Pacific Coast is the making of air and gas toy balloons and other inflatable novelties by the Pacific Balloon Co. at its plant, 186 Blaine street, Riverside, California. The concern was started a year and a half ago by H. A. Dodge, the president, who is

Pacific Balloon Co.'s Plant, Riverside, California.

also interested in a similar concern, the Howe-Baumann Rubber Co., of Newark, New Jersey, to supply the trade between Chicago and the West Coast.

Donald Fullerton is secretary-treasurer and manager of the new project that is producing 20,000 balloons daily and steadily increasing to meet a demand which the company has done much to promote. Until the advent of the company, toy rubber balloons were comparatively rare and dear on the Pacific Coast, it is said.

The factory was built especially for the manufacture of these toys, and it has an up-to-date equipment of dipping and curing apparatus, cement-mixing machines, form stripping devices, roller conveyors, etc. The rubber used for the gas balloons is cleaned,

milled and compounded at the Howe rubber works in New Brunswick, New Jersey. The factory is particularly well-ventilated and well-lighted. Riverside was selected because of its particularly non-humid climate as compared with other southern cities near the Coast. The rubber on the molds dries well and quickly in the warm, dry air; and only once, one day last summer, when the temperature was 112 degrees F., did the workmen have any trouble with the dippings, and then a large amount of finished stock stuck together and was ruined.

THE RUBBER TRADE ON THE PACIFIC COAST

By Our Regular Correspondent

Mid-year conditions in the rubber trade generally on the Pacific Coast are very encouraging, according to many representative manufacturers and dealers. Tires are going well, due not only to very favorable climatic conditions, an improved tone in all commercial circles, an increasing influx of tourists bringing their own cars, highway improvement on a continually broadening scale, and last, but not least, more aggressive salesmanship.

Mid-western and eastern tire makers are paying more attention than ever to the coastal territory and are establishing new agencies or strengthening old ones at strategic points near the Pacific and in the big hinterland.

Much relief was felt by the dealers in mechanical rubber goods at the recent settlement of the prolonged trouble in the building trades in San Francisco, where the strikers accepted without reserve a wage cut averaging 7½ per cent. Not only will this mean much directly to rubber men in the Bay City, but indirectly, it is figured, the effect will be very salutary in other big industrial centers on the Coast, which are invariably affected by the strong union labor movements of San Francisco.

Rubber footwear is going strong, wholesale dealers say, and their main anxiety is to get supplies. Their season runs to September 1. Rubber clothing has been in good demand in the northern district, and bathing goods have been selling particularly well in the southern section. Druggists' sundries find a steady sale; various extension plans of hydro-electric and public utility companies have revived dealings noticeably in insulated wire; and trade in reclaimed rubber shows a steady trend with slightly better prices.

SAN FRANCISCO NOTES

Hirsch-Blum Co., 1135 Van Ness avenue, San Francisco, has been appointed northern California distributer of Kenyon cord tires and tubes.

James D. Horan, manager of the Los Angeles branch, was a recent guest of the Pioneer Rubber Mills management in San Francisco. The Pioneer mills, which are in Pittsburg, California, continue to be one of the busiest rubber concerns on the Coast and overtime is the rule rather than the exception in several departments. A particularly good demand is reported for mechanicals, due to much activity in building lines in various Pacific states.

Joseph Tansey, of the Tansey-Crowe Co., 1233 Van Ness avenue, San Francisco, vulcanizer and distributer of Pennsylvania vacuum cup tires, has recently been attending a conference of dealers at the factory at Jeannette, Pennsylvania.

Automobile registration for the state of California for February, March, April and May, 1921, shows a total of 540,339 passenger cars, 30,757 trucks, 2,456 trailers, and 14,427 motorcycles. Figures for the same months in 1920 were 421,982, 29,326, 1,099, and 16,243. This state, like many other sections of the country, therefore had a loss in motorcycles, but had a big gain in other vehicles. Superintendent of the State Motor Vehicle Department, Charles J. Chenu, estimates that California will have 675,000 motor vehicles registered by the end of the year.

LOS ANGELES AND VICINITY

"Buy a spare" is the slogan which the allied California automobile trades associations intend to use to influence the sale of possibly 300,000 more tires in the State. According to a recent checking up of cities in the southern part of the State, less than 46 per cent of the automobiles carry a spare tire and even a smaller percentage have fitments for carrying a "spare."

As there are nearly 600,000 motor cars in California, the tire dealers reckon on about 300,000 possible purchasers of "spares." Should but one-third the amount be purchased, it is remarked that this would be a gain to the rubber trade worth working for and worthy of the emulation of tire makers and dealers throughout the other forty-seven states.

Some concerns handling rubber and rubberized goods are doing extra well. Weinstock & Nichols, Los Angeles agents for the Gould storage battery which utilizes not only hard rubber cells but also rubber-armored (impregnated) wooden separators, report last April business four and a half times that of a year ago and May's total nearly as large as April.

The Maxon Tire Co., Los Angeles County agent for Thermoid tires, is extending its operations, having leased another store at Tenth and South Main streets, Los Angeles.

A. E. Bush has been appointed manager of the Tire Company of California, specializing on Kelly-Springfield tires, at 1201 South Hill street, Los Angeles.

The Keaton Tire & Rubber Co., 1337 South Flower street, Los Angeles, is distributing to dealers a book and chart on rim equipment that is unique and useful.

A. F. Osterloh, vice-president and general manager of the Goodyear Tire & Rubber Company of California, is chairman of the manufacturing committee of the Chamber of Commerce of Los Angeles, which committee, comprising eighteen representative business men of the city, is making elaborate preparations for a Buyers' Week to be held from August 8 to 13, inclusive. The Union Terminal Co. has offered the use of 200,000 square feet of floor space free in its new building on East Seventh street. The committee hopes to have nearly $100,000 available for advertising and for entertaining possible buyers of rubber and many other Los Angeles products.

G. S. Richardson has been licensed in Santa Ana, California, to use the name and method of the Process Rubber Co., 5918 Hollywood Boulevard, Los Angeles, in infusing new life into tires and tubes, a process described at length in The India Rubber World, June 1, 1921.

The Elaterite Varnish & Rubber Co., 55th and Alameda streets, Los Angeles, was chartered July 7, 1919, with capital stock consisting of 2,500,000 shares of stock at $1 par value. Donald H. MacDonald is secretary.

The big brick factory of the United States Compression Inner Tube Co., at Burbank, California, is being hurried to completion, and operations, the directors believe, will be started early in the autumn. The company intends to use this plant to supply the Pacific Coast trade, as its Tulsa, Oklahoma, factory serves the Mid-West, and its Kittanning, Pennsylvania, factory supplies the company's puncture-proof inner tubes and casings to Eastern buyers.

Tire dealers on the Coast remarked a perceptible increase in sales following the recent cut in the price of gasoline from 27 to 25 cents.

W. V. Goar has been appointed to succeed H. C. Edelman, resigned, as manager in charge of sales at the Los Angeles branch of the Pennsylvania Rubber Co., Jeannette, Pennsylvania, with headquarters at 950 South Main street, Los Angeles. He formerly represented the Pennsylvania company in Seattle.

NORTHWESTERN NOTES

Arrangements are being made to resume work at the plant of The Washington Tire & Rubber Co. in Spokane, Washington, which concern has been inactive for several months. It is said that some financial difficulties that troubled the concern have been practically cleared up, and while operations may not be on as large a scale as formerly, it is expected that they will be proportionately more profitable. John B. White, for one year president of the concern, has resigned, and J. L. Bowling, vice-president, takes his place. J. W. Brett has been elected vice-president. H. S. Burdick is still secretary-treasurer. Roy Hayes, of Waverly, Washington, has been chosen as a trustee to take Mr. White's place on the board.

The Sound Rubber Co., Tacoma, Washington, mention of which was made in a recent issue, was incorporated April 19, 1916, under the laws of the State of Washington. Its authorized capitalization is $5,000,000 common and $1,500,000 preferred stock. The officers are: A. J. Ritchie, president and general manager; Morton Gregory, vice-president, and A. E. Braden, secretary-treasurer. The directors include the above and J. L. Carman, E. M. Hayden, S. J. Claridge and Marvin Evans. The company has been manufacturing tires since last September. Its factory is 80 by 260 feet, of solid concrete, and contains approximately 40,000 square feet of floor space. The site comprises about four acres of land, providing room for two additional units of the same size.

The Blekre Tire & Rubber Co., St. Paul, Minnesota, has established Pacific Coast headquarters by appointing as its agent Larry Sullivan, of the Fashion Garage, Tenth and Taylor streets, Portland, Oregon. He will cover six counties in that state and Clarke County, Washington.

The Spreckels "Savage" Tire Co., of San Diego, has opened a warehouse branch in Portland, Oregon. It is located close to "auto row." G. T. Cummings is corporation salesman and Delbert T. Fett handles the dealers. Pacific Coast manager Lester, driving from San Diego, attended the opening of the new depot on Puget Sound for Savage "Aristocrat" cords and fabrics.

SOUTHWESTERN NOTES

The United States Rubber Co. has taken a long lease on a large building at Fifth avenue and West Adams street, Phoenix, Arizona. George W. Miller, the new manager, reports that business is improving despite the reaction in the cotton industry and the long-continued dullness in mining.

A transaction which excited much interest recently was the transfer of the Southwest Cotton Co.'s 15,280 acres of planted land in the Salt River Valley, Arizona, and the company's gins and oil mills at Phoenix, Mesa, Temple, Glendale, Tolleson, Gilbert, Peoria, and Sarival to the Valley Ranch Co., a new corporation headed by Guy P. Nevitt, attorney for the Southwest company. A controlling interest is to be held by the Southwest company, with a remainder available for sale, the old company accepting the new company's notes for $710,000.

The transfer means the liquidation of The Goodyear Tire & Rubber Co.'s interests in cotton properties in Arizona, the Southwest company having represented Goodyear. The value of the property affected is put at $3,250,000, about $2,000,000 being the land value. It is understood that many other crops will be planted as well as cotton. The land is chiefly at Litchfield, a new and model town, twenty miles west of Phoenix in the lower Agua Fria valley.

Another large cotton ranch belonging to the Southwest company at Goodyear, thirty miles southeast of Phoenix, it is said, will be plotted for farmers in order to still further lighten the load of the Goodyear company.

It will not be the fault of ranchers in Perris Valley, Riverside County, California, if rubber manufacturers and others find next season's supply of cotton scanty, for they are disregarding the rule adopted by cotton-growers throughout the Southwest to reduce acreage in view of the big slump in prices, and they are, instead, extending their acreage, so that over 2,000 acres will be planted to cotton this year. Long-staple Durango is favored. One-quarter of the 2,500-acre ranch owned by Secretary of Commerce Herbert C. Hoover, at Wasco, is to be planted to cotton each year. Pima Egyptian is favored by the cabinet officer.

CANADIAN NOTES

JOSEPH STOKES RUBBER CO., LIMITED, BEGINS OPERATIONS

The Joseph Stokes Rubber Co., Limited, has completed its plant at Welland, Ontario, Canada. Representing an investment of $250,000, the plant is the first and only building to be designed, constructed and equipped for the manufacture of hard rubber products in Canada. It is situated on eight acres of land laid out with the future expansion of the plant in mind. The building, constructed of brick, steel and timber, and known as the slow-burning type, is 160 feet long and 60 feet wide with a wing 60 feet wide and 60 feet long, the latter including a vulcanizing room and toilets.

There is, in addition to the factory shown, a boiler room 60 by 60 feet, with a coal pocket and tracks overhead that connect with a siding of the Grand Trunk & Wabash Railroad. The building is triangular in shape with a tower, three stories high, forming the apex, which will be used for transformers and storage tank.

Plant of the Joseph Stokes Rubber Co., Limited, Welland, Ontario, Canada

Since the completion of the buildings, machinery has been installed with the result that the company now has a thoroughly modern plant of which it may well be proud.

While the Joseph Stokes Rubber Co., Limited, is the outgrowth of the Joseph Stokes Rubber Co., Trenton, New Jersey, and has the same officers, its affairs are entirely separate and the concern is operating under a charter granted by the Dominion Government. The plant is at the present time running only at a low capacity, but after additional machinery is installed, several hundred skilled workmen will be given employment.

The Goodyear Tire & Rubber Co. of Canada, Limited, with main office at Toronto, Ontario, has materially improved its condition recently and increased production by 300 tires daily. The company is being reorganized but with practically no changes in the personnel. It is free from bonds, mortgages, and liens, and has no past-due current accounts. It has materially reduced its bank borrowings and maintained full credit with its banks, while it is consistently taking advantage of all discounts. C. H. Carlisle is treasurer and general manager.

The Rubber Trade in Great Britain

By Our Regular Correspondent

The time-worn adage about the necessity of first catching your hare before commencing to cook it seems to have a certain application to such journalists as essay to write about the rubber trade. You have got to find the trade before you begin, and the matter is by no means so simple as it used to be in past days. True, the labor troubles on the score of wages have been temporarily settled, but the coal strike with its benumbing effect upon trade generally is still with us, being now in its eighth week.

It is to be feared that the restricted railway service will have some effect upon the attendance of country visitors to the Rubber Exhibition; another possible malevolent factor is the ill-temper prevalent among the rubber-share-holding public at the new low-level price of *9d.* per pound for the raw commodity coupled with the now customary notification of the passing of dividends, or at the best, the reduction in their amount. It certainly cannot be said that the recent speeches of chairmen of rubber companies have done anything to dispel the existing gloom, though I quite agree that it would be wrong to use optimistic language unless the facts and portents justified it.

TWO THOUSAND NEW USES OF RUBBER

It appears that the award of the adjudicators in the competition promoted by the Rubber Growers' Association with regard to new and extended uses of rubber will not be known in time for the Rubber Exhibition. Not only have the suggestions amounted to somewhere about 2,000, but it has been considered advisable to prove the statement made in many promising cases. This naturally takes time, hence the delay in making the award, and though it is unfortunate as regards the Exhibition, it is obvious that to come to an erroneous conclusion through haste would be more unfortunate still, The Exhibition seems likely to suffer, compared with previous ones, by the abstention of many firms which would doubtless have exhibited in more prosperous times. It is no secret that there is a general tightness of money, as appears also to be the case in America, to say nothing of Poland, and the natural tendency is to incur no unnecessary expenditure. It is now quite common for firms which used to pay their accounts by check to give three months' bills where the cash is much required. Another feature of the current year is the disinclination of rubber firms to renew contracts for chemicals, the prevalent idea being that prices have by no means reached bottom.

EXAMPLES OF DEPRESSION

As typical examples of the depressed condition of affairs, I may note here that, mainly owing to the coal strike, the large Silvertown works closed on April 22, and the directors have stated that under the circumstances they cannot recommend an interim dividend on the ordinary shares; last year it was 2½ per cent, and on the other side of the industry the Malacca Rubber Plantation Co.'s report for 1920 shows a profit of only £18,580 against £182,732 in 1919 and £230,749 in 1916. Instead of the 30 per cent paid last year, even the 7½ per cent cumulative preference dividend has to be passed this year.

THE PEACHEY PROCESS DEMONSTRATION PLANT

Matters have now progressed to an important stage in that a demonstration plant and laboratory have been erected at 380 High Road, Willesden, London, N. W. The plant has been erected by David Bridge Co., Limited, Castleton, Manchester, on the lines of an experimental plant first put up at their own works. With the mixing and calendering arrangements there is no novelty to call for notice, and the method of carrying out the cold vulcanization with the two gases, sulphur dioxide and hydrogen sulphide, is the novelty which arrests attention. This process is the same in principle as that previously shown on the laboratory table except that methods for dealing with the waste gases are necessarily added. The hydrogen sulphide or sulphuretted hydrogen, is made by the ordinary process of acting upon sulphide of iron with sulphuric acid and is stored in a gasometer outside the building, while the sulphur dioxide is purchased in the liquid form in cylinders.

The two units of the vulcanizing plant follow the lines of the steam pan and the dry heat stove. In the case of the pan, the goods to be cured are placed in the pan on a wooden rack. On the pan being closed the air is exhausted and sulphur dioxide admitted for ten minutes. This gas is then blown out and after a further exhaustion the hydrogen sulphide is admitted and allowed to act for thirty minutes. No inconvenience, it is understood, arises from the water produced in the interaction of the gases.

The continuous vulcanizing apparatus on the lines of the dry-heat stove is intended for the cure of fabrics, floor coverings, soling material, etc., containing leather buffings, wood meal, and so on. The chambers are constructed of wood with rollers at top and bottom. The first contains the sulphur dioxide gas, and the second, which is three times as long, the hydrogen sulphide. The materials enter the chambers under tension and between elastic flaps in order to avoid leakage of gases, this being naturally an important matter. It is stated that there is an absorber for the waste gases outside the building; probably there are two absorbers if the lines of ordinary chemical works practice are followed, and subsequent use is to be made of the different sulphur compounds obtained.

Up to now the chemist in the rubber works has been a consultant and an analyst. There is now an opportunity, where the Peachey process is adopted, for him to prove his worth as a process engineer. At any rate, it seems obvious that the process cannot be controlled by the ordinary foreman-vulcanizer of the past, and today, as much will depend upon chemical control of the operations. Doubtless the present year will see many pilgrimages of rubber folk to Willesden to see the plant in operation.

CHESS & STEAD, LIMITED

This company, having got into financial difficulties owing to bad trade and depreciation of stock, decided at a recent meeting of creditors to accept an offer of *6s.8d.* in the pound sterling. The firm is an amalgamation of Stead-Hunt and Chess-Brand with works at Brimscombe, Gloucestershire, and Middleton, Lancashire. T. H. Roberts, formerly the chief proprietor of Wood-Milne, Limited, is a director and the Middleton works were started under his auspices to make reclaimed rubber. The claims made for this product seem to have left the rubber manufacturers cold and the business was later turned over to rubber soles and heels, etc. Owing to the occurrence of a fire at the Brimscombe works and the destruction of the papers and books, the exact position of affairs cannot be ascertained. No doubt the concern will pull around after the slump in conjunction with others who have found themselves in a tight corner.

NORTH KENT RUBBER CO.

The affairs of the North Kent Rubber Co. of London have been considered by a meeting of creditors. This is another instance of a one-man affair started with a small capital in pre-war days and developed into a prosperous concern under war

conditions, subsequently, however, getting into difficulties with the coming of the slump in trade. The proprietor, Charles Russell, has obtained the assistance of friends who will pay a sum equal to about 5s. in the pound sterling. The estate will be dealt with under a deed of assignment, a committee of inspection having been appointed. It is noteworthy that the largest creditors are Chess & Stead, Limited, for £2,196.

FINANCIAL RESULTS

The fortieth annual general meeting of Siemens Bros. & Co., Limited, showed that the results for 1920 were quite satisfactory, as has been the case with the other cable-making concerns, the general business slump having left them unaffected. The net profit was £253,254, against £211,209 for 1919, and the dividend remains at 10 per cent free of tax. With regard to the proposed increase of capital and bonus distribution the chairman said that the whole of the authorized ordinary share capital of £1,500,000 was issued and fully paid up, and any addition was to be avoided if new capital could be issued on another basis and it was proposed to issue one million 10 per cent cumulative preference shares. It was further stated that to put the old shareholders on something like an equal footing with the new ones they would receive a bonus distribution of one new preference share for every five ordinary shares held. With regard to submarine cable, the principal feature of the Woolwich works, it was stated that the output in 1920 exceeded that of 1919 and in this, as in the other branches of the business, such as electrical apparatus, the business in hand was such as to enable a prophecy of a 10 per cent dividend for the current year.

Johnson & Phillips, Limited, another firm of electric cable manufacturers, has declared a dividend of 12½ per cent, the same as for 1919, the profit being £98,405 against £90,000 for the previous year.

The report of Bell's United Asbestos Co., Limited, a combination of Bell's Asbestos Co. and the United Asbestos Co., shows a net profit of £64,670 and enables 12½ per cent to be paid on the ordinary shares in addition to the preference dividend. The addition to the works at Harefield, Middlesex, for making the new Hurcan building slabs has recently come into operation, but owing to the high costs of labor and materials, the report does not speak too optimistically of the immediate future. The only important competitor of the company in this country is Turner Brothers Asbestos Co., Limited, which, in addition to its Rockdale premises, has large works in Trafford Park, Manchester, for the manufacture of building slabs and similar material.

THE EARL OF SHREWSBURY AND TALBOT

The Earl of Shrewsbury and Talbot, who died recently, was known in the rubber trade not so much by reason of being the premier Earl in the British peerage, but on account of his connection with the Shrewsbury & Challiner Tyre Co., of Ardwick, Manchester, now a subsidiary company under the control of Chas. Macintosh & Co., Limited. The fitting of hansom cabs in London and Paris with solid rubber tires was due to his initiative and he was prominent in the foundation of the company mentioned above, though he cannot be considered a rubber man in the sense that Lords Colwyn and Grinerton are.

SELENIUM OXYCHLORIDE

The importance of this body as a new solvent appears to have been amply demonstrated by Dr. Victor Lenher, professor of chemistry at the University of Wisconsin. It appears to dissolve bodies like enamel, bakelite, hard resins, etc., which have proved resistant to all the known solvents. Further than this, the press notice refers to it as a good solvent for rubber. One rubber firm informed me that they understood that the new solvent would entirely replace solvent naphtha. There are plenty of solvents for rubber, but comparatively few of them are likely to be used on a large scale in the industry for some reason or other, such as prices, toxicity, mineral content, etc. Although I am not in a position to speak authoritatively in the matter, I imagine that though selenium oxychloride may prove to be useful in the rubber trade, it will not be in the way of replacing solvent naphtha.

CAPTAIN BUCKLETON HONORED

The following modest item appears in a Liverpool (England) paper:

"The King of the Belgians has bestowed upon Captain Ernest Edward Buckleton, of 8, Croxteth Road, Liverpool, the Palmes en Argent de l'Ordre de la Couronne, in recognition of services rendered to the Belgian cause during the war.

Captain E. E. Buckleton

This honor, to be made a Knight of the Belgian Empire, is well deserved. It will be recalled that this well-known Anglo-American rubber man, in the early days of the Great War, opened his home to some 75 destitute Belgians and through his efforts among friends here and in Europe, cared for hundreds more. Belgium has not forgotten, nor should we, who appreciate such broad-minded, self-sacrificing helpfulness.

FIFTH INTERNATIONAL RUBBER EXHIBITION

The Fifth International Rubber Exhibition was opened at Agricultural Hall, Islington, London, June 3, at noon, by Sir Owen Philipps, G. C. M. G., M. P., the president, supported by most of the prominent members of the rubber industry.

The exhibition is thoroughly representative of all sections of the rubber industry, from the tree to the completed article. All the rubber-producing countries are represented and some new ideas with regard to new uses of rubber are in evidence.

The conferences promise to be of unusual importance and interesting papers will be read. A large number of competitions for valuable trophies have been announced. There will be frequent displays of moving pictures of scenes in rubber-producing and other tropical districts and instructive demonstrations in the factories.

A detailed report of the exhibition, which closes June 17, will appear in The India Rubber World, August 1, 1921.

THE RUBBER TRADE OF FRANCE IN 1920

IMPORTS

Recent official statistics for the trade of France during 1920 show that on the whole imports decreased. This holds good for the rubber industry too, in almost every department of which the figures for 1920 imports are lower than during 1919; in some cases considerably so. Thus, imports of crude rubber were 272,350 quintals (220.46 pounds), value 215,701,000 francs ($14,-875,931), in 1920, as against 307,347 quintals, value 243,419,000 francs ($33,344,921), in 1919. The figures for 1913 were 174,410 quintals, value 122,783,000 francs ($23,697,119).

Manufactures of rubber totaled 96,348 quintals, value 249,097,000 francs ($17,192,897), in 1920; 138,444 quintals, value 362,999,000 francs ($49,725,890), in 1919, and 33,260 quintals, value 44,386,000 francs ($8,566,498), in 1913. In manufactures, the most notable decreases were in rubber thread: 2,371 quintals, value 8,536,000

francs, in 1920, against 4,513 quintals, value 16,247,000 francs, the year before; rubberized clothing: only 776 quintals, value 5,044,000 francs, in 1920, as compared with 3,508 quintals, value 22,802,000 francs, in 1919; rubber footwear: 4,725 quintals, value 8,505,000 francs, in 1920, and 6,120 quintals, value 11,016,000 francs, in 1919; tires, tubes, covers: 49,153 quintals, value 132,713,000 francs, and 80,553 quintals, value 217,493,000 francs, in 1920 and 1919, respectively.

EXPORTS

Exports of crude rubber and gutta percha amounted to 106,994 quintals, value 84,739,000 francs ($5,844,069), in 1920; 103,150 quintals, value 81,695,000 francs ($11,191,096), in 1919 and 166,870 quintals, value 75,537,000 francs ($14,578,641), in 1913.

The totals for manufactured goods during the same years were: 187,849 quintals, value 462,309,000 francs ($31,883,380); 111,597 quintals, value 273,941,000 francs ($37,525,890); and 69,300 quintals, value 100,288,000 francs ($19,355,584). There was a noteworthy increase in the exports of footwear which jumped from 1,148 quintals, value 1,952,000 francs, in 1919 to 15,479 quintals, value 26,314,000 francs. Figures for rubber clothing nearly doubled in 1920, being 5,018 quintals, value 29,004,000 francs, against 2,559 quintals, value 14,790,000 francs, the year before. Exports of tires, tubes, covers, increased from 85,138 quintals, value 217,101,000 francs in 1919, to 138,645 quintals, value 353,545,000 francs the following year

TRADE DISTRIBUTION

The share of different countries in this trade during 1920 was as follows: Great Britain exported crude rubber valued at 126,435,000 francs ($8,719,655), manufactures to a value of 160,873,000 francs ($11,094,690); United States came next with manufactures totaling 59,422,000 francs, ($4,098,069); Belgium sent crude rubber to a value of 2,175,000 francs ($150,000) and manufactured rubber valued at 10,535,000 francs ($726,552). In exchange France sent to Great Britain manufactures amounting to 82,147,000 francs ($5,665,310) and crude rubber for 21,931,000 francs ($1,512,483); United States took crude rubber worth 19,337,000 francs ($1,333,586); exports to Germany were 19,251,000 francs ($1,327,655) worth of manufactures and crude rubber valued at 13,886,000 francs ($957,655); to Switzerland went manufactures amounting to 33,151,000 francs ($2,286,276) and to Belgium, manufactures and crude rubber valued at 58,236,000 francs ($4,016,276) and 7,042,000 francs ($485,655) respectively. As will be noted trade with Germany is beginning to assume sizable proportions.

According to statistics issued by the Ministry of Labor, based on the inspection of factories situated in different regions of France, there were in pre-war days 524 rubber and paper factories employing 41,909 workers, male and female. In August, 1914, this number had decreased to 287 factories employing only 19,107 hands; however, in October, 1920, it was found that there were 504 factories employing 47,365 persons.

THE RUBBER TRADE IN EUROPE

By Our Regular Correspondent

FRANCE

The Société Industrielle des Téléphones not only manufactures electrical articles, but also rubberized fabrics, pneumatic tires, electric apparatus, etc. Before the war, profits were between 2,600,000 francs and 2,800,000 francs. During the last years, however, the figures showed considerable fluctuations. In 1914 net profits rose from 1,792,000 francs to 5,103,000 francs in 1916 and 8,831,000 francs in 1917. In 1918, they dropped to 6,670,000 francs, then to 5,000,000 in 1919 and to 4,120,000 francs in 1920. During the same time the dividends rose from 15 francs per share to 30 and then 40 francs.

For the last two years the dividends were 35 francs. In general, the company has not exactly spent money freely and at last the directors have decided to renew the equipment in use since the foundation of the firm in 1893. For this purpose, the capital is to be increased from 18 to 36 million francs.

The Etablissements Industriels E. C. et A. Grammont has placed on the market 32,000 "B" shares. Up to the present only 28,000 "A" shares have been negotiated. This company has a capital of 30,000,000 francs, and factories at Lyon, in the Isère and in the Var, where it manufactures wires and cables for telegraph and telephone, submarine cables, and all kinds of electrical goods and apparatus. It has wire-drawing establishments and also produces rubber goods, particularly tires, tubes, belting, etc.

The company has progressed during the last few years. Before the war business amounting to 20,000,000 was reported, but in the latest report, that of 1919-1920, transactions amounted to over 100,000,000 francs, and this in spite of the increased costs of labor, materials and coal. The gross profits were 17,478,000 francs and the net proceeds were 2,055,000 francs. The dividend was fixed at 50 francs per share. The reserves exceed 78,000,000 against liabilities of 47,000,000.

The Société Repneu of 1 bis, rue Trayon, Paris, is in voluntary liquidation.

The Société Française du Caoutchouc d'Oullins has been formed at Lyon with a capital of 3,000,000 francs. The firm will engage in the manufacture and sale of rubber goods and similar products.

It is learned that the Société de Pontoux et Cie. has been changed into the Société Le Caoutchouc Industrial, with a capital of 800,000 francs and offices at Rue Saint-Régis (Belle-de-Mai), Marseilles.

GERMANY

A correspondent relates, in the *Gummi-Zeitung*, his experience concerning the rubber goods trade in the occupied parts of Germany. He states that foreign salesmen are taking the place of Germans. It seems that they are mostly Belgians, some French, but very few English or Americans, who offer local merchants all kinds of rubber goods at prices below those quoted by German manufacturers in unoccupied Germany. The terms of the foreigners are severe, but in spite of this they succeed in capturing the orders. Patriotism is not proof against lower prices, and on both sides of the Rhine there is a demand for foreign goods. The most important German firms stock quantities of French, Belgian, English and American rubber goods. In Frankfort-on-the-Main, goods are advertised or offered for sale under French names; thus, sticking plasters have become "emplâtre caoutchoutée," nipples, "tétines," etc.

Of course, the presence of foreign troops necessitates the carrying of foreign goods and the using of foreign terms. Nevertheless, the correspondent is much exercised over what he has found and sees in everything a sign of the Allies' determination to ruin Germany's trade and even to win over to themselves the occupied territories.

Rubber goods may now be exported freely from Germany without the export permits that were formerly required. It is said that this measure is a direct result of the "Sanctions" of the Entente which created a very difficult economic situation here.

A new rubber article has appeared in the shape of suspenders made entirely of red rubber with the exception of the strap-loops. At first they were made from auto-tire waste, but the pieces thus obtained were not always long or wide enough, and now producers of these suspenders buy sheets of smooth red rubber about 0.7-meter (one meter equals about 39 inches), wide and 2 millimeters thick, from which strips of the necessary size are cut. It seems that the new suspender is meeting with a good demand and can compete with the usual kind of suspender as far as price is concerned.

Richard Werner, of Werner & Pfleiderer, Cannstatt-Stuttgart, received from the political science faculty of the University Tubingen the degree of Doctor of Poltical Science.

On April 23, Moritz Wolf, one of the founders and owners of the firm of Bernhard, Wolf & Co., died at Frankfort-on-the-Main at the age of 69 years. The deceased was well-known and popular in the rubber industry and had traveled considerably outside of Germany. He was on the board of the Zentral-Verbandes des Chirurgischen Gummiwarenhandels Deutschlands E. V., the central association for the surgical rubber goods trade of Germany..

The founder of the Mitteldeutsche Gummiwarenfabrik, formerly Louis Peter, died recently at Frankfort-on-theMain, at the advanced age of 81 years. In 1872 he founded this company and devoted himself to it with such energy that it steadily grew in importance and extent. In 1905 he changed the concern to a stock company. His ceaseless striving in behalf of the rubber industry was rewarded with the title "Kommerzienrat" (Commercial Advisor).

COMPANY REPORTS

The Mitteldeutsche Gummiwarenfabrik, formerly Louis Peter, has decided to increase its capital stock to 30,000,000 marks. The increased capital is made necessary by new heavy expenditures. It is also considered advisable to make use of the present conditions in the capital market which are still favorable.

The annual report of the Asbestund Gummiwerke Alfred Calmon, Akt.-Ges., Hamburg, shows net profits for the year 1920 of 1,713,529.89 marks. A dividend of 15 per cent was declared. It was proposed to double the capital and bring it to a total of 20,000,000 marks. This increase is called for by expansion of the business and plans to reopen two asbestos departments and to take up again the manufacture of gymnastic and sporting shoes with rubber soles. This company began its activities in 1886 as a private company for the manufacture of asbestos and rubber goods. In 1896 it was incorporated, the capital being 1,500,000 marks. It is thus exactly 25 years since the company took on its present form and on the occasion of this anniversary, it was proposed to set aside the sum of 1,000,000 marks for the benefit of employes who had distinguished themselves by long and faithful service.

The Hackethal- Draht- und Kabelwerke, A.-G., Hanover, reports net profits of 4,878,578 marks for the year 1920. A dividend of 20 per cent was declared.

Aktiengesellschaft Metzeler & Co. has decided to raise its capital by 4,000,000 marks, by issuing 4,000 six per cent preferential shares. The capital of the company now consists of 8,000,000 original, and 4,000,000 preferential shares.

The Leipziger Gummiwarenfabrik, Aktiengesellschaft, formerly Julius Marx Heine & Co., reports that, on the whole, 1920 was satisfactory. Net profits were 327,976.33 marks and a dividend of 15 per cent was declared.

The Hannoversche Gummiwerke Excelsior, A-G., Hanover Limmer, experienced a huge demand for its goods in 1920. However, owing to the coal situation, all demands could not be fulfilled. The net profits for the year amounted to 4,356,582.95 marks. A dividend of 30 per cent plus five per cent bonus was declared to shareholders, and 1,356,582 marks were reserved for employes.

NEW FIRMS

Vulkan Gummiwaren-Handelsgesellschaft m. b. H., Hattingen; manufacture and sale of all kinds of rubber goods.

Fritz Willnow Gummi- und Asbestfabrikate, Charlottenburg.

Elastic, Süddeutsche Gummi-Industrie und Auto-bedarf-Handelsgesellschaft m. b. H.; manufacture and sale of all kinds of rubber goods, sale of automobiles, bicycles and accessories.

Offenbacher Gummiwerke Karl Stoeckicht Aktiengesellschaft, Offenbach (Main). This concern will continue the business known as Offenbacher Gummiwerke Karl Stoeckicht in Offenbach-on-Main and will manufacture and sell all kinds of rubber goods. The capital is 8,000,000 marks.

Gummikon, G. m. b. H., Klosterstrasse 70, Berlin C. 2; manufacture and sale of all kinds of rubber goods.

Norddeutsche Sportball-Fabrikation, G. m. b. H., Berlin; manufacture of sport balls and other sporting goods.

Calorifix, Dr. Freund & Co., Dresden; manufacture of rubber and asbestos goods, also technical goods.

P. Sauset, Kommanditgesellschaft in Nürnberg, 7 Wohlgemutstrasse, Nürnberg; manufacture of belting. Main offices are in Bonn.

Maschinenfabrik Atlanticwerk, G. m. b. H., Niederwalluf; manufacture and sale of all kinds of technical goods.

Gummigesellschaft Futura G. m. b. H., Hanover; manufacture and sale of "Futura" rubber heels and soles.

FINLAND'S FOREIGN TRADE

Official statistics for 1920 show that despite the unfavorable times trade in rubber was fairly satisfactory. Among the imports were crude rubber, gutta percha, balata: 233,183 kilos, value 4,443,000 finmarks (finmark=$0.193 [normal]); belting: 159,855 kilos, value 10,322,000 finmarks; automobile tires and bicycle pedals: 350,628 kilos, value 19,956,000 finmarks; rubber shoes: 294,191 kilos, value 14,323,000 finmarks; other rubber goods 18,109 kilos, value 1,123,000 finmarks.

FOREIGN TARIFFS

SPAIN

In the recent revision of the Spanish Customs Tariff, which went into effect May 21, 1921, certain articles are mentioned which are of interest to the rubber industry. It should be noted that duties on many articles were, last November, considerably increased. By the new law certain other classes have been reduced to the level of 100 per cent over the tariff of 1912. This new list includes tire covers and inner tubes of rubber, waterproof clothing of rubber; toys and games.

The duties imposed last November have been increased so that solid rubber tires with metallic mounting are now 100 per cent higher than the tariff of 1912.

Articles	New Rate, Pesetas Per Kilo	Old Minimum Rate, Pesetas Per Kilo
Rubber hose, pipes, sheets, etc.	5.20	1.30
Rubber belting, packing, etc.	8.00	2.00
Solid rubber tires with metallic mounting	4.80	1.20
Pneumatic tires	10.80	2.70
Rubber elastics	10.80	2.70
Rubber waterproof fabrics	14.80	3.60
Rubber clothing	19.60	5.60

GERMANY

A recent proclamation, as stated in the *Deutsche Reichsanzeiger* of May 4, requires that certain goods, whether of foreign or German origin, must be provided with, on importation from the occupied German territory into unoccupied Germany, an entry permit. Among the list of goods requiring this entry permit the following are noted: india rubber tubes for tires of vehicles and cycles; covers for the same of textile goods impregnated or coated with rubber; box and cord packing of textile goods in combination with rubber; asbestos paper and board; asbestos thread, cord and twine; asbetos tissues (except rubberized asbestos tissues); other unspecified wares of asbestos, or rubberized asbestos tissues.

LATVIA

In Latvia export restrictions on certain articles have been considerably relaxed, and a special license from the Ministry of Trade and Industry is now no longer necessary where goods are to be

exported. Rubber goods are among the various articles mentioned which are exempt.

MEXICO

A customs office has been established at Guadalajara, Mexico, in connection with the parcel post division of the post office. Parcels forwarded to Guadalajara by express or freight will, as heretofore, be subject to clearance at other ports of entry.

A Presidential decree, dated March 28, and quoted in the *Diario Oficial* (Mexico) of April 23, has the following modification of import duties among its items:

Articles	Rate of Duty Pesos Per Kilo	Cents, Gross
Rubber tires for passenger motor cars	1	50
Rubber tires for motor vehicles for carrying goods	0	75

THE RUBBER TRADE IN THE FAR EAST

By Our Regular Correspondent

CEYLON

Comparative statistics to hand would show that rubber restriction in Ceylon has been anything but a success. In spite of the fact that a large percentage of London and Ceylon-controlled estates voted in favor of the 25 per cent restriction which was to take effect from November 1, 1920, exports of rubber from this colony since January 1, 1921, are considerably higher than they were during the same period of 1920.

Thus the total exports of rubber from Ceylon to all countries from January 1 to April 11, 1921, amounted to 25,966,223 pounds, against 22,235,004 pounds during the corresponding period of 1920. That is to say that in 14 weeks Ceylon exported 3,731,219 pounds of rubber more than during the same period of the year before. At this rate, the total exports for 1921 would exceed those for 1920 by over 10,500,000 pounds.

It is realized that increases have been par''y due to the clearance of part of the heavy stocks at Colombo. However, the stocks still on hand indicate that there must be ' other reason for the heavy exports.

Some time ago, there was a feeling he. among many authorities that the Government should enforce restriction by 50 per cent on the lines suggested by Malaya. Now, however, since the Colonial Secretary has definitely refused to enforce restriction in Malaya, nothing will come of such a plan anywhere. It seems, therefore, that there will not be much of any kind of restriction here or elsewhere.

At a recent meeting of the Kelani Valley Planters' Association, a motion was made that the parent association be asked to urge the abolition of the rubber export tax. While it is recognized that the present condition in the rubber industry makes the tax a very heavy burden, the removal of which would aid planters considerably, it is realized that the financial stress of the Ceylon Government is a serious obstacle in the way of the abolition of the tax. However, the local press is not in favor of retention of the tax for, as the *Weekly Times of Ceylon* puts it, "the Ceylon rubber industry is at present too much of a broken reed for the Government to lean upon it with much advantage in its condition of financial exhaustion."

Trade between Ceylon and Germany is steadily reviving. Direct shipments this year have been large and it is believed that considerable quantities of Ceylon goods have gone to Germany through Holland. Up to the middle of April the amount of rubber exported direct to Germany was 1,339,959 pounds or nearly 600 tons.

Freight rates from Ceylon to the United Kingdom, for general cargo, including rubber, have been reduced to 65*s*. per 50 cubic feet. This reduction represents a fall of 35*s*. in the case of rubber.

MALAYA

It is now known that the Secretary of State for the Colonies, Winston Churchill, has definitely refused to legislate for compulsory restriction. In a telegram to the High Commissioner of the Federated Malay States he says: "There is no assurance that producers in other countries would be submitted to similar restriction so that they may benefit at the expense of producers in Malaya perhaps permanently. Conditions must be allowed to right themselves."

This has caused great disappointment among advocates of restriction, though it cannot be said that local producers were wholly unprepared for the decision. In fact, for at least a month it was openly said that the scheme would probably not go through and the question of what should be done has been widely discussed in the papers here. Correspondence reveals that people are awakening to the fact that there is a need for unity among planters; a definite policy regarding the planting of new areas, regulation of output, fixing of remunerative prices, knowledge regarding rubber stocks and world requirements.

As the knowledge has grown that the Government would and could do very little in the situation, the feeling that the industry must take care of itself has become stronger. There are still voices in favor of some form of government assistance—financial, for instance. On the whole, however, it seems that the majority are in favor of some scheme of self-help. The *Straits Times* has devoted several lengthy articles to the spreading and strengthening of this idea and has supported its views by quoting the examples of the recent action taken by the Copper Export Association in America and the methods of the California fruit growers.

In the rubber supplement of May 6 of its weekly issue, *The Straits Budget*, the *Straits Times* gives some points in a scheme of self-help. The idea is to ask the Government to grant to a body regularly constituted, and fully representative of the rubber industry, the exclusive right of exporting rubber from the ports. Armed with this right, the industry could introduce an effective system of control over output, varying the degree of restriction from time to time as conditions required. This Rubber Control Board would see to it that reliable records were obtained regarding supply, demand and price. It would maintain experimental and research work on behalf of the industry generally; ascertain annually the "full capacity output" of all estates and determine what percentage could be profitably put on the market, and issue export certificates for the authorized output of each estate.

One thing has been fully realized by most people, that unless some kind of restriction or control of rubber output is resorted to, it will take years—some say at least five—before the situation will be appreciably improved.

Some interesting statements made by the well-known Teluk Anson, planter, Maurice Maude who recently revisited Malaya, may be quoted. He is in favor of restriction and recommends alternate day tapping. He is one of those that believe that the cost of production could and should be reduced. In his opinion, 1*s*. 6*d*. a pound for rubber would be a very good business proposition for all first-class companies. Finally, he condemns the waste of time and money in the manufacture of so-called fancy rubber like pale crêpe, smoked sheet, etc. The aim should be, not to try to please the broker's eye, but to produce blocks of rubber that will require less time and expense in making.

COMPARISON OF RUBBER IN BURMA AND MALAYA

In a report on rubber in Burma, H. C. Pinching, A. R. C. S., mycologist and senior scientific officer of the Rubber Growers' Association in Malaya, states that the average growth of the trees, age for age, in Lower Burma, is inferior to the average growth of trees in Malaya or Sumatra, but superior to that of trees in-

Ceylon. This inferiority of the growth of trees in Burma to that of the Malayan trees, decreases toward the South. In many places in the Mergui and Tenasserine districts the average growth of the trees was only slightly, if at all inferior to that of Malaya. The difference in the rate of growth in Burma is attributed to the climatic conditions there, which are less favorable than in Malaya. In Malaya the rainfalls are more or less evenly distributed throughout the year but in Burma there is a wet and a dry season and in the North less than 10 per cent of the annual rainfall occurs during the five dry months, leaving 90 per cent to fall during the period June to November.

Mr. Pinching found that planters in Burma took great interest in the agricultural side of rubber producing, in contrast with Malayan planters who have not given this side of the matter the attention it deserves.

Burma estates were found to be well-kept, every care being expended in keeping trees in a healthy condition. Owing to the care taken to keep the land free from jungle timber and jungle stumps, very few trees were found to be affected with root diseases like those caused by *Fomes lignosus*, *Ustulina zonata*, etc. In this matter of clean clearing Burma estates are far ahead of Malayan estates, where considerable trouble has been caused by root diseases, groups of over 100 trees having been killed off by *Fomes lignosus*.

The principal diseases met with in Lower Burma were those due to different species of *Phytophthora*, as: black stripe canker, abnormal leaf-fall, pod disease, patch canker, pink disease, die-back, *Ustulina zonata* (not affecting the roots, however), and a few cases of brown bast were also observed.

The average yields in Lower Burma are lower than the yields from Malayan estates, which is partly due to the fact that from six weeks to two months of tapping is lost during the Southwest monsoon every year. A fair average estimated yield from Burma trees according to age is:

Age years	Pounds per acre	
4—5	50	(October to December only)
5—6	150	
6—7	180	(October to December only)
7—8	230	(October to December only)
8—9	300	(October to December only)
9—10	350	
10—11	400	

Factories and general establishments of Burma estates were up-to-date and well-cared for. Labor is plentiful, rice cheap and abundant, so that estates suffered no loss on this head.

According to Mr. Pinching, Lower Burma should be as successful a rubber-growing country as Malaya. Although present-day yields do not equal those of Malaya, he believes that they can in time approximate if not equal those yields.

The conditions for tenure of rubber lands are easier in Burma than in Malaya and these with the better labor conditions in Burma should put that country in a very favorable position as a rubber producer. Unfortunately the rate of exchange and the cost of freights on rubber have been detrimental to the rubber planting industry during the last few years. But, naturally, these are matters beyond the control of the rubber industry.

RUBBER ROAD EXPERIMENT

The first experimental portion of rubber road was recently laid down in Singapore. It consists of a small sample, three yards by twelve, and is located at the approach to a weighbridge, over which heavy granite-laden larries leave the yard, and a record of the traffic which these will carry over the rubber will be available in due course of time.

THE NETHERLANDS EAST INDIES

The effects of the present depression in the rubber industry are being felt more and more, particularly in Sumatra where costs are a good deal higher than in Java. It is reported that the number of discharged European planters' assistants in Sumatra's east coast already amount to over 60. Some have received free passage to Europe plus four months' salary, while the majority were not provided with free passage and received only the usual six weeks' salary. Most of these are still in Sumatra, while some have gone to Java and to the Straits to try their luck there. Complaint has been made that whereas the Government in the British rubber producing colonies is helping European unemployed, the local government is taking no action at all.

Where assistants have not been discharged salaries have been decreased. Three companies—the Anglo-Dutch Estates Agency, Limited, Harrisons & Crosfield, and the Marihat Sumatra Plantagen Cie., are known to have reduced salaries to pre-war levels plus 100 gilders to meet the present high cost of living.

Reports have it that the firms on the west coast of Sumatra in Tapanoeli have decided to decrease salaries temporarily by one-third.

Coolie wages are also being cut and hundreds of coolies have been discharged and repatriated to Java.

Up to the present nothing definite has been done here regarding restrictions of output, but it is said that Sumatra planters are beginning to think seriously of restriction and not only of 25 per cent, but 50 per cent.

In Java a note of optimism persists. Of course, it is realized that the crisis is practically only just beginning and that it may last a considerable time.

Rubber experts advise producers to keep calm and rightly consider that the controlling of panicky feelings and actions is the only way to help in getting out of the present dismal situation. Proper attention to lands is urged and it is advised to plant some harmless growth on lands that have to be temporarily abandoned.

The consoling factors here are the efficient experiment stations and the cost of production. Regarding the first it is interesting to quote what Dr. A. W. Nanninga of Deventer has to say. He was sent by the Minister of Agriculture, Industry and Commerce on a study tour to Malaya, Java and Sumatra. In his report to the Minister on his return, recently, he said that while both the experiment stations and the plantations of Sumatra and Java are hard at work trying to solve the many problems connected with the planting and preparation of rubber, very little is done in these respects in Malaya, and, he concluded—the Malayan rubber industry may result as did the cinchona industry. This industry is flourishing in Java but could not develop in India where the land was just as suitable for cinchona as in the first-named country.

As to costs of production, at present Java and Ceylon produce at a lower cost than other rubber-producing centers and the two islands together produce only about 100,000 tons of rubber. Consequently both Java and Ceylon can sell at some profit so long as they can manage to keep costs under selling prices, and a good many estates in these places can do that even at prevailing rates.

JAVA NOTES

From March 10, the freight rate for rubber was reduced to 27.50 gilders per cubic meter or 82.50 gilders per 1,800 kilos.

It is reported that Mr. and Mrs. Alberto Pirelli are in Java inspecting the rubber plantations belonging to the Pirelli firm. On their way, the couple stayed in Malaya for a few days to inspect the Johore estates. It seems that the Italian Pirelli company has increased its capital to 100 million lire and intends to form a dollar company in Singapore to supply the factories with raw materials and also to facilitate the organizing of the sale of their tires, cables and other goods in the Far East.

The Second Netherlands East Indian Industrial Fair is to be held at Bandoeng, Java, from September 19 to October 9, 1921. According to reports by the committee, the great support given by the local government, public institutions, industrials, and merchants, promises that this fair will be a great success.

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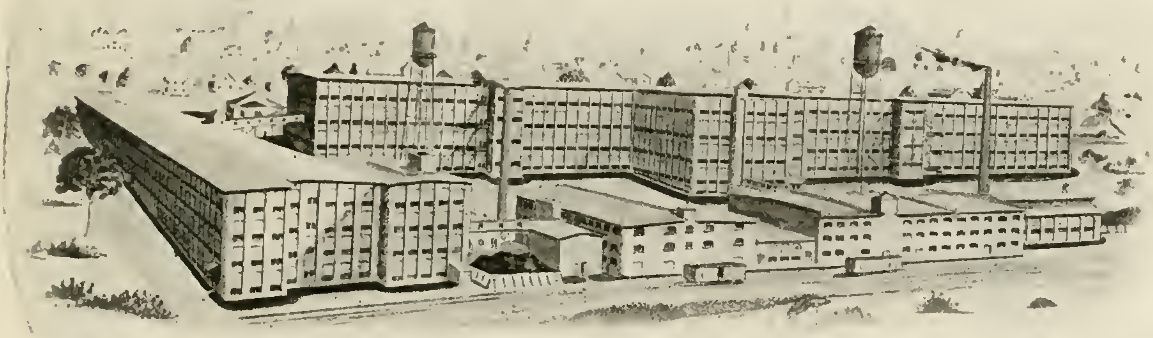

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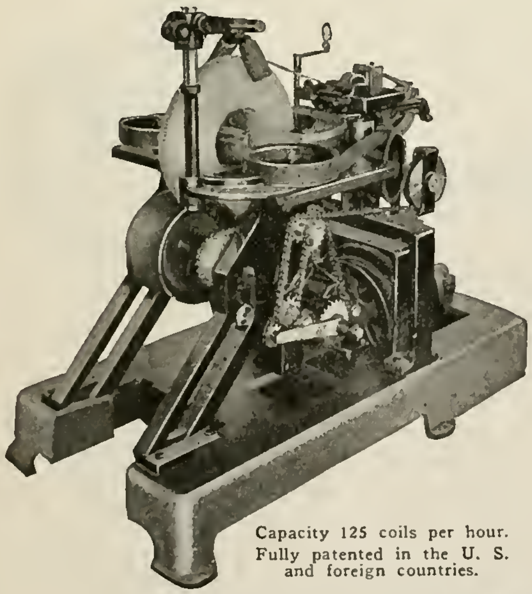

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Recent Patents Relating to Rubber

THE UNITED STATES

GRANTED MAY 3, 1921

No. 1,376,404 Demountable rim for tires. A. L. Cole, Auburndale, Mass.

1,376,750 Hose-supporter. C. W. Egerton and J. W. Hanf—both of Brooklyn, N. Y.

1,376,778 Tennis ball having hollow rubber center with a fabric cover applied directly to the rubber and having depressions molded in surface. W. J. Orr, Chicopee, Mass., assignor to A. G. Spalding & Bros., Jersey City, N. J.

1,376,783 Sanitary protector. C. Schoen, Scranton, Pa.

1,376,868 Tire-valve for truck tires. L. O. Gibson, Rawlins, Wyo.

1,376,965 Rubber heel. F. Nerger, Chicago, Ill.

1,376,968 Multiple tire valve. J. A. Overlander, New York, N. Y.

1,376,970 Pad for attaching valves to tires. A. T. Pickens, St. Louis, Mo.

1,377,011 Elastic tire. K. Fukuda, Tokio, Japan.

1,377,031 Hose-supporter. R. M. Silva, Brooklyn, N. Y.

1,377,079 Demountable rim for tires. W. F. Laing, Cumberland, Md.

1,377,098 Tire-boot. M. C. Seymour, Hesperia, Mich.

1,377,162 Disk wheel for pneumatic tires. G. H. Forsyth, Chicago, Ill.

REISSUES

15,099 Tire-wrapping machine folder. W. C. Stevens, Akron, Ohio, assignor to Pierce Wrapping Machine Co., Chicago, Ill. (Original patent No. 1,196,044, dated August 29, 1916. Divided: original patent No. 1,243,357, dated October 16, 1917.)

GRANTED MAY 10, 1921

1,377,170 Emergency tire. W. F. Aichele, Good Ground, N. Y.

1,377,173 Demountable tire rim. L. D. Allen, assignor of two-fifths to W. E. Allen—both of San Francisco, Calif.

1,377,260 Truss having pad and belt lining of sponge rubber. J. N. McCay, Watts, Calif.

1,377,283 Tire tread. F. G. Schenuit, Baltimore, Md.

1,377,353 Cushion wheel. W. B. Kerrick, Los Angeles, Calif.

1,377,354 Cushion wheel. W. B. Kerrick, Los Angeles, Calif.

1,377,375 Combination pneumatic tire casing. J. Velcio, assignor of one-third to C. A. Harpman—both of Youngstown, O.

1,377,466 Inflatable display form. R. H. Cowley, Salt Lake City, Utah

1,377,596 Combined tire valve and pressure indicator. J. Many, New York, N. Y.

1,377,614 Corset with elastic inserts. V. Buchanan, New York, N. Y.

1,377,627 Vehicle tire. C. S. Preston, San Diego, Calif.

1,377,642 Rotary rubber heel. A. Twarogowski and S. Klosinski—both of Detroit, Mich.

1,377,683 Bed pad with water-proof casing. W. M. Henes, Amherst O.

1,377,771 Demountable rim for tires. J. B. Harris, Cleveland, O.

1,377,782 Pneumatic tire. T. Mori, New York, N. Y.

1,377,903 Garter. R. A. Manny and J. A. Rielly—both of Brooklyn, N. Y.

1,377,910 Detachable rainproof top for baby carriages. W. R. Munson, Sharon, Pa.

1,377,924 Observation kite-balloon. E. Prassone and L. Avorio—both of Rome, Italy.

GRANTED MAY 17, 1921

1,378,025 Wheel with rim having centrally disposed tire cushion made up of segments of rubber cushion supported on metal plates. E. E. Hans, Kalamazoo, Mich.

1,378,081 Sleeve protector. B. Yaeger, Columbia Heights, Minn.

1,378,148 Tread for tires. G. W. Taylor, Everett, Mass.

1,378,234 Airplane shock absorber. J. T. Hughes, Council Bluffs, Ia.

1,378,243 Window cleaner. L. S. Kracke, Chicago, Ill.

1,378,273 Life-saving apparatus. G. Picco, New York, N. Y.

1,378,313 Tire construction. W. F. Beasley, Plymouth, N. C.

1,378,315 Tire core. W. A. Black, Rocky Ford, Colo.

1,378,331 Automobile tire. W. J. Davis and J. Hammell—both of Tipton, Ind.

1,378,332 Disk wheel for pneumatic tires. E. R. Draver, Richmond, Ind. (Original application divided.)

1,378,397 Demountable collapsible tire rim. F. G. Beron, assignor to F. P. Guilfoyle—both of Waterbury, Conn.

1,378,550 Nail holding and spacing strip of rubber to apply to soles. E. J. Miller, York, Pa.

1,378,641 Device for producing life-like motion of inanimate objects. J. E. Williamson, Norfolk, Va.

1,378,683 Teat cup for milking machines. B. A. Nowles, Azalia, Mich.

1,378,747 Elastic casing for watch with less preventing device. A. White, Williamstown, N. J.

1,378,763 Split demountable rim for tires. J. T. Cadenhead, Ensley, Ala.

1,378,764 Split demountable rim for tires. J. T. Cadenhead, Ensley, Ala.

1,378,766 Blow-out boot for pneumatic tires. A. Chapman, assignor to The Eagle Claw Tire Boot Co.—both of Kellogg, Idaho.

GRANTED MAY 24, 1921

1,378,832 Cushion tire. H. C. Babel, Buffalo, N. Y.

1,378,870 Knee-pad with elastic straps. E. N. Kauffman, Mahaffey, Pa.

1,378,905 Container for pneumatic inner tubes. W. Schuldt, Arlington Township, Woodbury County, Iowa.

1,378,922 Intermittent vacuum massage machine. G. A. Ward, Chicago, Ill.

1,378,968 Demountable rim for tires. F. K. Mallison, assignor by mesne assignments to Firestone Steel Products Co—both of Akron, Ohio.

1,379,032 Vehicle wheel with demountable rim for tires. J. C. Manternach, Lakewood, assignor to The Standard Parts Co., Cleveland—both in Ohio.

1,379,043 Tire. T. J. Reed, Kansas City, Mo.

1,379,096 Pneumatic tire pump. J. C. Gilbert, Grafton, Mass.

1,379,161 Abdominal supporter. J. L. Holt, Portland, Ore.

1,379,216 Pneumatic tire. C. Sattler, Brooklyn, N. Y.

1,379,220 Pressure gage for pneumatic tires or the like. M. C. Schweinert, West Hoboken, and H. J. Kraft, Ridgewood—both in New Jersey.

1,379,289 Urinary apparatus. E. C. Rogers, St. Louis, Mo.

1,379,314 Inner liner for tires. A. L. Sewell, assignor of one-third to E. J. Moran and one-third to J. A. Greeley—all of Chicago, Ill.

1,379,321 Pneumatic vehicle spring. L. I. Thompson, Portland, Ore.

1,379,458 Detachable rubber pads for protection soles. T. R. Lulham, Johannesburg, South Africa.

THE DOMINION OF CANADA

GRANTED MAY 3, 1921

211,163 Dust cap for tire valves. E. Van A. Myers, East Orange, New Jersey, U. S. A.

211,164 Dust cap for tire valves. E. Van A. Myers, East Orange, New Jersey, U. S. A.

211,242 Rubber mat. Gutta Percha & Rubber, Limited, assignee of J. H. S. Kerr—both of Toronto, Ont.

211,266 Waterproof tire cover, with elastic warp threads at selvages. The Russell Manufacturing Co., assignee of W. Achtmeyer—both of Middletown, Conn., U. S. A.

211,267 Pressure gage for tires. A. Schrader's Son, Inc., assignee of M. C. Schweinert—both of New York, New York, U. S. A.

GRANTED MAY 10, 1921

211,330 Repair patch for pneumatic tires. J. R. Buechler, Des Moines, Ia., U. S. A.

211,331 Inner tube. O. T. Bugg, Poughkeepsie, New York, U. S. A.

211,360 Blow-out patch for pneumatic tires. C. Horine, Lima, Ohio, U. S. A.

211,378 Pneumatic-tire filler. C. H. Lambert, Hartwell, Ohio, U. S. A.

211,389 Tire with sectional sponge-rubber filler. T. J. McCaffery, Seattle, Wash., U. S. A.

211,408 Resilient tire. A. Van der Stichelen, Ghent, Belgium.

211,431 Reinforcement for cushion tires. The Goodyear Tire & Rubber Co., assignee of J. E. Hale and E. F. Brunner, coinventors—all of Akron, Ohio, U. S. A.

211,434 Windshield cleaner. The Jubilee Manufacturing Co., assignee of A. F. Gillet—both of Omaha, Neb., U. S. A.

211,469 Inner tube. A. B. Shaw, Medford, and E. E. Fay, assignee of half-interest, Brookline—both in Mass., U. S. A.

GRANTED MAY 17, 1921

211,542 Hose supporter. B. C. Harriss, New Rochelle, New York, U. S. A.

GRANTED MAY 24, 1921

211,736 Pneumatic tire. J. Cairnes, South Norwood, London, Eng.

211,740 Garment supporter. T. L. Caudle, Wadesboro, North Carolina, U. S. A.

211,768 Shoe fasteners to replace lacing. F. Ferris, Westwood, Calif., U. S. A.

211,806 Dust cap for pneumatic-tire valves. J. W. Laird, Pasadena, Calif., U. S. A.

211,884 Cap for tire valves. H. A. Wood, Kingston, Ont.

211,915 Range-finding instrument for use in balloon observation. The Goodyear Tire & Rubber Co., assignee of R. H. Upson—both of Akron, Ohio.

THE UNITED KINGDOM

PUBLISHED MAY 4, 1921

159,416 Pressure gage for tires. K. F. Lees, 139 Pendleton street, New Haven, Conn., U. S. A.

159,447 Golf-ball gage. J. P. Cochrane and W. Patton, Murano Works, Albert street, Edinburgh.

159,491 Cushioned spring wheel. C. A. Mendenhall, Farmland, Ind., U. S. A. (Not yet accepted.)

159,590 Gramophone needle-carrier provided with rubber buffer. H. F. Honner, 32 Dunvegan Gardens, and A. Neachell, 201 Westmount Road—both in Eltham, London.

159,609 Microphone. H. J. Palmer, 151 Clive Road, and Telephone Manufacturing Co., Limited, 42A, Martell Road—both in West Dulwich, London.

159,611 Rubber heels reinforced by metal studs. C. J. Wattson, 8 Cliffs Road, St. Clair, near Dunedin.

159,639 Inhaler primarily intended for self-administration of anesthetics. L. B. Hall, 28 Station Road, Winchmore Hill, Middlesex.

159,641 Appliances for playing table football, etc. W. W. Milne, 4 Cessnock street, Glasgow.

159,760 Flexible rubber-sheathed double electric conductors, having the extra rubber sheathing capable of being dyed after vulcanization. British Insulated & Helsby Cables, Limited, and E. A. Bayles, The Oaks, Helsby, Cheshire.

159,768 Recessed rubber tire. E. R. Simms, Elks Building, Scottdale, Pa., U. S. A.

159,792 Flexible collars made of rubber fabric or compound reinforced along edges and at button-holes. T. Hase, 883 Sacramento street, San Francisco, Calif., U. S. A.

159,818 Spring wheel with continuous outer rigid ring and rubber ring, hub and cushions. F. Mathieu, Marseilles, France. (Not yet accepted.)

159,912 Detachable rubber pads for protecting soles. T. R. Lulham, Bellevue East, Johannesburg, South Africa.

159,915 Spring heel with continuous outer rigid ring and pneumatic hub and cushions. W. R. Borrie, Arlington House, Richmond Road, Stockton-on-Tees.

159,941 Tire casings manufactured from yarn or thread prepared from viscose, then rubber-coated. Dunlop Rubber Co., Limited, 1 Albany street, Regent's Park, London, and W. H. Paull, Para Mills, Aston Cross, Birmingham.

Chemical Patents will be found on pages 740-741. Machinery Patents on pages 748-749.

159,943 Milk churn provided with rings of rubber to lessen noise. E. Meldal, 45 Elm Park Mansions, Park Walk, Chelsea, London.

159,944 Parachute having resilient spreading-device attached. L. B. Jabn, Montevideo, Minn., U. S. A.

159,963 Device for administering anesthetics to animals. F. B. Reynolds, Royal Veterinary College, Great College street, Camden Town, London.

PUBLISHED MAY 11, 1921

160,043 Submarine cables insulated with one coating of india rubber, two coatings of vulcanized india rubber and a protecting coat of gutta percha B. S Hunt, 354 Acton Lane, Acton, London.

160,095 Exercising apparatus with elastic cords. R. D. Hughes, Old House, Waddon, Surrey.

160,108 Rubber heel lift having front corner tip portions inclined upward. F. J. Gleason, 20 Prescott street, Cambridge, Mass., U. S. A.

160,340 Spring wheel with solid tire. A. A. A. Darche, 39 Boulevard St. Martin, Paris, France.

160,343 Flat rubber cover to be sprung over mouth of a cup or jug, and having rueber teat projecting from one side. J. Abrabamson, 58 Mersey Road, Widnes, Lancashire.

160,356 Damper for moistening gummed surfaces, formed of rubber tube. H. B. Rogers and M. G. Rogers, 5 Prince's street, Hanover Square, London.

160,359 Flexible plug for repairing punctures in pneumatic tires. E. Jaume, 22 Boulevard Voltaires à Aubagne (Bouches-du-Rhône), France.

160,412 Collapsible rim for tires. M. C. O'Connor, 13 Victoria Road, Whalley Range, Manchester.

PUBLISHED MAY 19, 1921

160,476 Tire protector. W. Yarworth-Jones, 15 Carteret street, Westminster.

160,541 Rim for mounting pneumatic tires. R. T. Smith, 111 Lovely Lane, Warrington, Lancasbire.

160,568 Golf ball with hollow core, formed of two parts vulcanized together and wound with elastic thread under tension. F. T. Roberts, 1105 Lakeview Road, Cleveland, Ohio, U. S. A.

160,696 Golf ball with resilient core having shell formed with abrasive portions interspersed with smooth ones on surface. R. H. Hazeltine, 49 West 45th street, New York, New York, U. S. A.

160,712 Stopper for hot-water bottle, etc. J. J. Purdie, Dunavon, Lansdowne Road, Sidcup, Kent, and Leyland & Birmingham Rubber Co., Limited, 24 Duke street, Aldgate, London.

PUBLISHED MAY 25, 1921

160,942 Sectional inner tube for pneumatic tires and mold for making. T. B. McLeroth, 32 Caversham Road, London.

160,984 Rubber-padded horseshoe. B. P. Gray, Ellangowan, Bishops Road, Sutton Coldfield, Warwickshire. (Addition to No. 113,988.)

161,047 Leather and canvas casing for pneumatic tires. Societe F. E. C. I. T. (Fabricazione Esportazione Copertoni Imperforabili-Torinoi), 1 via Accademia Albertina, Turin, Italy.

161,049 Vehicle wheel with non-supporting casing enclosing spokes, provided at inner and outer edges with strips of rubber. Dunlop Rim & Wheel Co., Limited, Alma street, and G. E. Sharp, 42 Kingsway Stoke—both in Coventry.

161,066 Motorcycle knee-grips. Wood-Milne, Limited, 2 Central Buildings, Westminster, and G. H. Pearson, 36 Highgage avenue, Fulwood, near Preston, Lancashire.

161,108 Pneumatic tire comprising central air tube surrounded by a concentric series of smaller tubes communicating, through nonreturn valves, with a ring carrying the main inflating-valve, the tread portion being reinforced by two over-lapping series of flexible metal bands enclosed by leather bands stitched together. R. Osgood, Calbourne, Thurlow Park, and W. G. Huxtable, Villa Belza—both in Torquay, Devon.

161,124 Swimming glove. M. Schreiner, 415 St. Ann's avenue, Bronx, New York, U. S. A.

161,144 Tire composed of series of rubber laminæ, each carried by perforated metal plate sbaped to embrace a rim. B. Loutzkoy, 1 Viktoria-Luiseplatz, Berlin. (Not yet accepted.)

161,177 Device for warning of tire deflation. Michelin & Cie., Clermont-Ferrand, France. (Not yet accepted.)

161,290 Rubber tips for crutches, etc. M. S. Snyder, 605 First street, East Calgary, Alta, Can.

NEW ZEALAND

PUBLISHED APRIL 21, 1921

43,465 Sole-plate of leather slit for adjustment and having openings in which rubber or other pads are inserted. G. Lawler, Ngapuhi Road, Remuera, Auckland.

44,029 Pneumatic shoe-heel grip. G. Lawler, 123 Remuera Road, Remuera, Auckland.

45,137 Pneumatic tire sectional inner tube with partitions, etc. T. B. McLeroth, 32 Caversbam Road, London, N. W. 5, Eng.

TRADE MARKS

THE UNITED STATES

SERIAL NUMBERS PUBLISHED MAY 3, 1921*

No. 126,752 Stamina of the Sioux—inner tubes and fabric and cord tires. Sioux City Tire & Manufacturing Co., Sioux City, Ia.

126,787 Mascot Tubes above representation of a ram's head above a panel bearing the quoted words, "Too Tough for Me"—inner tubes. American Wbolesale Corporation, Baltimore and Cumberland, Md.

134,482 Angelus Tire Cover superimposed above representation of a tire against a triangular background—fabric tire covers. Parker & Waterman Manufacturing Co., Los Angeles, Calif.

137,100 Long Life within a double-outlined diamond—rubber and canvas hose—The Whitehead Bros. Rubber Co., Trenton, N. J.

140,236 Rita—bloomer-apron dress-protector. I. M. Weisert, New York, N. Y.

143,904 Walohn—corset bones and stays. American Hard Rubber Co., New York, N. Y.

SERIAL NUMBERS PUBLISHED MAY 10, 1921*

126,827 Tiger-Foot—tires. The Standard Tire Co., Willoughby, O.

131,611 Tusasag on representation of an airplane within a circular band bearing the words United States and South America Corporation. Justice to All—bathing caps, raincoats, and leather, rubber, and fabric shoes for men, women and children. The United States & South America Corporation, New York, N. Y.

136,751 Faultless on representation of label showing children playing with balloons. The Faultless Rubber Co., Ashland, O.

140,488 Toron—sulphur-terpene compounds and solutions. Clapp Products Co., Boston, Mass. (See The India Rubber World, October 1, 1920, page 26.)

140,503 Aquanon—waterproofing composition for fabrics of all kinds. W. B. Price, Poughkeepsie, N. Y.

141,047 N within a black circle—fabric fire-hose. Chas. Niedner's Sons Co., Malden, Mass.

142,956 Bob-Betty Belongings between two concentric circles, the inner one enclosing the letter B—animals, birds, chickens and dolls made of rubber, cloth, band decorated or colored, and stuffed with cotton, and a stuffed rubber Santa Claus for Christmas-tree decoration. Bob-Betty Belongings, Carlsbad, California.

143,619 Revere—tires. Revere Rubber Co., Providence, R. I.

SERIAL NUMBERS PUBLISHED MAY 17, 1921*

126,321 Deep-O-Diver—artificial minnows. James Heddon's Sons, Dowagiac, Mich. (See The India Rubber World, June 1, 1919, page 493.)

137,392 Seamless—hot-water bags or bottles. The Seamless Rubber Co., Inc., New Haven, Conn.

140,346 Progress above representation of a roller bearing the words All Season—rubber rollers for inking presses. Progress Roller Co., Omaha, Neb.

140,678 Arch Form—men's, women's and children's boots, shoes, and slippers of leather, rubber, etc. Thomas G. Plant Co., Boston, Mass.

140,900 Pennington with shield bearing the letter P—boots and shoes of leather or leather and rubber in combination. Pennington-Crowell Shoe Co., Manchester, N. H.

141,006 "Aksel"—compounds for use in vulcanizing rubber. Michigan Chemical Co., Essexville, Mich.

142,611 Wirebestos—clutch facings and brake linings. Durwyllan Co., Paterson, N. J.

142,627 All in One—heel cushions. L. G. & S. S. Co., Boston, Mass.

142,628 Stepsoft—heel cushions. L. G. & S. S. Co., Boston, Mass.

142,631 Foot Save—arch and heel cushions. L. G. & S. S. Co., Boston, Mass.

142,813 Dandy Line and representation of a dandelion—pneumatic tires and inner tubes. Standard-Four Tire Co., Keokuk, Ia.

143,297 Racine Multi-Mile Cord—tires. Racine Rubber Co., Racine, Wis.

143,574 Golden Rod and representation of a spray of golden rod—tires and tubes. Standard Four Tire Co., Keokuk, Ia.

145,202 "Beldenite"—rubber-covered electrical conductors. Belden Manufacturing Co., Chicago, Ill.

145,209 Smooth Point Safety Fountain Pen, New York, U. S. A., and representation of a safe—fountain pens. Samuel A. Harris, New York, N. Y.

SERIAL NUMBERS PUBLISHED MAY 24, 1921*

116,849 PPP conventionally arranged with two small triangles to occupy a diamond-shaped space—pneumatic tires. The Parker Tire & Rubber Co., Indianapolis, Ind.

119,784 WSM arranged as a monogram within a circle—rubber calenders, mills, vulcanizing presses, molds, cores, tubing machines, tire-applying presses, etc. The Wellman-Seaver-Morgan Co., Cleveland, O.

131,633 Lochly—raincoats, rubber shoes, boots, slippers, leggings, puttees, etc. Franklin Simon & Co., Inc., New York, N. Y.

133,808 31 Revere on red disk surrounded by white circle—golf balls. United States Rubber Co., New Brunswick, N. J., and New York, N. Y.

134,394 Savage beneath seal bearing profile of Indian's head—rubber and rubber composition tires. The Spreckels "Savage" Tire Co., San Diego, Calif.

135,609 Onazote—expanded vulcanized rubber for tires, tubes, shock-absorbers, etc. C. L. Marshall, London, England.

139,342 Azo—zinc oxide and mixtures containing it, for use as pigments. American Zinc, Lead & Smelting Co., Boston, Mass.

140,004 Red Wing—rubber belting. Webb Bros. Belting Co., Kansas City, Mo.

140,553 Seal or label bearing in white letters on black background the words R. T. Vanderbilt Co., N. Y., American Products, Super Sulphur—chemical accelerator used in vulcanizing rubber. R. T. Vanderbilt Co., Inc., New York, N. Y.

142,197 Rainbow with representation of section of rainbow—chewing gum. M. S. Copeland, Oelwein, Ia.

TWO KINDS OF TRADE MARKS NOW BEING REGISTERED

Under the rules of the United States Patent Office, trade marks registered under the Act of February 20, 1905, are, in general, fanciful and arbitrary marks, while those registered under the Act of March 19, 1920, Section 1 (b), are non-technical, that is, marks consisting of descriptive or geographical matter or mere surnames. To be registered under the latter act, trade marks must have been used for not less than one year. Marks registered under this act are being published for the first time when registered, any opposition taking the form of an application for cancellation.

GRANTED MAY 3, 1921

Under Act of February 20, 1905

141,824 Steadfast—tire casings and tubes. The Achilles Tire & Rubber Co., Inc., Binghamton, N. Y.

141,946 Heavy Tourist—tires and tubes. The Goodyear Tire & Rubber Co., Akron, O.

142,020 Samson—bicycle tires. Mead Cycle Co., Chicago, Ill.

*Notice of opposition must be filed with the Commissioner of Patents, Washington, D. C., within thirty days after this date.

142,059 Nashco—dress shields. S. K. Naschek, New York, N. Y.
142,065 Seminole—tire tubing and casing. The National Sales Co., assignor to J. W. Sutherland—both of Chicago, Ill.
142,066 Nasalco—inner liners, tubes, boots, patches and flaps. The National Sales Co., Chicago, Ill.

Under Act of March 19, 1920, Section 1 (b)

142,206 Hi-Test—rubber and cotton duck hose, belting, packing, valves and tires. Hudson Mechanical Rubber Co., Trenton, N. J., and New York, N. Y.
142,207 Hudson—rubber and cotton duck hose, belting, packing, valves and tires. Hudson Mechanical Rubber Co., Trenton, N. J., and New York, N. Y.
142,208 Clermont—rubber and cotton duck hose, belting, packing, valves and tires. Hudson Mechanical Rubber Co., Trenton, N. J., and New York, N. Y.
142,209 Rivet—rubber and cotton duck hose, belting, packing, valves and tires. Hudson Mechanical Rubber Co., Trenton, N. J., and New York, N. Y.

GRANTED MAY 10, 1921

Under Act of February 20, 1905

142,257 Gem—rubber erasers. Joseph Dixon Crucible Co., Jersey City, N. J.
142,262 Falls—tires, tubes, casings, shoes and repair parts. The Falls Rubber Co., Cuyahoga Falls, O.
142,263 Faust and representation of Faust—trousers-supporting belts. Faust Mfg. Co., Chicago, Ill.
142,284 The Best—Kleinert—rubber aprons, infant's sanitary goods, bathing caps, bloomers, etc. I. B. Kleinert Rubber Co., New York, N. Y.
142,294 McGraw—tires and tubes. The McGraw Tire & Rubber Co., East Palestine, O.
142,297 Madison Tires—tires. Madison Tire & Rubber Co., Inc., Buffalo, N. Y.
142,307 Castle Cord—pneumatic-tire casings. New Castle Rubber Co., New Castle, Pa.
142,342 4810—rubber and fabric hose. United States Rubber Co., New Brunswick, N. J., and New York, N. Y.
142,344 O and C separated by representation of an eye—rubber horse-shoe pads. Vought & Williams, New York, N. Y.

Under Act of March 19, 1920, Section 1 (b)

142,373 Johnson's Tire Patch on representation of tire-repair outfit—tire and tube repair outfits. W. S. Johnson, assignor to L. M. Wilkinson—both of St. Louis, Mo.
142,379 U-Put-On—rubber heels. Robert E. Miller, Inc., New York, N. Y.
142,380 Miller—rubber baby-bibs, bathing caps, belts, and household, acid and linemen's gloves. The Miller Rubber Co., Akron, O.
142,394 Stalwart—tires. G & J Tire Co., Indianapolis, Ind.

GRANTED MAY 17, 1921

Under Act of February 20, 1905

142,422 Safetee Shaving Brush—shaving brushes with bristles set in rubber. American Safeteesoap Corporation (now by change of name Safetee Soap Corporation), Brooklyn, N. Y.
142,455 Ny-cla—hat-water, cold-water, and ice-pack bags. Russell J. Powell, Elyria, O.
142,492 Daisy—water-pistols, etc. Daisy Manufacturing Co., Plymouth, Mich.
142,516 Jiffy—tire valves. Phillip A. Erbes, San Francisco, Calif.
142,517 Aviator—golf balls. The Fair, Chicago, Ill.
142,519 Topaz—rubber sponges and sponge-rubber blocks. Featheredge Rubber Co., Inc., Chicago, Ill.
142,521 Rex—hoof pads. The Federal Rubber Co., Cudahy, Wis.
142,601 Magictite—tire-repair outfits. Magic Auto Supply Co., Hartford, Conn.
142,604 Malco—windshield cleaner. The B. I. Malouf Co., Salt Lake City, Utah.
142,615 Master Cord—tires. The Master Tire & Rubber Co., Dayton, O.
142,737 Rusco—suspenders, hose supporters, garters, elastic braids and cords, belts and webs. The Russell Manufacturing Co., Middletown, Conn.
142,738 Rusco Products—suspenders, hose supporters, garters, elastic braids and cords, belts and webs. The Russell Manufacturing Co., Middletown, Conn.
142,739 Red Clover Chewing Gum—chewing gum. Floyd R. Perkins, Chicago, Ill.
142,808 Travel Tex—traveling bags, brief cases, etc., of rubber and fabric. United States Rubber Co., New Brunswick, N. J., and New York, N. Y.

Under Act of March 19, 1920, Section 1 (b)

142,898 Double Welt—fabric, rubber, rubber composition, and leather shoes. Shaft-Pierce Shoe Co., Faribault, Minn.

GRANTED MAY 24, 1921

Under Act of February 20, 1905

142,937 Boy Proof—shoes of leather, rubber and combinations with fabric and rubber fabric. The Bluff City Shoe Co., Hannibal, Mo.
142,989 Clipper—golf balls. Dunlop America Limited, Buffalo, N. Y.
142,990 Du Pont Fabrikoid—imitation or artificial leather. Du Pont Fabrikoid Co., assignor to E. I. du Pont de Nemours & Co.—both of Wilmington, Del.
143,010 Tiregram—monthly periodical. The Gardner, Moffat Co., Inc., New York, N. Y.
143,202 King Pin—fabric and rubber boots and shoes. United States Rubber Co., New Brunswick, N. J., and New York, N. Y.
143,226 AA as monogram—rubber-covered wire for electrical purposes. A A Wire Co., Inc., Newark, N. J.

Under Act of March 19, 1920, Section 1 (b)

143,248 Hood—tires. Hood Rubber Co., Watertown, Mass.
143,271 Kork-N-Seal—bottle caps. The Williams Sealing Corporation, Waterbury, Conn. (See The India Rubber World, October 1, 1920, page 36.)

THE DOMINION OF CANADA

REGISTERED

28,345 Representation of an eagle on a rock, within a circle—chemicals used in the rubber industry. The Eagle-Picher Lead Co., Cincinnati, Ohio, U. S. A.
28,403 Willard on a band across concentric circles; Thread Rubber Insulation between the circles, the letter "W" within the inner circle—storage batteries and parts made of hard rubber. Willard Storage Battery Co., Cleveland, Ohio, U. S. A.

THE UNITED KINGDOM

PUBLISHED MAY 4, 1921

394,119 Reddaway—mechanical rubber goods. F. Reddaway & Co., Limited, Victoria Mills, Cheltenham street, Pendleton, Manchester, Lancashire. (Mark proceeded with by order of Court under paragraph 5 of Section 9 of Trade Marks Act of 1905.)
394,120 Reddaway—hose of all kinds included in Class No. 50. F. Reddaway & Co., Limited, Victoria Mills, Cheltenham street, Pendleton, Manchester, Lancashire. (Mark proceeded with by order of Court under paragraph 5 of Section 9 of Trade Marks Act of 1905.)
405,979 Schrader—pneumatic tire valves and parts. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, New York, U. S. A. Address for service in the United Kingdom, care of Mewburn, Ellis & Co., 70 and 72 Chancery Lane, London, W. C. 2. (Advertised before acceptance, claiming distinctiveness.)
409,703 Drianlite, The Raincoat of Distinction, and representation of sun setting behind body of water—raincoats. Henry Freedman, trading as H. Freedman & Co., Shannon Street Mills, Shannon street, Leeds.
409,704 The Feather Raincoat and representation of sun setting behind body of water—raincoats. Henry Freedman, trading as H. Freedman & Co., Shannon Street Mills, Shannon street, Leeds.
410,825 "Every Time.U.need.It." and representation of clock face showing hands at 12.30—preparation for repairing tube punctures and tire cuts. Garton & Co., 307 Sydenham Road, London, S. E. 26.

PUBLISHED MAY 11, 1921

402,883 Rockbestos—asbestos yarn, electrical insulation material, etc. Marlin-Rockwell Corporation, 347 Madison avenue, New York, New York, U. S. A. Address for service in the United Kingdom, care of Marks & Clerk, 57 and 58 Lincoln's Inn Fields, London, W. C. 2.
405,977 Schrader Universal—tire pressure gages. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, New York, U. S. A. Address for service in the United Kingdom, care of Mewburn, Ellis & Co., 70 and 72 Chancery Lane, London, W. C. 2. (Advertised before acceptance, claiming distinction.)
405,980 Schrader Universal—pneumatic tire valves and parts. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, New York, U. S. A. Address for service in the United Kingdom, care of Mewburn, Ellis & Co., 70 and 72 Chancery Lane, London, W. C. 2. (Advertised before acceptance, claiming distinctiveness.)
B407,060 Banister, Established 1845, and representation of two medals and prize ribbons—leather, rubber and canvas boots, shoes, and slippers. James A. Banister Co., 370 Orange street, Newark, New Jersey, U. S. A. Address for service in the United Kingdom, care of Marks & Clark, 57 and 58 Lincoln's Inn Fields, London, W. C. 2.
407,072 Bates—tires and tubes. W. & A. Bates, Limited, St. Mary's Mills, off Narborough Road, Leicester. (Advertised before acceptance, claiming distinctiveness.)
411,737 A Chave and representation of a key—rubber-insulated electric cables. Callender's Cable & Construction Co., Limited, Hamilton House, Victoria Embankment, London, E. C. 4.
412,319 Bellerite—ebonite compound for heat insulating. Barrett & Elers, Limited, 127 and 129 Wallis Road, Hackney Wick, London, E. 9.
412,997 St. Bernard and representation of a St. Bernard monk—elastic webs included in Class No. 40. G. E. Bernard, 30 Edmund Place, London, E. C. 1.
413,468 Eclipse—surgical or curative unmedicated instruments, apparatus and contrivances. J. G. Ingram & Son, Limited, The London India-Rubber Works, Felstead street, Hackney Wick, London, E. 9.
B413,935 Gandy—rubber or balata machine belting. The Gandy Belt Manufacturing Co., Limited, Wheatland Works, Wheatland Lane, Seacombe, Cheshire.

NEW RULINGS ON CANADIAN PATENTS

Under date of June 6, 1921, George F. O'Halloran, Commissioner, has promulgated the following ruling relating to Canadian patents:

Under the tariff as amended by Act of Parliament passed on June 4, 1921, the fees for the full term of the patent are now $35, of which $15 is payable on filing the application and $20 on the grant of the patent. To complete these fees, $15 must be paid not later than six months from the date of the notice of allowance. In order that this payment may be completed, allowed applications are withheld from issue, and consequently, the weekly issue of the *Canadian Patent Office Record* will be discontinued for a short period.

VULCANIZATION ACCELERATOR PATENTS

THE UNITED STATES

Patent Number	Patentee	Assignee	Material
1,081,613	Hoffman and Dibruche	Bayer & Co.	Basic materials in synthetic rubber.
1,126,469	Hoffman and Gottlob	Synthetic Patents Co.	Piperidine.
1,130,903	Hoffman and Gottlob	Synthetic Patents Co.	Piperidine or methylene base in synthetic rubber.
1,149,580	Hoffman and Gottlob	Synthetic Patents Co.	Basic bodies of dissociation constant 10^{-8}.
1,157,177	S. J. Peachey		Para-nitroso bodies.
1,182,501	P. I. Murrill	Morgan & Wright	Bone oil.
1,229,724	E. de Meeus	Beacons Falls Rubber Co.	Aromatic bases.
1,242,586	I. Ostromislensky	New York Belting & Packing Co.	Halide or chloride of rubber.
1,242,886	E. Meyer	Morgan & Wright	Aniline and petrolatum.
1,247,257	H. A. Gardner		Zirconium and amines.
1,249,180	I. Ostromislensky	New York Belting & Packing Co.	Tri-nitro-benzene naphylamin.
1,249,181	I. Ostromislensky	New York Belting & Packing Co.	Oxidation of rubber.
1,249,272	C. R. Boggs	Simplex Wire & Cable Co.	Selenium and β-naphthylamin.
1,271,810	D. F. Twiss	Dunlop Rubber Co.	Glycerine and caustic soda.
1,280,940	C. E. Andrews	Walker Chemical Co.	Amines, methyl-isopropyl-benzene, amino cymene.
1,291,828	W. A. Gibbon	New York Belting & Packing Co.	β-dinitro-anthraquinone.
1,296,469	C. R. Boggs	Simplex Wire & Cable Co.	β-naphthylamine.
1,312,007	S. P. Thatcher	Revere Rubber Co.	Organic vulcanizing agent and red lead.
1,312,144	S. P. Thatcher	United States Rubber Co.	Nitrobenzol, red lead and organic accelerators.
1,320,166	I. Ostromislensky	New York Belting & Packing Co.	Oxygen-carrying compounds and amines.
1,323,951	C. W. Bedford	The Goodyear Tire & Rubber Co.	Product of hydrolytic decomposition of a proteid.
1,342,457	I. Ostromislensky	New York Belting & Packing Co.	Methylene bases and other accelerators that do not destroy coloring matter.
1,342,458	I. Ostromislensky	New York Belting & Packing Co.	Oxygen-carrying compound.
1,343,224	S. B. Molony	Michigan Chemical Co.	Sugar beet residues containing amines; dithiocarbamic compounds.
1,350,824	E. Meyer	Morgan & Wright	Caustic soda solution.
1,356,495	W. Scott	The Goodyear Tire & Rubber Co.	Carbon di-sulphide addition to σ-toluidine.
1,364,055	C. R. Boggs	Simplex Wire & Cable Co.	All primary and secondary amines with selenium.
1,364,732	De Long and Watson		Dichlor-aniline.
1,371,662 1,371,663 1,371,664	C. W. Bedford	The Goodyear Tire & Rubber Co.	Sulphur addition products such as sulphur and thiocarbanilide, sulphur and hexamethylene-tetramine, etc.

THE DOMINION OF CANADA

168,806	S. J. Peachey		P-nitroso-dimethylaniline or its homologs.
179,352	I. Ostromislensky	William E. Lake	Mono-cyclic aromatic compounds in the presence of litharge and of an aromatic amine.
179,353	I. Ostromislensky	William E. Lake	Sulphur, an organic dye and a metallic oxide.
179,354	I. Ostromislensky	William E. Lake	Benzoyl peroxide.
179,355	I. Ostromislensky	William E. Lake	Sulphur and tri-nitro benzene.
179,356	I. Ostromislensky	William E. Lake	Chlorine compound of rubber.
173,739	I. Ostromislensky	William E. Lake	Vulcanizing dye containing a nitro group in the presence of lead oxide and naphthylamine.
181,461	Whittley	Canadian Consolidated Rubber Co.	Sulphur chloride, aniline and benzol.
185,137	D. F. Twiss	Dunlop Rubber Co.	Glycerine and caustic soda.
190,042	D. F. Twiss	Dunlop Rubber Co.	Sodium in aniline, potassium in diphenylene or toluidine.
190,352	Gibbons	Canadian Consolidated Rubber Co.	β-dinitro anthraquinone.
192,470	D. F. Twiss	Dunlop Rubber Co.	Caustic alkali dissolved in an organic compound other than glycerol or glycol, of predominant hydroxylic character such as butyl or amyl alcohol or phenol.
204,387	B. D. Porritt	North British Rubber Co.	Anhydrous compound made from a base and the monophydroxy derivative of benzene in which the H of the OH is replaced by the base.
204,779	Chester E. Andrews	Selden Co.	Amines—methyl-isopropyl-benzene.
205,728	Eloi Ricard	Soc. Ricard, Allenet & Cie	Nitrogen derivative of furfuryl.
207,718	W. Scott	The Goodyear Tire & Rubber Co.	Aryl substituted thiourea with aryl group in ortho position.
207,982	Bedford and Sibley	The Goodyear Tire & Rubber Co.	Base resulting from reacting on P-nitroso-dimethylaniline in an inactive solvent with hydrogen sulphide.
207,983	Bedford and Sibley	The Goodyear Tire & Rubber Co.	Substituted di-thiourea.
211,926	S. B. Molony	Michigan Chemical Co.	Alkylated, dialyated or methylated dithiocarbamic acid.
211,927	S. B. Molony	Michigan Chemical Co.	Alkylated, methylated or mono-methyl dithiocarbamate of a metal.
211,928	S. B. Molony	Michigan Chemical Co.	Methyl ester of phenyl dithiocarbamic acid; metallic salts of phenylated dithiocarbamic acid; or metallic salts of phenyl dithiocarbamic acid.

GREAT BRITAIN

Application Number			
11,530—1912	Bayer & Co.		Piperidine and homologs.
11,615—1913	Bayer & Co.		Non-volatile derivatives of fugitive bases
12,777—1913	Newton		Aliphatic bases, difficultly volatile derivatives of easily volatile bases
4,263—1914	S. J. Peachey		P-nitroso-dimethylamine bodies.
7,370—1914	S. J. Peachey		Aromatic amines and aliphatic or aromatic aldehydes or an aromatic aldehyde with ammonia, e. g., hydrobenzamide.
10,833—1914	S. J. Peachey		P-nitroso-diphenylamine.
12,661—1914	Bayer & Co.		Sodium amide, quaternary bases, aldehyde ammonia and phenylenediamine.
17,760—1915	D. F. Twiss	Dunlop Rubber Co.	Amino guanadine carbonate.
Serial Numbers			
101,819—1916	S. J. Peachey		Nitro-phenols or their homologs.
108,300—1916	I. Ostromislensky	New York Belting & Packing Co.	Dinitrobenzene and red lead.
110,509—1916	D. F. Twiss	Dunlop Rubber Co.	Alkali glyceroxide.
111,257—1918	Barton and Gardner		Titanic oxide and calcium sulphate.
113,570—1918	S. J. Peachey		Para-nitroso dimethylaniline or its homologs and sulphur.
124,276—1919	D. F. Twiss	Dunlop Rubber Co.	Caustic alkali dissolved in an organic compound other than glycerol or glycol, of predominant hydroxylic character such as butyl or amyl alcohol or phenol.
126,606—1919	J. F. B. Van Hosselt		Nitroso bodies with aromatic bases.
129,798—1919	B. D. Porritt	North British Rubber Co.	Sodium phenate bases and mono-hydroxy derivatives of benzene.
130,857—1919	The Goodyear Tire & Rubber Co.	North British Rubber Co.	Sulphur reaction bodies from nitrogen bodies.
136,716—1920	S. J. Peachey		Nitroso hydrocarbons of the benzene series.

GREAT BRITAIN—(Continued)

Serial Numbers	Assignee	Material
140,387—1919 140,388—1919	G. Bruni G. Bruni	Addition salts of mono- or di-substituted dithiocarbamic acids and di- or tri-valent metals or inorganic radicles, e. g., pentamethylene dithio-carbamate of zinc.
142,083—1920	A. Heilbronner	Organic or inorganic reducing agents, e. g., paramidophenol derivatives, tannin, etc.
146,734—1920	S. J. Peachey	Nitroso hydrocarbons of the benzene series.
146,869—1920	Meister, Lucius & Browning	Pyridine bases.
147,000—1920	Meister, Lucius & Browning	Pyridine bases.
148,349—1920	E. Tilche	Vulcanization in an atmosphere of ammonia or a volatile organic ammonia compound.
148,350—1920	E. Tilche	Carbon disulphide addition to an ortho-alkyl substituted aromatic amine, e. g., di-orthotoluyl thiourea.
153,890—1920	The Goodyear Tire & Rubber Co.	
157,050—1921	Société R. Allenet & Cie	Furfuramide and other nitrogen derivatives of furfuryl, in particular the condensation products of pyromucic aldehyde with ammonia or amines.

FRANCE

470,883	Bastide	Amines as solvents for sulphur.
490,897	S. J. Peachey	P-nitroso bodies.

GERMANY

265,221	Bayer & Co.	Piperidine.
266,618	Bayer & Co.	Piperidine.
269,512	Bayer & Co.	Addition products of carbon disulphide and dimethylamine.
273,482	W. Esch	Albumen.
280,193	Bayer & Co.	P-phenylene diamine.
303,984 305,667	Bayer & Co.	All amines up to five per cent addition of ammonium compounds and or aniline sulphate.
325,306	J. F. B. von Hasselt	Nitroso bodies with aromatic bases.

AUSTRIA

68,724—1914	Bayer & Co.	Urea derivatives of the amines and carbon disulphide addition products.

HOLLAND

2,829—1919	S. J. Peachey	Para-nitroso-dimethylaniline.

BELGIUM

262,299	Newton	Aromatic bases, difficultly volatile derivatives of easily volatile bases.

JAPAN

34,944	D. F. Twiss	Dunlop Rubber Co.	Solution of sodium or potassium in primary or secondary amines.

OCEAN RATES FROM NEW YORK ON TIRES, TUBES, MECHANICAL GOODS, CLOTHING, FOOTWEAR AND DRUGGISTS' SUNDRIES[1]

(Same rates apply from other Atlantic ports where service is available.)

Country and Port	Rates: Cu. Ft.	Rates: 100 lbs.
AFRICA		
Africa, East Coast—		
Beira	..	*$26.00
Plus landing charges $0.30 per ton.		
Klidini	..	*34.00
Delagoa Bay, Lourence Marques	..	*25.40
Mauritius	..	*30.00
North Coast—		
All Ports	..	*22.00
Egypt—		
Alexandria	..	*22.00
South Coast—		
Algoa Bay	..	*23.60
Capetown	..	*23.00
East London	..	*24.20
Port Natal	..	*24.80
West Coast—		
Accra-Lagos, Secondi, Buruttu	..	*30.00
Dakar, Freetown	..	*28.00
Boma, Matadi	..	*32.00
ASIA		
China—		
Hongkong, Shanghai	..	*23.00
India—		
All direct ports	..	*21.00
Madras, Rangoon	..	*23.00
Japan—		
All direct ports	..	*23.00
Java—		
All ports	..	*21.00
Manchuria—		
Dalny	..	*24.00
Philippines—		
Manila	..	*23.00
Straits Settlements—		
Singapore, Penang	..	*21.00
Syria—		
Beyrout	..	*24.00
CENTRAL AMERICA		
Costa Rica—		
Port Limón	$.64	1.31
Mexico—		
Tampico	.52½	1.05
Plus 2½c. per 100 lbs. bar dues.		
Vera Cruz, Puerto Mexico	.52½	1.05
Panama—		
Colon	.32	.64
Plus $1 per ton transfer charge.		
Panama	.37	.74
Plus $1 per ton transfer charge.		
Salvador—		
La Libertad	.79	1.42
EUROPE		
Belgium—		
Antwerp	.40	.75
British Isles—		
All ports	.45	.85
Except rubber belting	.50	1.00
Canary Islands—		
Las Palmas	..	*25.00
Denmark—		
Copenhagen	.55	1.00
Esthonia—		
Reval	.75	1.50
Finland—		
Helsingfors	.75	1.50
France—		
All Atlantic ports	.40	.75
Marseilles	..	*22.00
Germany—		
Hamburg, Bremen	.45	.82½
Danzig	.50	.90
Greece—		
All ports	..	*22.00
Holland—		
Rotterdam	.40	.75
Amsterdam	.40	.75
Italy—		
Direct ports	.50	1.00
Fiume, Trieste, Venice	..	*26.00
Norway—		
All ports	.55	1.00
Portugal—		
Lisbon	..	*20.00
Oporto	..	*25.00
Rumania—		
All ports	..	*25.00
Spain—		
All ports	..	*20.00
Gibraltar	.65	1.20
Sweden—		
Malmo, Stockholm	.65	1.25
Gothenburg	.55	1.00
SOUTH AMERICA		
Argentina—		
Buenos Aires	..	*20.00
Rosario	..	*27.50
Brazil—		
Rio de Janeiro	..	*22.50
Santos	..	*20.00
Bahia	..	*24.00
Pernambuco	..	*23.50
Chili—		
All ports	.74	1.32
Colombia—		
Cartagena, Puerto Colombia, Santa Marta	.51	1.12
Plus government charges.		
Buenaventura—		
(via direct steamer)	1.03	1.84
(via transshipment)	.98	1.75
Ecuador—		
Guayaquil—		
(via direct steamer)	.74	1.32
via transshipment)	.70	1.25
Peru—		
Callao, Mollendo	.74	1.32
Uruguay—		
Montevideo	..	*20.00
Venezuela—		
La Guayra	.40	.65
Plus 4c per 100 kilos landing charge, plus 40% surcharge.		
New Zealand—		
All ports	..	*30.00
WEST INDIES		
Bermuda—		
Hamilton	.37	.75
Grenada, St. Croix, St. Thomas, St. Kitts	.50	1.00
Port of Spain	.40	.75
Cuba—		
Havana	.47	.94
Plus 30c per 100 lbs. Cuban wharfage and handling charges.		
Santiago	.59	1.18
Cienfuegos	.61	1.21
Curacao—		
Curacao	.30	.65
Plus 40% surcharge.		
Jamaica—		
Kingston	.42	.84
Porto Rico—		
All ports	.31	.75
San Juan landing charge 1c per ft., or 2½c per 100 lbs. additional.		
Santo Domingo—		
Santo Domingo	.51	.91

[1]Compiled by Austin Baldwin & Co., Inc., 44 Whitehall st., New York, N. Y.

*Rate is figured on ton of 40 cubic feet or 2,240 lbs.

Review of the Crude Rubber Market

NEW YORK

The lowest price records in the history of crude rubber were made during the past month when first latex crêpe sold for 13½ cents and ribbed smoked sheets were sold for 11½ cents. The market has been in a practically demoralized condition throughout the month, due to the distressed stocks that were thrown on the market and sold at a sacrifice. Good factory business was eagerly solicited and there was strong competition among dealers to secure the business, however small.

On June 4, first latex crêpe, spot was quoted 17 cents, ribbed smoked sheet, 14 cents, and upriver fine, 17 cents. In a generally dull and inactive market with small interest shown in futures, values steadily declined, and on June 23, first latex spot had reached the low mark of 13½ cents, ribs were 11½ and upriver fine, 15 cents.

While ruling conditions are very unfavorable and lower values may be recorded, there is undoubtedly a better outlook than there was a month ago. The larger Akron tire companies are recovering from the temporary setback of last month and are increasing production. It is reported that Goodyear has put on three shifts a day, and many of the medium-sized factories are running 60 per cent of normal and some are at full production. The effect of this improved condition in Akron must be reflected in the rubber market sooner or later.

Imports of all grades during May were 10,732 tons, compared with 27,338 tons last year. Plantation arrivals for May were 9,127 tons, compared with 24,443 tons a year ago. Total imports of all grades for the five months ended May 31, 1921, were 65,235 tons, compared with 137,008 tons for the same period in 1920.

Spot and future quotations on standard plantation and Brazilian grades were as follows:

Plantations, June 4. Spot first latex crêpe, 17 cents; July—September, 17¼ cents; October—December, 18½ cents. June 22. Spot first latex crêpe, 14 cents; July—September, 15 cents; October—December, 16 cents; January—March, 17 cents.

June 4. Spot ribbed smoked sheets, 14 cents; July—September, 15 cents; October—December, 16½ cents. June 22. Spot ribbed smoked sheets, 12 cents; July—September, 13 cents; October—December, 14 cents; January—March, 15 cents.

June 4, Spot, No. 1 amber crêpe, 12½ cents; July—September, 13 cents; July—December, 13½ cents. June 22. Spot, No. 1 amber crêpe, 12 cents; July—September, 12 cents; October—December, 12½ cents; January—March, 14 cents.

June 4. Spot, No. 1 rolled brown crêpe, 10¼ cents; July—September, 10½ cents. June 22. Spot No. 1 rolled brown crêpe, 9 cents; July—September, 9¼ cents; October—December, 9¾ cents; January—March, 10½ cents.

South American Parás and Caucho. June 4. Spot, upriver fine, 17 cents; islands fine, 17½ cents; upriver coarse, 8¾ cents; islands coarse, 9 cents; Cametá, 8 cents; caucho ball, 10½ cents. June 22. Spot, upriver fine, 15½ cents; islands fine, 17 cents; upriver coarse, 7½ cents; islands coarse, 9 cents; Cametá, 8 cents; caucho ball, 7 to 9 cents.

NEW YORK QUOTATIONS

Following are the New York spot quotations, for one year ago, one month ago, and June 22, the current date:

PLANTATION HEVEA	July 1, 1920	June 1, 1921	June 22, 1921
First latex crêpe	$0.35 @.36	$0.17 @	$0.14½ @
Off latex crepe	@	.15 @.15½	.13 @
Amber crêpe No. 1	.38 @	.13 @	.12 @
Amber crêpe No. 2	.35 @.36	.12 @	.11 @
Amber crêpe No. 3	.34 @.35	.11 @	.10 @
Brown crêpe, thick and thin	.33 @.35	.12½ @	.12½ @
Brown crêpe, specky	.31 @	.11 @	.09 @
Brown crêpe, rolled	.30 @	.10 @.10½	.09 @
Smoked sheet, ribbed	.35 @	.14½ @	.12 @.13½
Smoked sheet, plain	.36 @	.13 @	.11 @
Unsmoked sheet	.33 @	.12 @	.10 @
Colombo scrap No. 1	.30 @	@	.08 @
Colombo scrap No. 2	.28 @	@	.07 @
EAST INDIAN			
Assam crêpe	@	@	@
Assam onions	@	@	@
Penang block scrap	@	@	@
PONTIANAK			
Banjermassin	.12½ @	.06¾ @	.06½ @
Palembang	@	.07½ @	@
Pressed block	.24 @	.11½ @	.11 @
Sarawak	@	.05¾ @	.05½ @
SOUTH AMERICAN			
PARAS			
Upriver, fine	.35 @.36	.16½ @.17	.15 @.16
Upriver, medium	.34 @	.13½ @.14	.13 @.14
Upriver, coarse	.26 @	.08½ @.08¾	.07 @.08
Upriver, weak, fine	.33 @	.13 @	.12 @
Islands, fine	.37 @	.18½ @.19	.17 @
Islands, medium	.35 @	.14 @.15	.13 @
Islands, coarse	.21 @	.09 @.09½	.09 @
Cameta	.20 @.20½	.08½ @	.08 @
Acre Bolivian, fine	.39 @	.17 @.18½	.16 @.16½
Madeira, fine	.40 @	.19 @.20	.18 @.19
Peruvian, fine	*.36½ @	.16½ @.17	.15 @
Tapajos, fine	*.36 @	.16½ @.17	.15 @
CAUCHO			
Upper caucho ball	.29 @	.10¾ @.11½	.09 @.10
Lower caucho ball	.27 @.28	.09½ @.10	.07 @
MANICOBAS			
Ceará negro heads	.25 @	.12 @	*.10 @
Ceará scrap	.18 @	.06 @	*.04 @
Maniçoba, 30% guarantee	.24 @	.11 @	*.10 @
Mangabeira thin sheet	.30 @	.13 @	*.12 @

CENTRALS	July 1, 1920	June 1, 1921	June 22, 1921
Corinto scrap	.22 @	.11 @.11½	.06 @.08
Central scrap	.21 @.22	.10 @.11	.06 @.08
Central scrap and strip	.19 @.20	.06 @.07	.06 @.08
Central wet sheet	.15 @	.04 @	.03 @.04
Esmeralda sausage	.22 @	.11 @.12	.06 @.08
Guayule, 20% guarantee	.27 @	@	@
Guayule, washed and dried	.37 @	.26 @	.26 @
AFRICANS			
Benguela, No. 1, 28½%	.21 @	.08 @	.04 @
Benguela, No. 2, 32½%	.19 @	@	@
Conakry niggers	.33 @	@	@
Congo prime, black upper	.19 @	@	@
Congo, prime, red upper	@	@	@
Kassai, black	@	@	@
red	.35 @	@	@
Massai sheets and strings	.33 @	@	@
Niger flake, prime	.16 @	.13½ @	@
Rio Nunez ball	.35 @	@	@
Rio Nunez sheets, strings	.34 @	@	@
GUTTA PERCHA			
Gutta Siak	.26 @	.13¾ @ .15	.13½ @ .14
Red Macassar	2.75 @	2.30 @2.65	1.50 @ 2.00
BALATA			
Block, Ciudad, Bolivar	.72 @	.53 @	.51 @ .54
Colombia	.47 @	.43 @	.35 @ .38
Panama	@	.43 @	.25 @ .35
Surinam sheet	.79 @	.74 @	.65 @ .70
amber	.82 @	.81 @	.67 @ .73

*Nominal.

RECLAIMED RUBBER

The market position of reclaimed rubber has been still marked by the recession in crude rubber to new low figures. Production has been curtailed by all reclaimers to meet the hand-to-mouth demand of the rubber manufacturers, who continue to operate on schedules greatly reduced from their normal capacities. Although many of their plants are closed down, reclaimers are optimistic enough to believe in the certain revival of their trade with the resumption of normal production in the manufacturing divisions of the rubber industry.

There is considerable movement of rubber shoddy in less than carloads between factories, and the consolidated classification now requires this article to be shipped in bags, bales, barrels or

boxes, but the official classification committee will establish regulations permitting the shipment of rubber shoddy in less than carloads between points in official classification territory (points east of the Mississippi and north of the Ohio rivers) when shipped in rolls or slabs.

NEW YORK QUOTATIONS

June 24, 1921.

Prices subject to change without notice

STANDARD RECLAIMS	
Floating	$0.14 @ $0.16
Friction	.14 @ .16
Mechanical	.09 @ .11
Shoe	.11¼ @ .12¼
Tires, auto	.11¼ @ .13¼
truck	.09 @ .11
White	.14 @ .15

AMSTERDAM RUBBER MARKET

Joosten & Janssen, Amsterdam, report, under date of June 3, 1921: Prices this week fluctuated within narrow limits at about last closing prices. The turnover in spot lots was poor and only moderate in futures, the tone mostly dull. The close was steady at about following prices:

Crêpe, Fl. .43	Sheets, Fl. .39 on the spot.
Crêpe, Fl. .46½	Sheets, Fl. .41½ July—September.
Crêpe, Fl. .49	Sheets, Fl. .44 October—December.

ANTWERP RUBBER MARKET

Osterrieth & Co., Antwerp, report under date of June 3, 1921: The market today is slightly lower than a week ago, and the demand and volume of business are very small. For distant positions there is as little inquiry as for near, and unless there is either an early resumption of buying or an effective curtailment of production it will be difficult to maintain prices even on their present basis. In this respect it is rather encouraging to note that for the first time for one year past, the actual deliveries in London exceed the quantity landed, although to a small extent only. The last quotations of the week are:

	Crêpes, Francs per Kilo	Sheets, Francs per Kilo
June, 1921	3.65	3.35
July	3.75	3.45
August	3.85	3.45
September	3.95	3.45
October	4.05	3.55
November	4.15	3.60
December	4.25	3.60
January, 1922	4.35	3.60
February	4.35	3.60
March	4.35	3.60
April	4.35	3.60
May	....	....

During the past week buyers have shown practically no interest for Congo sorts, the quantity of which has been increased by some 20 tons arrived by the S.S. "Mayumbe," from Belgian Congo. As a matter of interest we may mention the sale of some small lots of red Congo Kassai (barky) at 2.25 to 2.75 francs per kilo; for red Congo thimbles there seems to be some interest at about 0.50-franc per kilo.

Stock today: about 1,856 tons, plantation and Congo.

SINGAPORE RUBBER MARKET

Guthrie & Co., Limited, Singapore, report under date of May 12, 1921:

There was a good attendance of buyers at the weekly auctions held yesterday and to-day, and demand was more active than has been the case for some time past. No sales of standard quality rubber fail to be recorded, sellers withdrawing at sheet 30 cents and crêpe 32½ cents. The demand for standard pale crêpe has fallen off, and the heavy premium recently paid for this grade has been considerably reduced. F. A. Q. sheet was in better demand and advanced 1½ cents on the week. The feature of the sale was the keen inquiry for off latex crêpe, which sold freely from 21½ to 32 cents. Browns were in good demand at 1½ to 2 cents up, while dark and barky crêpes advanced 2 to 4 cents. Values declined towards the close of the sale on weaker advices from London and New York; 863 tons were catalogd, and 496 tons sold. The following is the course of values:

	In Singapore per pound	Sterling Equivalent per pound in London
Sheet, good ribbed smoked	16 @ 30	—/ 6⅛ @ —/10½
Crêpe, good pale	21 @ 32	—/ 8⅜ @ —/11⅛
Crêpe, fine brown	19½ @ 23	—/ 8 @ —/ 9
Crêpe, good brown	13½ @ 19	—/ 6⅜ @ —/ 7⅞
Crêpe, dark	10½ @ 16½	—/ 5½ @ —/ 7⅛
Crêpe, bark	9½ @ 13½	—/ 5⅛ @ —/ 6⅜

COMPARATIVE LOW AND HIGH NEW YORK SPOT RUBBER PRICES

	June 1921*	1920	1919
PLANTATIONS			
First latex crêpe	$0.14 @ $0.17½	$0.37½ @ $0.39	$0.40 @ $0.45
Smoked sheet ribbed	.12 @ .14¾	.37¼ @ .39	.39 @ .44
PARAS			
Upriver, fine	.15½ @ .18	.36¾ @ .38½	.55½ @ .56¾
Upriver, coarse	.07 @ .09¼	.27¼ @ .28¾	.32½ @ .34¾
Islands, fine	.16 @ .18	.38 @ .40½	.47 @ .47½
Islands, coarse	.07 @ .09	.21 @ ...	.21 @ .22
Cametá	.07½ @ .09	.21 @ .23	.22 @ .23

*Figured to June 22, 1921.

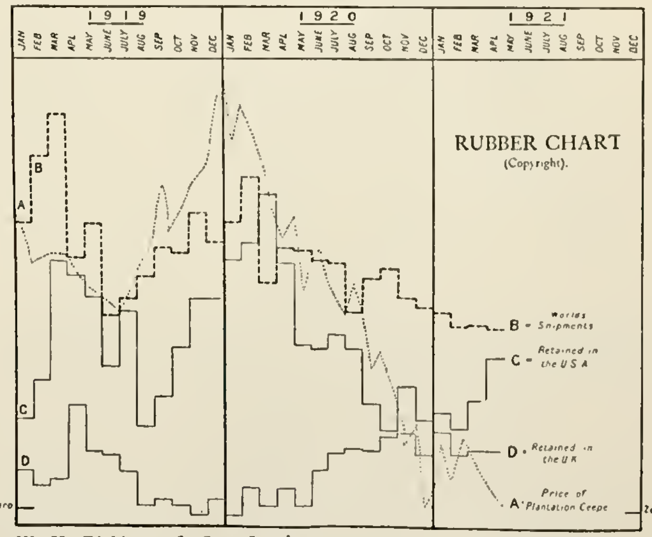
PLANTATION RUBBER PRICE FLUCTUATIONS

The following chart and key were published as a supplement to *The World's Rubber Position*, May, 1921, showing the fluctuations in prices of rubber, shipments and stocks:

KEY TO THE CHART

(*A*) Fluctuations in the price of plantation crêpe rubber, each horizontal line representing one penny per pound. Zero line commences at 10*d.* per pound.

(*B*) The World's monthly shipments of plantation, Brazilian and other kinds of rubber from the producing countries, each horizontal line above zero representing 2,000 tons.



W. H. Rickinson & Son, London

Crêpe Prices, World's Monthly Shipments of Crude Rubber, Amount Retained Monthly in the United States and the United Kingdom.

(*C*) Amount of rubber retained monthly in the United States of America, each horizontal line above zero representing 2,000 tons.

(*D*) Amount of rubber retained monthly in the United Kingdom, each horizontal line above or below zero representing 2,000 tons.

In studying the chart it will be seen that to effect an improvement in the price of rubber either line *B* must fall or line *C* rise considerably, and the longer the line *D* is maintained about its present position the greater must be this fall or rise.

NEW YORK AVERAGE SPOT RUBBER PRICES

Prices in Cents Per Pound

MAY, 1921

Plantations:	16	17	18	19	20	21	23	24	25	26	27	*28	30†	31
Sheet:														
Ribbed smoked	16¼	16½	16¼	16	15⅞	15⅞	15⅝	15¼	14¾	14⅛	14⅜	...	...	14¼
Crêpe:														
First latex	18¼	18¼	18¼	18	17¾	17¾	17¾	17⅝	17¼	16¼	17	...	...	16⅜
Off latex	16½	15¾	16	15⅝	15⅝	15½	15¾	15¾	15¼	14	15	...	...	14⅝
No. 1 blanket	14¼	14¼	14¼	14¼	14¼	14¼	13¾	13¾	13¼	13¼	13¼	...	...	13¼
No. 2 blanket	13¼	13¼	13¼	13¼	13¼	13¼	12¾	12¾	12¼	12¼	12¼	...	...	12¼
No. 3 blanket	12¼	12¼	12¼	12¼	12¼	12¼	11¾	11¾	11¼	11¼	11¼	...	...	11¼
Clean, thin, brown	13¾	13¾	13¾	13⅛	13⅛	13¼	13¼	13¼	12⅝	12¼	12½	...	...	12½
Specky brown	12¼	12¼	12¼	12¼	12¼	12¼	11½	11¼	10¾	11¼	10½	...	...	10½
Rolled brown	11	11	11	10¾	10¾	10¾	10¾	10½	10⅝	10¾	10½	...	...	10¼

JUNE, 1921

Plantations:	1	2	3	4	6	7	8	9	10	11	13	14
Sheet:												
Ribbed smoked	14¼	13⅞	13¾	13¾	13⅞	13¼	12¾	12¼	11¾	11¾	12	12⅝
Crêpe:												
First latex	16⅝	16¼	16	16	15¾	15¼	14¾	14¼	13¾	13¾	13⅞	14¼
Off latex	14½	14¾	14½	14½	14½	13⅜	13¼	13¾	13	13	12¼	13
No. 1 blanket	12¾	12¾	12¾	12¾	12¾	12¼	11¾	11¾	11¼	11¼	11¼	11⅜
No. 2 blanket	11¾	11¾	11¾	11¾	11¾	11¼	10¾	10¾	10¼	10¼	10½	10¾
No. 3 blanket	10¾	10¾	10¾	10¾	10¾	10¼	9¾	9¾	9¼	9¼	9¾	10¼
Clean, thin, brown	12¼	12¾	12½	12½	12	12¼	11¾	12¼	10⅞	10⅞	10¼	11⅛
Specky brown	10½	10⅜	10½	10½	10⅝	10¾	9¾	10	9⅛	9⅛	8¾	9¼
Rolled brown	9¾	10	9¾	9¾	10	9⅝	9¼	9	8¼	8¼	8¾	8⅞

*Trade closed. †Holiday.

PLANTATION RUBBER EXPORTS FROM MALAYA

(These figures include the production of the Federated Malay States, but not of Ceylon.)

	January 1 to February 28, 1921			January 1 to May 12, 1921	
	Singapore	Malacca	Penang	Port Swettenham	Totals
To United Kingdom...*pounds*	8,760,940	1,704,487	3,483,100	7,836,821	21,785,348
The Continent..	2,408,539	1,739,485	23,067	44,800	4,215,891
Japan	7,658,201	......	......	......	7,658,201
Ceylon	......	......	46,800	170,281	217,081
United States and Canada	8,474,495	15,640	110,067	......	8,600,202
Australia	356,495	806	......	......	357,301
Other countries.	......	......	796,533	......	796,533
Totals...*pounds*	27,658,670	3,460,418	4,459,567	8,051,902	43,630,557

Compiled by Barlow & Co., Singapore.

FEDERATED MALAY STATES RUBBER EXPORTS

An official report from Kuala Lumpur states that 7,444 tons of rubber were exported from the Federated Malay States in April, as against 7,408 tons in March and 8,375 tons in the corresponding month last year. The total exports for four months of the current year amount to 28,028 tons compared with 38,799 tons last year and 36,315 tons in 1919. Appended are the comparative statistics:

	1919	1920	1921
January ....*tons*	7,163	11,119	7,085
February	10,809	9,781	6,091
March	10,679	9,524	7,408
April	7,664	8,375	7,444
Totals ....*tons*	36,315	38,799	28,028

STRAITS SETTLEMENTS RUBBER EXPORTS

It is announced by official report from Singapore that 6,091 tons of rubber were exported from Straits Settlements ports in the month of April, as compared with 7,275 tons in March and 9,768 tons in the corresponding month last year. Transhipments amounted to 1,246 tons. The total exports for four months of the current year amount to 24,988 tons as against 46,203 tons last year and 61,821 tons in 1919. Appended are the comparative statistics.

	1919	1920	1921
January ....*tons*	14,404	13,125	5,809
February	15,661	17,379	5,813
March	20,908	5,931	7,275
April	10,848	9,768	6,091
Totals ....*tons*	61,821	46,203	24,988

These figures include transhipments of rubber from various places in the neighborhood of the Straits Settlements, such as Borneo, Java, Sumatra and the non-Federated Malay States as well as rubber actually exported from the Colony, but do not include rubber exports from the Federated Malay States.

PLANTATION RUBBER EXPORTS FROM JAVA*

	March		Three Months Ended March	
	1920	1921	1920	1921
To Netherlands. ....*kilos*	463,000	627,000	1,058,000	2,161,000
Great Britain..............	157,000	433,000	1,167,000	2,256,000
Germany	....	55,000	....	117,000
Belgium	....	....	....	5,000
Italy	....	....	....	1,000
United States..............	1,397,000	739,000	4,674,000	1,903,000
Singapore	430,000	294,000	1,171,000	925,000
Japan	102,000	52,000	131,000	95,000
Australia	....	6,000	....	208,000
Totals ....*kilos*	2,549,000	2,206,000	8,201,000	7,671,000
Ports of origin:				
Tandjong Priok..........*kilos*	1,469,000	1,033,000	4,052,000	3,620,000
Samarang	17,000	72,000	149,000	126,000
Soerabaya	1,043,000	883,000	3,735,000	3,242,000

*The February figures are verified.

CEYLON RUBBER EXPORTS

	January 1, to April 27	
	1920	1921
To United Kingdom .... *pounds*	11,744,668	12,710,335
Belgium	25,100	249,904
France	223,107	306,120
Germany	90,308	1,448,252
Holland	28	355,987
Denmark	......	51,565
Italy	67,200	90,720
Norway	......	2,240
Victoria	3,200	107,970
New South Wales..............	96,680	62,680
United States..............	15,872,411	14,530,763
Canada and Newfoundland..............	425,600	419,148
India	336	3,652
Straits Settlements..............	44,800	......
Japan	155,427	105,426
Totals ....*pounds*	28,748,865	30,444,762

Compiled by the Ceylon Chamber of Commerce.

RUBBER EXPORTS FROM PENANG

	January 1, to April 30	
	1920	1921
To Great Britain..............*piculs*[1]	78,968	65,634
Europe	851	509
United States..............	74,707	2,504
Totals ....*piculs*[1]	154,526	68,647

[1] One picul equals 133⅓ pounds.

CRUDE RUBBER ARRIVALS AT ATLANTIC AND PACIFIC PORTS AS STATED BY SHIPS' MANIFESTS

PARAS AND CAUCHO AT NEW YORK

	Fine	Medium	Coarse	Caucho	Totals Pounds
May 31. By the S. S. "Byron" from Brazilian Ports.					
H. A. Astlett & Co..........	35,000	......	......	......	35,000
Poel & Kelly..............	37,696	9,571	11,516	......	58,783
June 9. By the S. S. "La Place" from Pará.					
Poel & Kelly..............	171,006	723	......	......	171,729
H. A. Astlett & Co..........	160,000	......	......	......	160,000
Meyer & Brown, Inc..........	53,760*	......	......	......	53,760
June 14. By the S. S. "Denis" from Manáos.					
G. Amsinck & Co., Inc.......	......	......	......	......	18,429
Arkell & Douglas, Inc.......	......	......	......	......	13,400
Meyer & Brown, Inc........	78,400*	......	......	......	78,400
Various	......	......	......	......	159,858
June 14. By the S. S. "Denis" from Iquitos.					
W. R. Grace & Co..........	......	......	......	......	7,506

*Includes medium.

PLANTATIONS

(Figured at 180 pounds net to the bale or case.)

	Shipment from:	Shipped to:	Pounds.	Totals.
May 19. By the S. S. "Eclipse" at New York.				
General Rubber Co.......	Belawan	New York	1,128,240	
Various	Belawan	New York	18,815	
J. T. Johnstone & Co., Inc.	Penang	New York	39,600	
Mitsui & Co., Limited....	Batavia	New York	55,980	
F. R. Henderson & Co...	Batavia	New York	113,220	
William H. Stiles & Co...	Batavia	New York	45,254	
Winter, Ross & Co.......	Batavia	New York	2,520	
Stein, Hall & Co., Inc....	Batavia	New York	19,980	
Various	Batavia	New York	21,346	
John D. Lewis..........	Samarang	New York	11,700	
Thornett & Fehr........	Soerabaya	New York	114,660	
The Fisk Rubber Co.....	Singapore	Chicopee Falls	49,845	
L. Littlejohn & Co., Inc..	Singapore	New York	45,100	1,666,260
May 21. By the S. S. "City of Oran" at New York.				
Baird Rubber & Trading Co.	Colombo	New York	29,700	
Baring Brothers	Colombo	New York	58,140	
F. R. Henderson & Co...	Colombo	New York	12,960	
L. Littlejohn & Co., Inc..	Colombo	New York	107,360	
Various	Colombo	New York	193,360	
The Fisk Rubber Co.....	Singapore	Chicopee Falls	56,000	457,520
May 21. By the S. S. "Ryndam" at New York.				
H. A. Astlett & Co......	Rotterdam	New York	25,000	
Various	Rotterdam	New York	73,320	
L. Littlejohn & Co., Inc..	Java	New York	89,600	187,920
May 28. By the S. S. "Niew Amsterdam" at New York.				
Meyer & Brown, Inc.....	Rotterdam	New York	44,800	44,800
May 28. By the S. S. "Koranna" at New York.				
H. A. Astlett & Co......	Colombo	New York	180,000	
Baring Brothers	Colombo	New York	327,600	
Poel & Kelly..........	Colombo	New York	6,840	
Chas. T. Wilson Co., Inc.	Colombo	New York	50,400	
L. Littlejohn & Co., Inc..	Colombo	New York	257,600	
Meyer & Brown, Inc.....	Colombo	New York	336,000	
Various	Colombo	New York	184,290	1,342,730
May 28. By the S. S. "Amazon Maru" at New York.				
Baird Rubber & Trading Co.	Batavia	New York	134,640	
Baring Brothers.........	Batavia	New York	82,260	
Thornett & Fehr........	Batavia	New York	274,320	
Poel & Kelly..........	Batavia	New York	363,780	
Eastern Rubber Co......	Batavia	New York	50,400	
The Fisk Rubber Co.....	Singapore	Chicopee Falls	100,800	
L. Littlejohn & Co., Inc..	Singapore	New York	123,420	1,129,620
May 28. By the S. S. "Kentucky" at New York.				
Thornett & Fehr........	Singapore	New York	458,820	
Meyer & Brown, Inc.....	Singapore	New York	170,840	
General Rubber Co......	Singapore	New York	645,480	
McAllister Brothers......	Singapore	New York	100,800	
Smith & Schippers, Inc..	Singapore	New York	81,000	
L. Littlejohn & Co., Inc..	Singapore	New York	481,600	
Baird Rubber & Trading Co.	Singapore	New York	22,400	
Goldman, Sachs & Co....	Singapore	New York	30,240	
Thomas A. Desmond & Co.	Singapore	New York	124,200	
F. R. Henderson & Co...	Singapore	New York	909,000	
William H. Stiles & Co..	Singapore	New York	56,000	
H. A. Astlett & Co......	Singapore	New York	120,000	
Jaeger & Co............	Singapore	New York	46,260	
Poel & Kelly..........	Singapore	New York	182,340	
Pennsylvania Rubber Co..	Singapore	Jeannette	412,560	
The Fisk Rubber Co.....	Singapore	Chicopee Falls	75,400	
Various	Singapore	New York	219,280	
General Rubber Co.......	Belawan-Deli	New York	43,480	
Various	Belawan-Deli	New York	46,620	4,225,320

	Shipment from:	Shipped to:	Pounds.	Totals.
May 30. By the S. S. "Laertes" at New York.				
W. R. Grace & Co.......	Cochin	New York	9,000	
Various	Cochin	New York	34,020	
J. T. Johnstone & Co., Inc.	Penang	New York	54,000	
Various	Penang	New York	27,900	
Various	Belawan-Deli	New York	186,660	
Far East Importing Co., Inc.	Singapore	New York	14,400	
L. Littlejohn & Co., Inc..	Singapore	New York	403,200	
East Asiatic Co..........	Singapore	New York	536,940	
Baring Brothers..........	Singapore	New York	244,800	
J. T. Johnstone & Co., Inc.	Singapore	New York	262,080	
Chas. T. Wilson Co., Inc.	Singapore	New York	181,620	
Continental Rubber Co., of New York..........	Singapore	New York	112,000	
Rubber Importers & Dealers Co., Inc..........	Singapore	New York	229,860	
F. R. Henderson & Co...	Singapore	New York	52,560	
W. E. Byles............	Singapore	New York	27,000	
William H. Stiles & Co...	Singapore	New York	89,600	
Baird Rubber & Trading Co.	Singapore	New York	11,200	
Meyer & Brown, Inc.....	Singapore	New York	41,760	
General Rubber Co......	Singapore	New York	52,020	
Pell & Dumont, Inc.....	Singapore	New York	36,000	
Firestone Tire & Rubber Co.	Singapore	Akron	181,620	
The Fisk Rubber Co.....	Singapore	Chicopee Falls	44,795	
Meyer & Brown, Inc.....	Singapore	New York	44,800	
Various	Singapore	New York	2,283,451	
Meyer & Brown, Inc.....	Colombo	New York	190,400	
Hood Rubber Co.........	London	Watertown	56,054	5,407,740
May 31. By the S. S. "Lewis Luckenbach" at New York.				
Thornett & Fehr.........	Rotterdam	New York	173,340	
Baird Rubber & Trading Co.	London	New York	134,400	307,740
June 1. By the S. S. "Mineric" at New York.				
L. Littlejohn & Co., Inc..	Colombo	New York	44,800	
Baird Rubber & Trading Co.	Colombo	New York	89,600	134,400
June 1. By the S. S. "Mineric" at Boston.				
Hood Rubber Co.........	Colombo	Watertown	43,000	43,000
June 3. By the S. S. "Invincible" at New York.				
L. Littlejohn & Co., Inc..	London	New York	316,275	
Hood Rubber Co.........	London	Watertown	134,169	
Baird Rubber & Trading Co.	London	New York	84,000	
A. C. Spencer Hess.....	Rotterdam	New York	98,817	
Various	Rotterdam	New York	47,544	680,805
June 3. By the S. S. "Akita Maru" at New York.				
Various	Soerabaya	New York	485,800	
L. Littlejohn & Co., Inc..	Singapore	New York	204,620	
H. A. Astlett & Co......	Singapore	New York	60,000	750,420
June 3. By the S. S. "Virgilia" at New York.				
L. Littlejohn & Co., Inc..	London	New York	44,800	44,800
June 4. By the S. S. "Bessie Dollar" at New York.				
William H. Stiles & Co..	Singapore	New York	47,600	
Meyer & Brown, Inc.....	Singapore	New York	112,000	
L. Littlejohn & Co., Inc..	Singapore	New York	147,225	
H. A. Astlett & Co.......	Singapore	New York	56,000	
Various	Singapore	New York	585,775	948,600
June 4. By the S. S. "Deer Lodge" at New York.				
Netherlands Corporation for oversea Trade.....	Soerabaya	New York	610,238	
Mitsui & Co., Limited..	Soerabaya	New York	13,158	
F. R. Henderson & Co...	Soerabaya	New York	165,294	
Various	Soerabaya	New York	60,375	
J. T. Johnstone & Co., Inc.	Penang	New York	67,200	
F. R. Henderson & Co...	Penang	New York	89,600	
Firestone Tire & Rubber Co.	Penang	Akron	208,214	
Mitsui & Co., Limited..	Batavia	New York	12,465	
Various	Batavia	New York	10,672	
J. T. Johnstone & Co., Inc.	Singapore	New York	75,390	
John D. Lewis..........	Singapore	New York	90,400	
F. R. Henderson & Co...	Singapore	New York	625,966	
L. Littlejohn & Co., Inc..	Singapore	New York	560,000	
William H. Stiles & Co...	Singapore	New York	145,600	
Poel & Kelly...........	Singapore	New York	420,969	
Pacific Trading Co.......	Singapore	New York	11,200	
Various	Singapore	New York	184,690	3,351,431
June 5. By the S. S. "Noordam" at New York.				
L. Littlejohn & Co., Inc..	Java	New York	22,766	
Meyer & Brown, Inc.....	Rotterdam	New York	67,200	89,966
June 6. By the S. S. "West Amargosa" at New York.				
East Asiatic Co., Inc.....	Soerabaya	New York	374,334	
Firestone Tire & Rubber Co.	Belawan-Deli	Akron	47,160	
Lewis & Peat...........	Belawan-Deli	New York	101,520	
Chas. T. Wilson Co., Inc.	Belawan-Deli	New York	59,760	
John D. Lewis..........	Singapore	New York	120,960	
Poel & Kelly...........	Singapore	New York	324,180	
Various	Singapore	New York	134,820	1,162,734
June 9. By the S. S. "Neuleus" at New York.				
Various	Soerabaya	New York	28,080	
L. Littlejohn & Co., Inc..	Batavia	New York	115,380	
Various	Batavia	New York	27,360	170,820
June 9. By the S. S. "Eastern Merchant" at New York.				
Chas. T. Wilson Co., Inc.	Colombo	New York	20,160	
Firestone Tire & Rubber Co.	Singapore	Akron	195,480	215,640

	Shipment from:	Shipped to:	Pounds.	Totals.
June 10. By the S. S. "Tulsa" at New York.				
L. Littlejohn & Co., Inc..	Singapore	New York	56,017	
Various	Rotterdam	New York	103,463	159,480
June 10. By the S. S. "Yaka" at New York.				
East Asiatic Co., Inc....	Rotterdam	New York	52,200	52,200
June 17. By the S. S. "Verentia" at New York.				
Various	London	New York	28,440	28,440
June 18. By the S. S. "Rotterdam" at New York.				
Various	Rotterdam	New York	240,660	240,660
June 18. By the S. S. "Grace Dollar" at New York.				
Fred Stern & Co.........	Singapore	New York	50,400	
L. Littlejohn & Co., Inc..	Singapore	New York	39,600	
W. G. Ryckman, Inc....	Singapore	New York	189,000	
Firestone Tire & Rubber Co.	Singapore	Akron	105,660	
Poel & Kelly...........	Singapore	New York	70,920	
Pacific Trading Corporation of America.......	Singapore	New York	81,000	
William H. Stiles & Co..	Singapore	New York	33,600	
Various	Singapore	New York	77,820	
Various	Penang	New York	42,480	
Chas. T. Wilson Co., Inc.	Colombo	New York	72,720	
American Trading Co....	Colombo	New York	22,500	
Baird Rubber & Trading Co.	Colombo	New York	78,400	
H. A. Astlett & Co.......	Colombo	New York	77,580	
L. Littlejohn & Co., Inc..	Colombo	New York	391,320	
H. Muehlstein & Co......	Colombo	New York	22,500	
Thomas A. Desmond & Co.	Colombo	New York	78,300	
Whittall & Co. of Ceylon	Colombo	New York	67,860	
Various	Colombo	New York	32,660	1,534,320
June 19. By the S. S. "Salabangka" at New York.				
L. Littlejohn & Co., Inc..	Soerabaya	New York	322,020	
Stein, Hall & Co., Inc....	Soerabaya	New York	30,780	
Various	Soerabaya	New York	106,740	
L. Littlejohn & Co., Inc..	Batavia	New York	10,440	
Huth & Co..............	Batavia	New York	27,720	
Various	Batavia	New York	36,540	
General Rubber Co.......	Belawan-Deli	New York	204,120	
Various	Belawan-Deli	New York	300,480	
General Rubber Co.......	Belawan	New York	1,024,560	
William H. Stiles & Co...	Singapore	New York	33,600	2,097,000
June 20. By the S. S. "Kandahar" at New York.				
Meyer & Brown, Inc.....	Singapore	New York	622,720	622,720
June 17. By the S. S. "Kandahar" at Boston.				
Hood Rubber Co.........	Singapore	Watertown	78,400	78,400
June 20. By the S. S. "Clan MacInnes" at Boston.				
Hood Rubber Co.........	Colombo	Watertown	80,200	80,200

CENTRALS

May 26. By the S. S. "Sixaola" at New York.				
J. H. Thompson........	Puerto Colombo	New York	540	540
June 4. By the S. S. "Quilpue" at New York.				
Balfour Williamson & Co.	Guayaquil	New York	38,100	
W. R. Grace & Co.......	Guayaquil	New York	20,100	
Ultramares Corporation...	Guayaquil	New York	12,300	70,500

PONTIANAK

May 28. By the S. S. "Kentucky" at New York.				
Various	Singapore	New York	198,900	198,900
May 30. By the S. S. "Laertes" at New York.				
Various	Singapore	New York	204,900	204,900
June 18. By the S. S. "Grace Dollar" at New York.				
Arthur W. Stedman, Inc.	Singapore	New York	300	300

GUTTA PERCHA

June 4. By the S. S. "Deer Lodge" at New York.				
Various	Singapore	New York	45,300	45,300

GUAYULE

May 31. By the S. S. "El Oriente" at New York.				
Continental Rubber Co. of New York	Torreon	New York	75,000	75,000

BALATA

May 23. By the S. S. "Hebe" at New York.				
Wm. Schall & Co........	Paramaribo	New York	1,050	1,050
May 23. By the S. S. "Maraval" at New York.				
G. Amsinck & Co., Inc...	Trinidad	New York	12,765	12,765
May 24. By the S. S. "Elmac" at New York.				
Wm. Schall & Co........	Paramaribo	New York	7,350	
Middleton & Co., Limited.	Surinam	New York	20,548	27,898
May 26. By the S. S. "Sarpfos" at New York.				
G. Amsinck & Co., Inc...	Cartegena	New York	4,050	4,050
May 27. By the S. S. "Caronia" at New York.				
Earle Brothers..........	Liverpool	New York	900	900
May 31. By the S. S. "Michigan" at New York.				
Earle Brothers..........	London	New York	23,000	23,000
June 3. By the S. S. "Invincible" at New York.				
Earle Brothers..........	Rotterdam	New York	2,974	2,974
June 4. By the S. S. "Matura" at New York.				
G. Amsinck & Co., Inc...	Trinidad	New York	10,120	
Ultramares Corporation..	Trinidad	New York	7,935	18,055
June 11. By the S. S. "Carrillo" at New York.				
Rinehardt & Co..........	Santa Marta	New York	450	450
June 14. By the S. S. "Denis" at New York.				
General Rubber Co......	Manáos	New York	286	
Various	Manáos	New York	2,002	2,288
June 16. By the S. S. "Parima" at New York.				
Ultramares Corporation..	Trinidad	New York	20,470	20,470

EXPORTS OF INDIA RUBBER MANUFACTURES AND INSULATED WIRE AND CABLE FROM THE UNITED STATES BY COUNTRIES, DURING THE MONTH OF MARCH, 1921

EXPORTED TO—	Belting Value	Hose Value	Packing Value	Boots		Shoes		Soles and Heels Value	Automobile Tires				Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
				Pairs	Value	Pairs	Value		Casings Value	Inner Tubes Value	Solid Tires Value	All Others Value				
EUROPE:																
Azores and Madeira Islands	....	....	....	....	....	42	$38	$26	....	....	....	....	....	....	....	$64
Belgium	....	$2,875	$2,593	....	....	....	....	32	....	$150	....	$108	$60	$72	$3,479	9,369
Czechoslovakia	....	....	58	....	....	....	....	....	$1,425	....	....	....	....	....	....	1,483
Denmark	....	....	440	....	....	7,917	9,890	....	7,223	....	....	935	412	470	1,186	20,556
Finland	$96	....	199	....	....	....	....	....	490	125	....	....	66	....	495	1,471
France	1,525	1,230	2,360	....	....	318	340	....	440	....	....	....	11,804	13,133	16,818	47,650
Germany	....	....	....	....	....	....	....	15	....	....	....	....	1,286	....	825	2,126
Greece	....	....	....	....	....	....	....	....	1,012	268	....	....	50	....	....	1,330
Iceland and Faroe Islands	....	....	....	756	$2,723	2,544	2,364	694	1,045	61	....	....	....	....	9	6,896
Italy	....	99	....	2	10	....	....	....	2,393	155	....	....	635	....	721	4,013
Malta, Gozo and Cyprus Islands	....	....	....	....	....	....	....	....	1,858	....	....	....	....	....	....	1,858
Netherlands	....	2,761	115	....	....	....	....	....	8,060	2,104	916	2,300	....	787	1,287	18,330
Norway	857	891	....	....	....	18,546	15,978	....	24,572	1,935	3,249	....	1,223	802	3,083	52,590
Poland and Danzig	....	....	....	....	....	....	....	....	2,725	....	....	5,500	10,118	621	....	18,964
Portugal	....	13	....	403	1,861	....	....	....	....	....	....	....	....	23	18	1,915
Roumania	....	26	306	....	....	....	....	....	495	54	....	....	....	325	485	1,691
Russia in Europe	....	50	....	....	....	....	....	....	....	....	....	....	....	....	....	50
Spain	....	90	....	6	25	....	....	1,335	175	27	1,475	120	22,500	....	6,732	32,479
Sweden	926	98	....	190	500	....	....	....	54,974	5,037	....	....	130,606	....	1,403	193,544
Switzerland	702	53	....	....	....	378	295	....	1,788	279	....	....	5,097	....	28	8,242
Turkey in Europe	....	....	....	....	....	....	....	....	6,236	1,736	....	....	....	....	....	7,972
England	1,290	36,314	5,044	780	2,384	16,440	13,074	2,383	77,757	6,594	4,580	8	18,729	13,525	46,946	228,628
Scotland	....	825	....	....	....	23,249	23,257	....	40	....	....	....	....	617	18	24,757
Ireland	....	....	....	....	....	....	....	....	....	....	....	....	32	51	1,662	1,745
Yugoslavia, Albania, etc	....	....	....	....	....	....	....	....	....	....	493	....	....	....	....	493
TOTALS, EUROPE	$5,396	$45,325	$11,115	2,137	$7,503	69,434	$65,236	$4,485	$192,708	$18,525	$10,713	$8,971	$202,618	$30,426	$85,195	$688,216
NORTH AMERICA:																
Bermuda	....	$150	$52	21	$66	811	$1,219	$278	....	....	....	$530	$219	$219	$171	$2,904
British Honduras	....	7	1	....	....	720	1,086	65	$231	$31	....	....	47	9	40	1,517
Canada	$8,426	10,745	4,529	2,551	9,606	5,904	6,713	145	77,487	39,181	$6,103	3,540	20,921	25,543	122,625	335,564
Costa Rica	....	384	....	....	....	....	....	445	432	15	....	210	2,704	....	64	4,254
Guatemala	....	1,127	1,100	....	....	72	86	372	1,949	159	....	....	177	30	33	5,033
Honduras	1,795	851	158	....	....	474	702	4	922	84	....	....	785	67	163	5,531
Nicaragua	720	45	....	....	....	312	573	400	1,014	157	....	....	300	272	115	3,596
Panama	109	4,007	181	12	41	3,867	4,453	1,039	6,530	1,009	589	6,330	5,238	247	7,275	37,048
Salvador	....	150	....	....	....	....	....	981	1,378	255	....	50	1,228	....	283	4,325
Mexico	16,324	44,682	29,073	28	137	42,625	50,856	8,560	64,465	7,687	2,209	4,123	44,540	5,157	28,379	306,192
Miquelon, Langley, etc	....	....	30	396	1,539	....	....	....	....	....	....	....	....	....	....	1,569
Newfoundland and Labrador	115	991	....	1,083	3,670	676	767	484	313	24	74	....	1,872	18	940	9,268
Barbados	....	49	....	....	....	12	15	....	4,355	524	....	209	273	....	464	5,889
Jamaica	277	1,272	164	....	....	2,058	2,135	....	688	352	555	8	99	113	40	5,703
Trinidad and Tobago	1,350	755	114	....	....	3,684	4,076	....	2,928	99	1,675	317	2,597	10	1,466	15,387
Other Brit. West Ind.	769	88	218	....	....	138	83	143	2,891	273	....	61	307	176	70	5,079
Cuba	1,347	14,777	5,494	72	371	5,263	6,875	9,753	71,897	9,379	27,251	9,091	61,422	7,771	17,040	242,468
Virgin Islands of United States	443	1,406	108	....	....	974	1,672	252	1,700	184	....	8	244	10	911	6,938
Dutch West Indies	....	....	....	....	....	409	414	90	291	70	....	....	36	24	54	979
French West Indies	161	8	....	....	....	....	....	....	272	....	....	....	....	....	....	441
Haiti	....	87	59	....	....	216	533	....	1,153	20	....	....	....	91	174	2,117
Dominican Republic	94	827	528	....	....	96	108	31	5,808	799	....	133	2,134	462	766	11,690
TOTALS, NORTH AMERICA	$31,930	$82,408	$41,809	4,163	$15,430	68,311	$82,366	$23,042	$246,704	$60,302	$38,456	$24,610	$145,143	$40,219	$181,073	$1,013,492
OCEANIA:																
Australia	$1,815	$227	$4,071	....	....	....	....	....	$2,578	$107	$323	$839	$1,265	$2,182	$6,935	$20,342
New Zealand	1,287	19	169	3,547	$14,445	435	$716	....	32,974	555	1,538	....	49,759	1,105	3,807	106,374
Other British Oceania	....	....	....	....	....	3,287	5,190	....	1,149	726	....	1,150	....	....	164	8,379
French Oceania	....	169	....	....	....	662	1,130	....	955	49	171	260	150	....	16	2,900
Other Oceania	....	....	....	....	....	....	....	....	....	75	....	....	121	15	....	211
Philippine Islands	104	509	642	24	66	4,878	6,746	$5,204	20,306	1,375	13,601	1,940	15,520	1,530	23,011	90,554
TOTALS, OCEANIA	$3,206	$924	$4,882	3,571	$14,511	9,262	$13,782	$5,204	$57,962	$2,887	$15,633	$4,189	$66,815	$4,832	$33,933	$228,760
SOUTH AMERICA:																
Argentina	$16,913	$4,338	$1,075	468	$2,117	720	$815	$186	$89,911	$10,869	$2,253	....	$56,990	$1,888	$19,814	$207,169
Bolivia	1,287	....	....	....	....	....	....	....	....	....	....	....	72	18	76	1,453
Brazil	3,264	5,371	149	....	....	4,435	4,586	151	10,352	57	236	$840	102,713	2,183	7,210	137,112
Chile	4,663	2,670	807	100	700	172	188	300	3,533	342	400	102	9,556	479	2,217	25,957
Colombia	4,389	....	464	....	....	....	....	....	2,920	315	....	5	2,823	553	113	11,582
Ecuador	....	103	624	....	....	....	....	....	497	62	....	....	377	....	....	1,663
British Guiana	....	18	80	....	....	69	136	....	922	168	104	....	560	....	112	2,100
Dutch Guiana	....	....	....	....	....	....	....	....	511	....	....	....	47	....	....	558
French Guiana	....	60	....	....	....	....	....	....	75	43	....	....	1,144	....	....	1,322
Peru	263	3,136	100	1	5	....	....	....	4,360	1,737	1,157	100	12,070	378	1,394	24,700
Uruguay	....	321	....	....	....	....	....	869	4,637	....	....	1,850	2,690	148	5,378	15,893
Venezuela	50	20	457	....	....	96	146	216	9,385	815	950	....	690	437	1,455	14,621
TOTALS, SOUTH AMERICA	$30,829	$16,037	$3,756	569	$2,822	5,492	$5,871	$1,722	$127,103	$14,408	$5,100	$2,897	$189,732	$6,084	$37,769	$444,130

EXPORTED TO—	Belting Value	Hose Value	Packing Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Soles and Heels Value	Casings Value	Inner Tubes Value	Solid Tires Value	All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
ASIA:																
Aden	....	....	....	....	....	....	....	....	$81	$20	....	....	....	....	....	$101
China	....	$2,926	$518	48	$216	2,425	$2,663	....	6,955	105	....	....	$86,417	$1,739	$7,265	108,804
Chosen	$523	....	....	....	....	....	....	....	1,918	560	....	....	....	....	....	3,001
British India	21,728	11,784	389	....	....	270	292	$134	32,256	112	$4,019	$5	13,591	1,486	4,412	90,208
Straits Settlements	....	282	....	....	....	72	70	....	1,346	86	809	....	....	48	....	2,641
Other British East Indies	....	....	....	....	....	408	498	....	185	....	....	....	....	....	....	683
Dutch East Indies	349	181	2,319	12	31	....	....	....	52,967	270	800	....	3,840	....	67	60,824
Hongkong	....	101	28	....	....	2,448	2,980	....	1,704	193	....	....	206	231	481	5,924
Japan	125	....	360	3,112	8,378	26,342	29,510	....	10,114	98	2,226	....	8,572	691	31,907	91,981
Persia	....	....	....	....	....	1	2	....	97	126	....	....	....	....	....	225
Siam	....	....	....	....	....	....	....	....	171	....	....	....	....	....	113	284
Turkey in Asia	....	100	55	12	27	849	1,396	....	242	171	....	....	....	....	....	1,991
TOTALS, ASIA	$22,725	$15,374	$5,669	3,184	$8,652	32,815	$37,411	$134	$108,036	$1,741	$7,854	$5	$112,626	$4,195	$44,245	$366,667
AFRICA:																
Belgian Kongo	$39	....	....	....	....	1	$2	....	....	....	....	....	....	....	....	$41
British West Africa	....	....	....	....	....	1	2	....	$2,562	$883	....	....	....	$23	....	3,470
British South Africa	6,056	$25,014	$1,379	160	$982	183	244	$1,599	10,434	....	....	....	$4,468	1,365	$13,256	64,797
British East Africa	....	....	....	....	....	....	....	....	788	....	....	....	245	....	114	1,147
Canary Islands	....	....	....	....	....	....	....	....	1,164	74	....	....	....	....	29	1,267
French Africa	3,993	....	....	....	....	....	....	....	144	....	$1,568	....	....	....	2	5,707
Liberia	....	....	....	....	....	....	....	....	16	145	....	....	....	....	....	161
Morocco	....	....	....	....	....	....	....	....	....	....	....	....	....	....	70	70
Portuguese Africa	....	4,893	85	....	....	....	....	....	....	....	....	....	....	17	1,790	6,785
Egypt	....	....	....	....	....	....	....	....	1,989	398	....	$300	....	....	....	2,687
TOTALS, AFRICA	$10,088	$29,907	$1,464	160	$982	185	$248	$1,599	$17,097	$1,500	$1,568	$300	$4,713	$1,405	$15,261	$86,132
GRAND TOTALS	$104,174	$189,975	$66,695	13,784	$49,900	185,499	$204,914	$36,186	$749,610	$99,363	$79,324	$40,972	$721,647	$87,161	$397,476	$2,827,397

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORY OF UNITED STATES

	Belting, Hose and Packing Value	Boots and Shoes Pairs	Boots and Shoes Value	Tires: Automobile Value	Tires: All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
Hawaii	$9,165	....	....	$108,021	$658	......	......	$21,256	$139,100
Porto Rico	5,601	....	....	52,124	4,364	......	......	10,247	72,336
TOTALS	$14,766	....	....	$160,145	$5,022	......	......	$31,503	$211,436

Compiled by the Bureau of Foreign Commerce, Department of Commerce, Washington, D. C.

OFFICIAL INDIA RUBBER STATISTICS FOR THE UNITED STATES

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	March 1920 Pounds	March 1920 Value	March 1921 Pounds	March 1921 Value
UNMANUFACTURED *free:*				
India rubber:				
From France	681,507	$216,758	....	....
Netherlands	508,979	234,584	282,125	$63,225
Portugal	590,983	153,832	1,022,225	107,547
United Kingdom	12,132,921	5,430,923	2,495,490	420,552
Canada	10	4	....	....
Central America	33,633	8,690	3,895	207
Mexico	50,918	20,731	....	....
Brazil	5,195,613	1,586,260	2,265,853	283,133
Peru	....	....	4,638	974
Other South Am.	112,781	36,202	84,861	34,561
British E. Indies	50,543,518	24,079,584	17,106,287	4,619,839
Dutch E. Indies	11,230,835	4,934,512	5,243,621	1,333,270
Other countries	1,395,909	681,081	....	....
Totals	82,477,607	$37,383,161	28,508,995	$6,863,308
Balata	61,035	$32,289	46,216	$28,042
Guayule	256,300	59,820	....	....
Jelutong (Pontianak)	1,053,230	164,519	228,424	29,722
Gutta percha	630,394	106,495	140,690	25,227
Rubber scrap	1,554,686	104,357	181,799	15,217
Totals, unmanufactured	86,033,252	$37,850,641	29,106,124	$6,961,516
Chicle .... *dutiable*	1,123,964	$863,822	654,149	$366,449
India rubber and gutta percha ... *dutiable*	....	107,543	....	76,612

EXPORTS OF DOMESTIC MERCHANDISE

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
MANUFACTURED—				
India rubber:				
Scrap and old	1,418,288	$89,108	371,646	$17,997
Reclaimed	608,702	98,729	37,340	5,609
Belting[1]	....	277,576	....	104,174
Hose[1]	....	235,832	....	189,975
Packing[1]	....	128,940	....	66,695
Boots[1] .... *pairs*	37,487	111,438	13,784	49,900
Shoes[1] .... *pairs*	1,175,958	1,009,218	185,499	204,914
Soles and heels[1]	....	71,897	....	36,186
Tires:				
Casings[1]	....	4,220,956	....	749,610
Inner tubes[1]	....	565,578	....	99,363
Solid tires[1]	....	479,148	....	79,324
All other tires[1]	....	181,101	....	40,972
Druggists' rubber sundries[1]	....	178,402	....	87,161
Suspenders and garters	....	323,881	....	61,208
Other rubber manufactures[1]	....	729,766	....	397,476
Totals, manufactured	....	$8,701,570	....	$2,190,564
Fountain pens.... *number*	26,411	$31,346	20,879	$21,951
Insulated wire and cables	....	543,546	....	721,647

EXPORTS OF FOREIGN MERCHANDISE

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
UNMANUFACTURED—				
India rubber	554,505	$231,013	623,851	$114,124
Balata	83,390	46,976	55,711	20,657
Jelutong (Pontianak)	28,750	5,562	46,436	9,133
Rubber scrap	49,693	9,690	....	....
Totals, unmanufactured	716,338	$293,241	725,998	$143,914
MANUFACTURED—				
Gutta percha and india rubber	....	$1,527	....	$4,194
India rubber substitutes	3,059	1,407	....	....
Totals, manufactured	....	$2,934	....	$4,194
Chicle	41,498	$21,299	....	....

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
MANUFACTURED—				
To Alaska:				
Belting, hose and packing	....	$12,542	....	$3,915
Boots and shoes.. *pairs*	9,059	30,813	2,517	7,356
Other rubber goods	....	4,266	....	2,859
Totals	....	$47,621	....	$14,130
To Hawaii:				
Belting, hose and packing	....	$24,385	....	$9,165
Automobile tires	....	123,133	....	108,021
Other tires	....	22,986	....	658
Other rubber goods	....	20,512	....	21,256
Totals	....	$191,016	....	$139,100
To Porto Rico:				
Belting, hose and packing	....	$3,626	....	$5,601
Automobile tires	....	41,484	....	52,124
Other tires	....	7,716	....	4,364
Other rubber goods	....	8,641	....	10,247
Totals	....	$61,467	....	$72,336

[1]Details of exports of domestic merchandise by countries during March, 1921, appear in this issue.

UNITED STATES CRUDE RUBBER IMPORTS FOR 1921 (BY MONTHS)

1921	Plantations	Paras	Africans	Centrals	Guayule	Manicoba and Matto Grosso	Balata	Miscellaneous	Waste	Totals 1921	Totals 1920
January .... tons	12,819	1,312	43	3	....	....	41	173	1,071	15,462	22,401
February	7,913	432	269	2	25	....	25	216	37	8,919	33,984
March	12,241	1,794	377	1	....	3	29	7	345	14,797	33,998
April	16,861	403	....	5	....	....	64	226	7	17,566	24,957
May	9,127	1,570	....	2	33	....	40	186	41	10,999	28,666
Totals, 5 months, 1921...	58,961	5,511	689	13	58	3	199	808	1,501	67,743	......
Totals, 5 months, 1920..	121,492	11,457	3,183	523	340	13	312	4,102	2,584	......	144,006

Compiled by The Rubber Association of America, Inc.

CUSTOM HOUSE STATISTICS

NEW YORK

IMPORTS

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
Unmanufactured—*free*				
Crude rubber.				
From Belgium....	116,819	$58,175	......	......
France	864,073	251,239	......	......
Netherlands	133,674	54,892	622,022	$103,804
Portugal	14,100	9,869	......	......
England	8,712,078	4,186,309	3,374,461	524,827
Costa Rica.........	445	153	......	......
Nicaragua	6,218	1,713	4,080	408
Panama	7,264	1,573	2,601	910
Mexico	7,139	2,185	......	......
Trinidad	1,135	478	......	......
Brazil	5,183,214	1,499,276	1,611,408	177,074
Colombia	38,837	10,445	50,000	13,860
Ecuador	56,009	12,776	......	......
Peru	789,052	246,707	8,377	875
Uruguay	18,159	4,653	22,357	5,578
British India.......	435,912	215,660	306,960	59,673
Straits Settlements	32,605,537	15,971,292	12,524,541	3,036,180
British East Indies..	4,240,765	1,908,405	4,285,845	712,404
Dutch East Indies..	7,647,262	3,623,383	2,138,724	579,517
Japan	67,300	33,409	......	......
~~Philippine Islands~~..	13,096	5,896	......	......
British West Africa.	92,572	41,109	......	......
British South Africa	13,871	5,548	......	......
Portuguese Africa...	962	230	......	......
Bolivia	......	......	148,200	16,552
Totals	60,965,513	$28,145,375	25,099,576	$5,231,662
Balata	79,073	47,037	157,667	95,491
Jelutong (Pontianak).......	1,720,819	298,528	140,789	25,197
Gutta percha..............	692,234	152,997	14,474	1,489
Totals	63,457,639	$28,643,937	25,412,506	$5,353,839
Rubber scrap and reclaimed.	1,308,534	84,376	96,700	4,968
Totals, unmanufactured.	64,766,173	$28,728,313	25,509,206	$5,358,807
Manufacturers of rubber and gutta percha..............	......	$42,000	......	$70,418
Rubber substitutes..........	8,946	1,539	......	......
Chicle ....*dutiable*	368,192	272,889	90,186	39,007

EXPORTS

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
Manufactured:				
Automobile and other tires..	......	$2,508,721	......	$527,804
Inner tubes	......	273,426	......	47,552
Belting, hose, and packing...	......	293,854	......	179,164
Rubber boots and shoes, *pairs*	378,082	373,658	68,513	90,983
Soles and heels............	......	78,531	......	23,091
Druggists' sundries.........	......	72,088	......	45,565
Other rubber manufactures..	......	460,651	......	201,288
Totals, manufactured...	......	$4,060,929	......	$1,115,447
Insulated wire	......	$437,331	......	$750,882
Unmanufactured—*free:*				
Rubber scrap and reclaimed.	111,254	$14,524	335,573	$21,240

FOREIGN EXPORTS

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
Crude rubber	......	......	647,444	$127,112
Balata	......	......	35,680	18,735
Rubber scrap and reclaimed	......	......	25,293	2,529
Rubber manufactures.......	......	......	......	691
Chicle	......	......	943	366

MASSACHUSETTS

IMPORTS

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
Unmanufactured—*free:*				
Crude rubber:				
From England	88,836	$46,872	....	....
Straits Settlements..	....	....	11,200	$1,758
British East Indies..	....	....	365,720	42,452
Totals	88,836	$46,872	376,920	$44,210
Gutta percha.......	111,957	17,353	....	....
Rubber scrap and reclaimed .	104,234	5,681	....	....
Totals, unmanufactured..	305,027	$69,906	376,920	$44,210
Rubber manufactures *dutiable*	....	$18,011	....	$4,796

EXPORTS (New York)

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
Manufactured:				
Automobile and other tires...	....	$4,584	....	$11,944
Inner tubes.	....	2,301	....	548
Belting, hose and packing....	....	8,382	....	2,391
Rubber boots and shoes—*pairs*	310,277	283,887	13,197	15,022
Soles and heels.............	....	2,976	....	503
Druggists' sundries..........	....	10,361	....	2,926
Other rubber manufactures..	....	57,154	....	42,724
Totals, manufactured....	....	$369,645	....	$76,058
Insulated wire....	....	$30,737	....	$798
Rubber scrap and reclaimed.	50,812	4,573	....	....

BUFFALO

IMPORTS

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
Unmanufactured—*free:*				
Rubber scrap and reclaimed.	329,661	$14,274	2,321	$66
Rubber manufactures.*dutiable*	......	134	......	435
Chicle ....*dutiable*	8	6	......	......

EXPORTS

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
Manufactured:				
Automobile and other tires.	......	$114,021	......	$22,532
Inner tubes	......	2,851	......	1,930
Belting, hose, and packing..	......	28,913	......	10,824
Rubber boots and shoes.*pairs*	77	95	1	4
Soles and heels...........	......	1,093	......	129
Druggists' sundries	......	10,102	......	7,659
Other rubber manufactures.	......	65,573	......	97,750
Totals, manufactured..	......	$222,648	......	$140,828
Insulated wire.............	......	$5,084	......	$11,114
Rubber scrap and reclaimed.	210,540	31,964	18,013	1,893

FOREIGN EXPORTS

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
Crude rubber..............	77,819	$37,978	574,487	$90,154
Chicle	548	156	......	......
Rubber manufactures.......	......	39	......	834

PHILADELPHIA

IMPORTS

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
Rubber manufactures.*dutiable*	......	$198	......	$167

EXPORTS

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
Manufactured:				
Automobile and other tires..	......	$31,962	......	......
Inner tubes................	......	152	......	......
Belting, hose, and packing..	......	23,095	......	5,784
Soles and heels............	......	1,773	......	......
Druggists' sundries.........	......	439	......	......
Other rubber manufactures.	......	14,911	......	114
Totals, manufactured...	......	$72,332	......	$5,898
Insulated wire.............	......	$14,581	......	$82
Rubber scrap and reclaimed.	11,529	1,350	30,919	2,000

NEW ORLEANS

IMPORTS

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
Unmanufactured—*free:*				
Crude rubber:				
From Nicaragua.........	2,535	$416	......	......
Totals, unmanufactured	2,535	$416	......	......
Chicle ....*dutiable*	997	$659	192	$95

EXPORTS

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
Manufactured:				
Automobile and other tires.	......	$38,739	......	$3,121
Inner tubes..............	......	11,084	......	438
Belting, hose, and packing..	......	37,754	......	11,079
Rubber boots and shoes.*pairs*	13,565	15,265	3,989	7,869
Soles and heels...........	......	6,486	......	183
Druggists' sundries.........	......	23	......	825
Other rubber manufactures..	......	2,151	......	376
Totals, manufactured...	......	$111,502	......	$23,891
Insulated wire............	......	......	......	$2,194

OHIO

IMPORTS

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
Rubber scrap and reclaimed.	......	......	18,376	$2,134

SAN FRANCISCO

IMPORTS

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
UNMANUFACTURED—*free*				
Crude rubber:				
From Straits Settlements	1,002,681	$522,138	22,570	$4,514
Dutch East Indies	341,442	110,033	39,816	7,168
Hongkong	600	200	......	......
Colombia	......	......	4,500	969
Totals, unmanufactured	1,344,723	$632,371	66,686	$12,651
Rubber manufactures, *dutiable*	......	$19	......	......

EXPORTS

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
MANUFACTURED:				
Automobile and other tires	......	$381,275	......	$45,216
Inner tubes	......	32,554	......	1,041
Belting, hose, and packing	......	67,372	......	26,682
Rubber boots and shoes, *pairs*	6,670	10,979	2,992	3,430
Soles and heels	......	13,469	......	807
Druggists' sundries	......	4,164	......	2,285
Other rubber manufactures	......	21,048	......	4,384
Totals, manufactured	......	$530,861	......	$83,845
Insulated wire	......	$5,664	......	$4,383
Rubber scrap and reclaimed	238,112	12,192	50,000	1,125

FOREIGN EXPORTS

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
Crude rubber	298	$63	......	......
Chicle	43,367	44,196	......	......
Rubber manufactures	......	1	......	......

WASHINGTON

IMPORTS

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
UNMANUFACTURED—*free*:				
Crude rubber:				
From Canada	......	......	18,000	$1,800
Dutch East Indies	......	......	54,323	10,159
Totals	......	......	72,323	$11,959
Rubber scrap and reclaimed	......	......	3,770	66
Totals, unmanufactured	......	......	76,093	$12,025

EXPORTS

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
MANUFACTURED:				
Automobile and other tires	......	$20,115	......	$3,975
Inner tubes	......	2,229	......	34
Belting, hose, and packing	......	1,668	......	591
Rubber boots and shoes, *pairs*	292	614	1,488	2,528
Druggists' sundries	......	1,938	......	459
Other rubber manufactures	......	1,674	......	3,267
Totals, manufactured	......	$28,238	......	$10,854
Insulated wire	......	$9	......	......
Rubber scrap and reclaimed	$90,695	3,967	127,353	$2,736

CHICAGO

IMPORTS

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
Rubber manufactures, *dutiable*	......	$9,560	......	$10,345
Chicle .... *dutiable*	61,413	38,668	638,329	322,453

MICHIGAN

IMPORTS

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
Rubber scrap and reclaimed	......	......	25,570	$1,544
Rubber manufactures, *dutiable*	......	$31	......	645

EXPORTS

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
MANUFACTURED:				
Automobile and other tires	......	$82,589	......	$4,673
Inner tubes	......	9,166	......	26
Belting, hose, and packing	......	3,684	......	2,469
Rubber boots and shoes, *pairs*	3,924	13,630	4,253	13,997
Soles and heels	......	567	......	......
Druggists' sundries	......	843	......	1,171
Other rubber manufactures	......	16,454	......	8,996
Totals, manufactured	......	$126,933	......	$31,332
Insulated wire	......	$3,252	......	$2,552
Rubber scrap and reclaimed	58,258	4,492	41,543	539

IMPORTS OF CRUDE RUBBER INTO THE UNITED STATES BY CUSTOMS DISTRICTS

CUSTOMS DISTRICTS	May, 1921 Pounds	May, 1921 Value
Massachusetts	241,020	$28,019
Buffalo	188,262	95,072
New York	23,275,087	3,901,444
Los Angeles	47,278	11,175
San Francisco	134,531	35,419
Washington	4,660	792
Totals	23,890,838	$4,071,921

UNITED KINGDOM RUBBER STATISTICS

IMPORTS

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
UNMANUFACTURED—				
Crude rubber:				
From—				
Straits Settlements	5,218,700	£636,494	7,922,200	£395,451
Federated Malay States	6,996,600	848,448	7,275,800	404,318
British India	800,100	96,420	711,700	38,523
Ceylon and dependencies	3,431,500	415,713	3,210,800	164,446
Other Dutch possessions in Indian Seas	661,700	80,981	1,366,300	66,505
Dutch East Indies (except other Dutch possessions in Indian Seas)	1,753,100	210,055	1,997,000	112,983
Other countries in East Indies and Pacific, not elsewhere specified	173,500	20,982	254,700	13,026
Brazil	1,386,300	149,940	160,300	7,375
Peru	900	90	......	......
South and Central America (except Brazil and Peru)	5,700	672	15,100	597
West Africa:				
French West Africa	4,700	255	3,300	124
Gold Coast	17,100	1,937	7,600	382
Other parts of West Africa	357,100	25,074	59,600	2,821
East Africa including Madagascar	293,700	33,527	89,300	4,202
Other countries	146,500	11,701	87,000	4,167
Totals	21,247,200	£2,532,289	23,160,700	£1,214,920
Waste and reclaimed rubber	996,700	19,717	77,100	1,200
Totals, unmanufactured	22,243,900	£2,552,006	23,237,800	£1,216,120
Gutta percha and balata	502,500	£84,106	410,000	£76,306
Rubber substitutes	246,000	10,417	4,000	147
MANUFACTURED—				
Boots and shoes...*dozen pairs*	26,698	£68,689	12,639	£23,733
Waterproof clothing	....	270	....	667
Insulated wire	....	5,180	....	2,853
Tires and tubes	....	501,394	....	163,562
Other rubber manufacturers	....	58,600	....	49,232

EXPORTS

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
UNMANUFACTURED—				
Waste and reclaimed rubber	1,576,900	£41,959	190,200	£5,665
Rubber substitutes	257,000	12,686	47,000	1,371
Totals	1,833,900	£54,645	237,200	£7,036
MANUFACTURED—				
Boots and shoes....*dozen pairs*	6,719	£14,833	6,552	£15,263
Waterproof clothing	....	267,648	....	69,128
Insulated wire	....	121,048	....	162,914
Submarine cables	....	88,278	....	387,949
Tires and tubes	....	552,196	....	185,997
Other rubber manufactures	....	369,818	....	216,740

EXPORTS—COLONIAL AND FOREIGN

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
UNMANUFACTURED—				
Crude rubber:				
To Sweden, Norway and Denmark	199,900	£22,468	127,800	£7,074
Germany	1,193,700	142,204	1,799,800	74,992
Belgium	998,100	121,854	81,200	4,765
France	3,142,300	421,811	601,700	28,762
Spain	99,500	13,281	12,200	550
Italy	1,323,000	174,074	225,900	9,428
Austria-Hungary	....	....	148,200	6,757
Other European countries	57,700	5,940	98,300	3,395
United States	7,676,300	938,762	4,493,300	207,980
Canada	714,300	85,107	....	....
Other countries	203,100	26,419	3,300	247
Totals rubber	15,607,900	£1,951,920	7,591,700	£343,950
Waste and reclaimed rubber	8,300	£373	200	£14
Gutta percha and balata	216,200	34,275	27,200	5,462
Rubber substitutes	7,300	490	....	....
MANUFACTURED—				
Boots and shoes...*dozen pairs*	3	£26	285	£1,177
Waterproof clothing	....	....	....	330
Insulated wire	....	85	....	....
Tires and tubes	....	32,411	....	57,714
Other rubber manufactures	....	1,914	....	3,754
Totals, manufactured	....	£34,436	....	£62,975

RUBBER EXPORTS FROM PENANG

	January 1 to March 31, 1920	January 1 to March 31, 1921
To Great Britain .... *piculs*[1]	69,247	49,749
Europe	742	425
United States	59,798	2,084
Totals .... *piculs*[1]	129,787	52,258

[1]One picul equals 133⅓ pounds.

RUBBER STATISTICS FOR THE DOMINION OF CANADA

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	March			
	1920		1921	
	Pounds	Value	Pounds	Value
Unmanufactured *free*:				
Rubber, gutta percha, etc.:				
From United Kingdom	905,319	$581,613	55,266	$11,076
United States	516,817	192,995	741,715	131,844
Brazil	36,036	26,327	97,555	13,916
British East Indies:				
Ceylon	291,290	192,391	....	....
Straits Settlements..	1,652,309	840,583	796,722	181,671
Dutch East Indies....	114	57	....	....
Other countries	4,486	2,086	29,461	11,700
Total	3,406,281	$1,836,052	1,720,719	$350,207
Rubber, recovered	586,432	88,549	44,453	6,821
Rubber, powdered, and rubber or gutta percha scrap......	101,502	11,420	61,318	3,328
Rubber substitutes	271,962	32,584	60,035	8,817
Totals, unmanufactured..	4,366,177	$1,968,605	1,886,525	$369,173
Partly Manufactured—				
Hard rubber sheets and rods.	18,827	$14,688	21,086	$6,112
Hard rubber tubes..........	....	2,835	....	7,828
Rubber thread, not covered...	6,227	8,998	1,679	2,251
Totals, partly manufactured	25,054	$26,521	22,765	$16,191
Manufactured—				
Belting	....	$15,836	....	$18,416
Hose	....	9,941	....	10,013
Packing	....	17,133	....	5,814
Boots and shoes............	....	21,500	....	12,233
Clothing, including waterproofed	....	29,962	....	23,302
Gloves	....	1,195	....	1,991
Hot water bottles...........	....	3,799	....	2,926
Tires, solid	....	14,764	....	11,165
Tires, pneumatic	....	380,913	....	132,070
Inner tubes................	....	47,720	....	15,183
Elastic round or flat........	....	73,665	....	26,320
Mats and matting...........	....	460	....	543
Cement	....	4,720	....	5,271
Other rubber manufactures...	....	209,570	....	155,517
Totals, manufactured...	....	$831,178	....	$420,764
Totals, rubber imports.	4,391,231	$2,826,304	1,909,290	$806,128
Insulated wire and cables:				
Wire and cables covered with cotton, linen, silk, rubber, etc.	....	$11,301	....	$10,041
Copper wire and cables, covered as above...........	....	24,871	....	14,813
Chicle	167,846	121,322	182,296	81,933
Fillets	....	919	....	595
Webbing	....	72,634	....	30,294
Fountain pens	....	6,203	....	3,263

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS

	March			
	1920		1921	
	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
Unmanufactured—				
Crude and waste rubber......	$37,092	....	$4,976	....
Manufactured—				
Belting	$954	....	$228	....
Hose	16,778	....	3,903	....
Boots and shoes............	146,814	$76	58,205	$6,672
Clothing, including waterproofed	5,132	....	299	....
Tires, pneumatic	974,026	....	97,208	....
Tires	10,799	3,677	9,571	484
Other manufactures	24,528	1,528	11,008	12,093
Totals, manufactured..	$1,179,031	$5,281	$180,422	$19,249
Totals, rubber exports..	$1,216,123	$5,281	$185,398	$19,249
Insulated wire and cable:				
Copper wire and cable.. ..	$4,282	....	$15,669	....
Chicle	72,243	....	44,770	....

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	Twelve Months Ended March			
	1920		1921	
	Pounds	Value	Pounds	Value
Unmanufactured—*free*:				
Rubber, gutta percha, etc.:				
From United Kingdom....	6,764,275	$3,626,381	4,734,734	$2,483,804
United States	6,383,440	2,904,973	7,558,101	1,984,587
Belgian Congo	72,071	27,536	63,821	52,662
Brazil	110,941	72,092	638,592	237,204
British East Indies:				
Ceylon	1,403,665	835,873	272,052	124,404
India	....	....	43,793	20,510
Straits Settlements.	9,678,095	4,531,390	9,257,010	3,867,239
Dutch East Indies....	342	171	22,129	10,933
Other countries	20,669	12,316	215,968	105,853
Totals	24,433,498	$12,010,732	22,806,200	$8,887,196
Balata	62	$91	104	$171
Rubber, recovered	3,782,439	597,553	2,523,590	433,456
Rubber, powdered, and rubber or gutta percha scrap......	2,073,665	191,380	2,325,562	189,863
Rubber substitutes	1,503,689	176,034	1,508,872	213,396
Totals, unmanufactured.	31,793,353	$12,975,790	29,164,328	$9,724,082
Partly Manufactured—				
Hard rubber sheets and rods	240,612	$127,801	213,970	$128,734
Hard rubber tubes..........	....	31,240	....	51,075
Rubber thread, not covered..	47,875	69,605	40,873	53,339
Totals, partly manufactured	288,487	$228,646	254,843	$233,148
Manufactured—				
Belting	....	$161,424	....	$192,658
Hose	....	112,955	....	142,157
Packing	....	94,140	....	85,614
Boots and shoes............	....	287,617	....	269,055
Clothing, including waterproofed	....	238,180	....	248,082
Gloves	....	14,034	....	17,248
Hot water bottles...........	....	34,547	....	29,529
Tires, solid	....	191,424	....	203,299
Tires, pneumatic	....	1,655,118	....	1,903,444
Inner tubes................	....	168,340	....	204,198
Elastic, round or flat........	....	403,443	....	485,867
Mats and matting...........	....	4,275	....	3,080
Cement	....	84,593	....	50,634
Other rubber manufactures...	....	1,404,909	....	1,688,865
Totals, manufactured..	....	$4,854,999	....	$5,523,730
Totals, rubber imports..	32,081,840	$18,059,435	29,419,171	$15,480,960
Insulated wire and cables:				
Wire and cables covered with cotton, linen, silk, rubber, etc	....	$167,199	....	$206,607
Copper wire and cables, covered as above...........	....	141,465	....	302,336
Chicle	2,084,392	1,542,165	514,910	265,902
Fillets	....	11,556	....	4,567
Webbing	....	541,389	....	582,733
Fountain pens	....	48,973	....	50,536

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS

	Twelve Months Ended March			
	1920		1921	
	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
Unmanufactured—				
Crude and waste rubber	$442,209	$161,204	$133,516	$1,751
Manufactured—				
Belting	$24,455	....	$83,869	....
Hose	169,822	....	225,435	....
Boots and shoes............	1,750,967	$3,132	1,524,969	$10,178
Clothing, including waterproofed	56,640	1,030	36,534	2,413
Tires, pneumatic	7,291,777	....	8,191,511	....
Tires	103,395	41,023	62,475	66,301
Other manufactures	230,698	34,673	581,219	49,487
Totals, manufactured....	$9,627,754	$79,858	$10,706,012	$128,379
Totals, rubber exports.	$10,069,963	$241,062	$10,839,528	$130,130
Insulated wire and cable:				
Copper wire and cable......	$905,868	....	$566,007	....
Chicle	734,414	....	197,416	....

RUBBER STATISTICS FOR SCANDINAVIA

SWEDEN

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	December 1919	December 1920	Year Ended December 1919	Year Ended December 1920
UNMANUFACTURED—				
Crude rubber..............*kilos*[1]	103,118	182,433	2,054,902	1,592,365
MANUFACTURED—				
Rubber footwear...........	85,600	7,162	132,831	100,970
Clothing and similar goods, coated or impregnated with rubber	23,565	9,210	176,353	450,997
All other rubber goods.....	186,599	118,306	1,961,707	3,407,250

EXPORTS OF CRUDE AND MANUFACTURED RUBBER

	December 1919	December 1920	Year Ended December 1919	Year Ended December 1920
UNMANUFACTURED—				
Waste and old rubber......*kilos*[1]	5,471	3,102	28,089	285,543
MANUFACTURED—				
Footwear	1,738	6,182	70,692	99,131

NORWAY

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	November 1919	November 1920	Eleven Months Ended November 1919	Eleven Months Ended November 1920
UNMANUFACTURED—				
Crude rubber and gutta percha.*kilos*[1]	12,574	7,470	382,249	231,150
MANUFACTURED—				
Oiled and rubberized clothing.	13,730	3,996	75,072	150,586
Rubber in sheet, tubes, etc...	14,670	20,578	303,232	257,472
Rings, mats, etc.............	35,217	27,281	444,205	644,072
Footwear	51,653	57,979	417,375	562,427
Other rubber goods.........	6,363	21,880	58,247	64,893

EXPORTS OF CRUDE AND MANUFACTURED RUBBER

	November 1919	November 1920	Eleven Months Ended November 1919	Eleven Months Ended November 1920
UNMANUFACTURED—				
Waste ....*kilos*[1]	17,187	2,500	115,010	139,585
MANUFACTURED—				
Rubberized fabric	2,924	1,945	21,601	26,090
Footwear, etc.	16	4,740	32	4,814

DENMARK

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	December 1919	December 1920	Year Ended December 1919	Year Ended December 1920
UNMANUFACTURED—				
Crude rubber ....*kilos*[1]	32,600	30,200	705,900	507,700
MANUFACTURED—				
Footwear	55,900	28,100	225,800	219,600
Cycle tires..................	153,600	133,100	1,240,300	1,655,900
Hose	6,500	10,900	84,300	132,300
Manufactures of rubber combined with fabric.........	44,700	25,900	323,900	488,800
Manufactures of rubber without fabric..............	18,100	16,400	193,800	265,200

[1]One kilo equals 2.2 pounds.

RUBBER STATISTICS FOR SPAIN

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	Nine Months Ended September 1919 Kilos[1]	1919 Pesetas[2]	1920 Kilos	1920 Pesetas
UNMANUFACTURED—				
Crude rubber, gutta percha and similar materials:				
From Argentina	66,887		1,000	
Brazil	111,902		11,841	
United States..........	3,897		69,625	
France	1,844,946	19,969,462	1,641,160	19,969,207
Great Britain...........	516,502		1,002,638	
Peru	2,834		2,307	
Asia	167,233		193,051	
Other countries.........	358,024		150,564	
Totals	3,072,225	19,969,462	3,072,186	19,969,207
MANUFACTURED—				
Hose and tubes..............	53,637	504,188	104,484	982,150
Belting and packing.........	35,681	384,139	83,524	906,235
Solid tires armed with metal:				
From Germany	......		7,390	
United States..........	75,063		79,314	
France	63,808	1,820,908	190,376	3,959,693
Great Britain...........	145,509		316,536	
Other countries.........	137		25,086	
Tires and tubes:				
From Germany	......		2,245	
Belgium	1,554		6,984	
United States..........	187,658		498,248	
France	177,832	9,273,146	345,635	21,332,064
Great Britain...........	105,237		207,420	
Switzerland	......		146	
Other countries........	13,265		33,274	
Shoe elastic, garters, suspenders	21,197	413,341	44,087	859,696
Waterproofed fabrics, in pieces or cut out	32,609	635,875	84,370	1,645,215
Rubbered clothing, sewn or not	2,122	64,403	12,878	390,846
Footwear, combined or not with other materials.............	44,099	716,608	65,785	1,069,006
Other goods, excepting toys, instruments and writing materials	6,918	224,834	16,258	528,385

EXPORTS

	Nine Months Ended September 1919 Kilos[2]	1919 Pesetas[1]	1920 Kilos	1920 Pesetas
Rubber in sheets.............	18,692	224,304	16,571	198,852
Rubber in other forms.......	38,737	697,266	66,110	1,189,980

[1] One kilo equals 2.2 pounds.
[2] One peseta equals $0.193 (normal).

RUBBER STATISTICS FOR ITALY

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	Twelve Months Ended December 1919 Quintals[1]	1919 Lire[2]	1920 Quintals	1920 Lire
UNMANUFACTURED—				
Crude rubber and gutta percha —raw and reclaimed:				
From Great Britain	132		1,300	
French Colonies in Asia.	1,311		2,075	
British India and Ceylon.	25,579		7,412	
Straits Settlements......	44,624	100,020,750	39,906	64,637,050
French African Colonies.	3,978		1,357	
Belgian Congo..........	1,033		2,116	
Brazil	27,712		10,596	
Other countries.........	916		3,277	
Totals	105,285	100,020,750	68,039	64,637,050
Rubber scrap	15,083	2,262,450	255	38,250
Totals, unmanufactured...	120,368	102,283,200	68,294	64,675,300
MANUFACTURED—				
India rubber and gutta percha—				
Threads	295	855,500	437	1,267,300
Sheets, including hard rubber	153	304,500	293	554,000
Tubes	228	335,450	223	418,350
Belting	603	994,950	805	132,825
Rubber-coated fabrics in pieces	531	1,119,000	868	1,734,800
Boots and shoes.......*pairs*	90,393	1,807,860	185,625	3,712,500
Other rubber footwear......	2	3,000	2	3,000
Elastic webbing	363	1,234,200	804	2,733,600
Clothing and articles for travel	28	112,000	222	888,000
Tires and tubes:				
From Belgium	107		894	
France	4,314		5,270	
Great Britain...........	1,722	17,572,800	8,755	46,306,400
United States..........	126		1,388	
Other countries.........	7		231	
Germany (reparation)....	—		23	
Other manufactures..........	15,388	28,859,400	22,130	41,500,500
Totals, manufactured.....	......	53,198,660	......	99,251,275
Total imports.............	......	155,481,860	......	163,926,575

EXPORTS OF CRUDE AND MANUFACTURED RUBBER

	1919 Quintals	1919 Lire	1920 Quintals	1920 Lire
UNMANUFACTURED—				
India rubber and gutta percha— raw and reclaimed:				
To Austria	.....		543	
Spain	2,155	2,380,500	1,020	2,911,500
United States	2,605		3,716	
Totals	4,761	2,380,500	5,823	2,911,500
Waste	4,842	968,400	9,058	1,811,600
Totals unmanufactured....	9,603	3,348,900	14,881	4,723,100
India rubber and gutta percha—				
Threads	503	1,559,300	397	1,230,700
Sheets, including hard rubber	89	189,400	327	615,600
Tubes	906	1,271,500	2,242	2,915,650
Belting	95	199,500	.....	....
Rubber-coated fabrics in pieces	293	879,000	720	2,153,600
Boots and shoes.......*pairs*	64	1,280	612	12,240
Other rubber footwear......	.....	....	5	7,500
Elastic webbing	1,005	3,819,000	1,414	5,373,200
Clothing and articles for travel	167	835,000	885	4,425,000
Tires and tubes:				
To Austria	1,281		3,393	
Belgium	1,385		2,687	
Czecho-Slovakia	729		1,176	
Denmark	424		1,455	
France	1,160		2,484	
Great Britain...........	8,843		11,821	
Netherlands	225		541	
Roumania	236		1,685	
Spain	696	58,675,000	1,674	133,410,000
Switzerland	1,845		797	
Hungary	.....		264	
India and Ceylon........	1,410		5,285	
Dutch East Indies.......	417		3,068	
Straits Settlements......	271		2,853	
Australia	508		1,149	
Argentina	1,532		4,025	
Brazil	1,057		3,423	
Other countries............	1,441		5,584	
Other rubber goods..........	4,604	8,517,600	15,595	28,739,000
Totals, manufactured......	.....	75,946,580	......	178,882,490
Total exports	.....	79,295,480	......	183,605,590

[1]One quintal equals 220.46 pounds.
[2]One lira equals $0.193 (normal).

RUBBER STATISTICS FOR FRANCE

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	Year Ended December 1919		Year Ended December 1920	
UNMANUFACTURED—	Quintals[1]	Francs[2]	Quintals	Francs
Crude rubber and gutta percha—				
From Brazil	31,417		15,094	
England	113,054		159,640	
French Congo	5,168		1,814	
Senegal	3,213	243,419,000	792	215,701,000
Other French African Colonies	10,060		6,515	
British Indies	82,944		29,396	
Other countries	61,491		59,099	
Totals	307,347	243,419,000	272,350	215,701,000
MANUFACTURED—				
Pure rubber sheets, not vulcanized	7,544	22,632,000	12,511	37,533,000
Rubber thread	4,513	16,247,000	2,371	8,536,000
Elastic fabrics	750	3,000,000	691	2,764,000
Rubbered fabric in pieces	9,496	37,984,000	5,801	23,204,000
Articles made of rubbered fabric	8	48,000	22	132,000
Garment protectors	46	244,000	19	101,000
Garters, suspenders, belts	11	58,000	39	207,000
Rubberized clothing	3,508	22,802,000	776	5,044,000
Rubberized fabric for card clothing	220	462,000	329	691,000
Footwear	6,120	11,016,000	4,725	8,505,000
Tires, tubes, casings	80,553	217,493,000	49,153	132,713,000
Belting, hose, valves, etc.	25,675	31,013,000	19,911	29,867,000
Totals, manufactured	138,444	362,999,000	96,348	249,297,000

EXPORTS OF CRUDE AND MANUFACTURED RUBBER

	Year Ended December 1919		Year Ended December 1920	
UNMANUFACTURED—	Quintals[1]	Francs[2]	Quintals	Francs
Crude rubber and gutta percha—				
To England	12,213		27,691	
United States	17,825	81,695,000	24,415	84,739,000
Germany			17,533	
Other countries	73,112		37,355	
Totals	103,150	81,695,000	106,994	84,739,000
MANUFACTURED—				
Sheets, unvulcanized and vulcanized threads	1,374	3,504,000	709	1,808,000
Elastic fabric	1,415	5,053,000	1,133	4,045,000
Rubberized fabric in pieces	798	2,848,000	2,642	9,432,000
Rubberized fabric for card clothing	642	1,328,000	2,580	5,335,000
Clothing	2,559	14,790,000	5,018	29,004,000
Articles of rubberized fabric	153	819,000	397	2,126,000
Footwear	1,148	1,952,000	15,479	26,314,000
Tires, tubes, casings:				
To England	.....		26,651	
Germany			4,530	
Belgium	85,138	217,101,000	14,388	353,545,000
Switzerland	.....		10,039	
Other countries	.....		83,137	
Totals	85,138	217,101,000	138,745	353,545,000
Belting, hose, valves, etc.	18,371	26,546,000	21,246	30,700,000
Totals, manufactured	111,598	273,941,000	187,949	462,309,999

[1]One quintal equals 220.46 pounds.
[2]One franc equals $0.193 (normal).

THE MARKET FOR RUBBER SCRAP

NEW YORK

The rubber scrap market continues increasingly dull, only a small amount of buying is being done, and this by dealers only. There has hardly been such a thing as a scrap market.

The following revised freight classifications are of interest. Because of the impracticability of bundling large, heavy tires the consolidated classification committee will establish rating of fourth class, applicable in all territories, on so-called scrap tires, each weighing 50 pounds or over, when shipped loose.

QUOTATIONS FOR CARLOAD LOTS DELIVERED

June 24, 1921

Prices subject to change without notice

BOOTS AND SHOES			
Arctic tops	lb.	*$0.075 @	
Boots and shoes	lb.	*.03½ @	.04
Trimmed arctics	lb.	*.02¾ @	.03
Untrimmed arctics	lb.	*.02 @	.02¼
HARD RUBBER			
Battery jars, black compound	lb.	*.07½ @	.01
No. 1, bright fracture	lb.	*.12 @	.15
INNER TUBES			
No. 1	lb.	*$0.06 @	$0.06¼
Compounded	lb.	*.04¼ @	.04½
Red	lb.	*.04¼ @	.04¾
MECHANICALS			
Black scrap, mixed, No. 1	lb.	*.02¼ @	.03
No. 2	lb.	*.01½ @	.02
Car springs	lb.	*.02½ @	.03
Heels	lb.	*.02½ @	.03
Horse-shoe pads	lb.	*.02½ @	.03
Hose, air brake	lb.	*.01 @	.01½
fire, cotton lined	lb.	*.01 @	
garden	lb.	.07 @	.01
Insulated wire stripping, free from fiber	lb.	*.01½ @	.02
Matting	lb.	*.01 @	
Red packing	lb.	*.04½ @	.05
Red scrap, No. 1	lb.	*.07 @	.08
No. 2	lb.	*.05½ @	.06
White scrap, No. 1	lb.	*.07 @	.07½
No. 2	lb.	*.06 @	.06½
TIRES			
PNEUMATIC—			
Auto peelings	lb.	*.02 @	.02¼
Bicycle	lb.	*.01½ @	.02
Standard white auto	lb	*.02¼ @	.02¾
Mixed auto	lb.	*.01 @	.01½
Stripped, unguaranteed	lb	*.01 @	.01½
White, G. & G., M. & W., and U. S.	lb.	*.02¾ @	
SOLID—			
Carriage	lb.	*.02¼ @	.02¾
Irony	lb.	@	
Truck, clean	lb.	*.01½ @	.02

*Nominal.

THE MARKET FOR COTTON AND OTHER FABRICS

NEW YORK

Manufactures of cotton composed of a staple of 1⅜ inches or more, which are dutiable under the new Emergency Tariff Law, are subject to seven cents a pound additional duty to the rates in the Tariff Act of 1913, and include tire fabrics, cotton canvas and duck.

The method of determining the length of the staple is as follows: "A number of fibers are gradually worked into a parallel condition and afterwards a small tuft is extracted. This operation is performed by taking a handful of cotton, and while holding it fairly firm with one hand, the tuft is broken by the other hand, and the loose fibers gently removed; then a number of fibers are gripped by the forefinger and thumb and drawn gradually out of the bulk and if the majority of said fibers measure 1⅜ inches or over in length it can then be safely assumed that such cotton will fall under the provisions of paragraph 16 of the Emergency Tariff Act."

The only cottons imported that have such lengths are Sakellarides, Abassi, white and brown Egyptian and certain grades from Peru, West Indies and Brazil.

The obvious result of this tax will be that manufacturers will use shorter cotton more extensively but, as a protective measure, it may be disappointing to Arizona growers who should reduce costs in order to compete in the world's markets.

American Cotton. The market trend for the past month has been downward with spot values in the South at the lowest figures recorded for the season and the last five years. Trade buying for future requirements is liable to continue as consumers realize that American cotton acreage has been reduced 30 per cent, and fertilizer 50 per cent which would result in a small crop under unfavorable weather and other adverse conditions.

Spot middling uplands has ranged in price from 12.95 cents earlier in the past month to 10.85 cents on June 20.

Egyptian Cotton. While the market for extra staple has been comparatively easy, prices have not declined as much as the almost entire lack of business would forecast. Good grade Uppers were quoted at 14 to 16 cents and medium grade Sakel at 20 to 23 cents. Top grades are worth approximately 30 cents.

The Egyptian crop is progressing favorably and is rapidly making up for the late start which it had this season. Thus far the weather conditions in Egypt have been very similar to those in our own South. The Department of Agriculture in Egypt has recently decreed that a reduced acreage must be planted in 1922 and 1923, but this may be modified by conditions.

Arizona Cotton. There is practically no change in Pima cotton which is quoted 30 to 32 cents.

Sea Island. There has been some inquiry for Sea Islands that indicates that better than 40 cents would be paid for extra choice. It is understood that the acreage in the South this year under Sea Island cotton is somewhat larger than last year but it is doubtful if more than 3,000 bales are raised altogether, unless the boll-weevil can be successfully subdued.

Mechanical Ducks and Drills. Very little improvement has been noted in the demand for these materials, which has been confined wholly to replacement orders. Quotations have indicated a lower range of prices.

Raincoat Fabrics. Business has been very dull in these fabrics as the present period is between seasons. Dealers do not expect much activity in this market before fall.

Sheetings. The decline in cotton late in June resulted in an easier market for sheetings, and lower prices. Buying has been spasmodic and orders could be obtained for only absolutely necessary requirements. The indications are that this market will be very quiet during the summer months.

Tire Fabrics. The tire fabric market is very much like the market for tires. It is really demoralized as to prices, and the mills are unable to give quotations that represent market values. Quotations from different sources vary from 15 to 20 cents a pound, and therefore, the figures given in the following list of tire fabrics are what may be considered as fair market values.

NEW YORK QUOTATIONS

June 24, 1921

Prices subject to change without notice

BURLAPS				
32—7-ounce	100 yards	*$3.50	@	
32—8-ounce		*3.50	@	
40—7½-ounce		*4.00	@	
40—8-ounce		*4.00	@	
40—10-ounce		*4.50	@	
40—10½-ounce		*4.50	@	
45—7½-ounce		*4.50	@	
45—8-ounce		*4.50	@	
45—10-ounce		*5.00	@	
DRILLS				
38-inch 2.00-yard	yard	.12	@	
40-inch 3.47-yard		.07¾	@	
52-inch 1.90-yard		.14	@	
52-inch 1.95-yard		.13¾	@	
60-inch 1.52-yard		.17½	@	
DUCK				
CARRIAGE CLOTH				
38-inch 2.00-yard enameling duck	yard	.13	@	
38-inch 1.74-yard		.15	@	
72-inch 16.66 ounce		.31¼	@	
72-inch 17.21-ounce		.32¼	@	
MECHANICAL				
Hose	pound	.25	@	
Belting		.25	@	
HOLLANDS, 40-INCH				
Acme	yard	.20	@	
Endurance		.22	@	
Penn		.26	@	
Flat finish		.23	@	
Dead finish		.26	@	
Lonsdale or Sunfast.				
White		.59	@	
Dark green or blue		.66	@	
Colors		.61	@	
Piece goods, 40-inch			@	
Piece goods, 36-inch			@	
RAINCOAT FABRICS				
COTTON				
Bombazine 64 x 60	yard	.12½	@	
60 x 48		.11½	@	
Cashmeres, cotton and wool, 36-inch, tan		.65	@	
Twills 64 x 72		.10	@	.12
60 x 102		.16	@	
Twill, mercerized, 36-inch, blue and black		.26½	@	
tan and olive		.24½	@	
Tweed		$0.40	@	1.00
printed		.18	@	
Plaids 60 x 48		.10	@	
56 x 44		.11	@	
Repp		.25	@	
Prints 60 x 48		.13	@	
64 x 60		.14	@	
IMPORTED WOOLEN FABRICS SPECIALLY PREPARED FOR RUBBERIZING—PLAIN AND FANCIES				
63-inch, 3¼ to 7½ ounces	yard	1.00	@	2.50
36-inch, 2¾ to 5 ounces		.60	@	1.50
IMPORTED PLAID LINING (UNION AND COTTON)				
63-inch, 3½ to 7 ounces	yard	.60	@	1.37½
36-inch, 2 to 4 ounces		.37½	@	.80
SHEETINGS, 40-INCH				
48 x 48, 2.35-yard	yard		@	
48 x 48, 2.50-yard		.09½	@	
48 x 48, 2.85-yard		.08¼	@	
64 x 68, 3.15-yard		.09½	@	
56 x 60, 3.60-yard		.08	@	
48 x 44, 3.75-yard		.06¾	@	
SILKS				
Canton, 38-inch	yard	.27½	@	
Schappe, 36-inch		.47½	@	
STOCKINETTES				
SINGLE THREAD				
3½ Peeler, carded	pound		@	
4½ Peeler, carded			@	
6½ Peeler, combed			@	
DOUBLE THREAD				
Zero Peeler, carded	pound		@	
3½ Peeler, carded			@	
6½ Peeler, combed			@	

TIRE FABRICS

BUILDING				
17¼-ounce Sakellarides, combed	pound	$0.80	@	$0.85
17¼-ounce Egyptian, combed		.70	@	.80
17¼-ounce Egyptian, carded		.65	@	.75
17¼-ounce Peelers, combed		.70	@	.75
17¼-ounce Peelers, carded		.55	@	
CORD				
15-ounce Egyptian	pound	.80	@	.85
BICYCLE				
8-ounce American	pound		@	
10-ounce American			@	
CHAFER				
9¼-ounce Sea Island	pound	1.00	@	
9¼-ounce Egyptian, carded		.80	@	.90
9¼-ounce Peeler, carded		.70	@	

*Nominal.

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS

NEW YORK

During the past month the market for chemicals and compounding ingredients has not maintained the improvement noted the month previous, except in the case of lithophone, where the improvement was attributable to the demand for it from the paint more than from the rubber trade.

As yet, revival of rubber manufacturing is not in marked evidence. Akron news from the tire division indicates some increase of activity but improvement has not been noted in other lines during the past month.

Aniline Oil. Demand has continued dull and prices depressed ruling 19 to 25 cents a pound.

Barytes. Some foreign imports were offered but not enough to affect the market. In general, demand has been routine or dull except on the part of makers of lithopone, who are manufacturing their product under a satisfactorily brisk demand.

Benzol. The call for both grades has been well-maintained, with prices firm, ranging for 90 per cent grade from 25 to 31 cents a gallon and for the pure grade from 27 to 33 cents a gallon.

Blanc Fixe. A slightly improved demand was noted early in the month but in general the business became routine and dull.

Blue Lead. The demand has been steadily moderate following the lead of the other lead pigments.

Carbon Black. Prices have been cut to a level that seems to ensure a continuous and fair business.

Carbon Bisulphide. Only light buying has been experienced from the rubber trade. In general the demand has declined to very moderate proportions.

Carbon Tetrachloride. Beginning the month in brisk request —at the end there was no call from the rubber trade.

China Clay. There has been a fair call supplied to a considerable extent by large arrivals from England. This material of domestic production is at serious disadvantage owing to the prevailing high freight rates which curtail its movement to the market.

Dry Colors. In all lines dry colors rule quiet. Further price reductions are opposed by the producing interests.

Litharge. The purchase of litharge by consumers has continued somewhat restricted the entire month.

Lithopone. The demand has held very brisk and satisfactory for weeks. Producers have been operating at capacity. Prices have remained steady at 7 cents a pound for bags and 7½ for barrels.

Solvent Naphtha. The proofing trade, which is a large consumer, is particularly inactive at present. Prices are lower on certain grades.

Sulphur. Demand has been only routine in character.

Talc. Early in the month there was ample supply on hand with no foreign arrivals and prices steady. During the last week foreign stocks appeared and demand dropped to routine proportions.

Whiting. Ample stocks of chalk are coming in which are being taken largely by the whiting makers. Business has continued fair.

Zinc Oxide. Week by week an improvement has been noted and during the last week demand from the automobile tire manufacturers has been reported.

NEW YORK QUOTATIONS

June 24, 1921

Prices subject to change without notice

ACCELERATORS, ORGANIC				
Accelerene (f. o. b. English port)	lb.	13s.	@	
Accelemal (bbl.)	lb.	$0.60	@	
Adco	(kegs) lb.	.65	@	
Aldehyde ammonia crystals	lb.	.95	@	1.00
Aniline oil	lb.	.19	@	.25
Excellerex	lb.	.70	@	.75
Formaldehyde aniline	lb.	.60	@	.65
Hexamethylene tetramine	lb.	.95	@	1.00
Lead oleate (bbls. factory)	400 lbs.	.20	@	
N. C. C.	lb.	.45	@	
No. 999	lb.	.14½	@	
Paradin	lb.	.65	@	
Paraphenylene diamine	lb.	1.75	@	2.00
Thiocarbanilide	lb.	.45	@	.70
Vulcocene	lb.	.35	@	
X L O	lb.	1.50	@	2.00
ACCELERATORS, INORGANIC				
Lead, dry red	lb.	.10	@	
sublimed blue	lb.	.07¼	@	.07½
sublimed white	lb.	.07¼	@	.08
white, basic carbonate	lb.	.07½	@	.08
Lime, flour	lb.	.02½	@	
Superfine	lb.	.03	@	
Litharge, domestic	lb.	.09¾	@	
imported	lb.	.17	@	
sublimed	lb.		@	
Magnesium, carbonate, light	lb.	.09	@	
oxide, calcined light	lb.	.27	@	.30
calcined heavy	lb.	.06½	@	.08½
ACIDS				
Acetic 28 per cent	lb.	.02½	@	
glacial, 99 per cent	cwt.	11.00	@	11.75
Cresylic (97% straw color)	gal.	.85	@	.87
(95% dark)	gal.	.80	@	.82
Muriatic, 20 degrees	lb.	.02	@	
Nitric, 36 degrees	lb.	.05¾	@	
Sulphuric, 66 degrees	lb.	.01½	@	
ALKALIES				
Caustic soda (factory)	lb.	.03⅞	@	.04¼
Soda ash, 58%	cwt.	1.90	@	2.25
COLORS				
Black				
Bone, powdered	lb.	.06½	@	.14
granulated	lb.	.11	@	
Carbon black (sacks, factory)	lb.	.09	@	.14
pressed	lb.	.10	@	.15
Dipped goods	lb.	1.00	@	
Drop	lb.	.08	@	.16
Ivory black	lb.	.17	@	.45
Lampblack	lb.	.10½	@	.45
Oil soluble aniline	lb.	.95	@	
Rubber black	lb.	.10	@	.16
Rubber makers' non-flying black	lb.	.40	@	
Blue				
Cobalt	lb.	.25	@	.30
Dipped goods	lb.	1.00	@	
Prussian	lb.	.60	@	
Rubber makers' blue	lb.	3.50	@	
Ultramarine	lb.	.16	@	.35
Brown				
Iron oxide	lb.	.05	@	.07
Sienna, Italian, raw and burnt	lb.	.05	@	.07
Sienna, Italian, raw (tan color)	lb.	.06	@	.14
Umber, Turkey, raw and burnt	lb.	.05	@	.07
Vandyke	lb.	.06	@	.08
Green				
Chrome, light	lb.	.36	@	.40
medium	lb.	.40	@	.52
dark	lb.	.52	@	.58
commercial	lb.	.13½	@	
tile	lb.	.08	@	.17
Guignet	lb.	1.50	@	
Dipped goods	lb.	1.00	@	
Oxide of chromium	lb.	.55	@	.70
Rubber makers' green	lb.	3.50	@	
Red				
Antimony, crimson	lb.	.44	@	
crimson, F	lb.	.35	@	
crimson, R. M. P.	lb.	.55	@	
Antimony, golden	lb.	.28	@	
golden, R. M. P.	lb.	.25	@	
golden 1	lb.	.30	@	
golden 2	lb.	.25	@	
7-A	lb.	.42	@	
vermilion	lb.	.55	@	
red	lb.	.25	@	
Arsenic, red sulphide	lb.	.13½	@	
Dipped goods, red	lb.	1.25	@	
purple	lb.	1.00	@	
orange	lb.	1.25	@	
Indian	lb.	.13½	@	
Iron oxide, reduced grades	lb.	.04	@	.12
pure bright	lb.	.15½	@	

COLORS—Continued

Maroon oxide	lb.	$0.13½	@	
Oil soluble aniline, red	lb.	1.75	@	2.00
orange	lb.	1.50	@	
Oximony	lb.	.17½	@	
Para toner	lb.	1.60	@	
Red excelsior	lb.		@	
Rubber-makers' red (four shades)	lb.	3.50	@	
purple	lb.	2.50	@	
Spanish natural	lb.	.05	@	.06
Toluidine toner	lb.	3.00	@	3.25
Venetian	lb.	.03	@	.06
Vermilion, American	lb.	.25	@	.30
permanent	lb.	.32	@	
English quicksilver	lb.	1.10	@	1.20
White				
Albalith	lb.	.07	@	.07¼
Aluminum bronze, extra brilliant	lb.		@	
extra fine	lb.		@	
Lithopone, Beckton white	lb.	.07	@	.07½
Lithopone, domestic (factory)	lb.	.07	@	.07½
Ponolith (carloads, factory)	lb.		@	
Rubber-makers' white	lb.		@	
		C.L.		L.C.L.
Zinc oxide. American Horse Head (factory)	lb.	.08¾	@	.09¼
Special	lb.	.09¼	@	.09¾
XX red	lb.	.08¾	@	.09¼
French process, Florence brand (factory):				
White seal	lb.	.12¼	@	.12½
Green seal	lb.	.11	@	.11½
Red seal	lb.	.10	@	.10½
White seal	lb.	.12¼	@	.12½
Azo (factory):				
ZZZ (lead free)	lb.	.08¾	@	.09¼
ZZ (under 5% leaded)	lb.	.08	@	.08½
Z (8-10% leaded)	lb.	.07⅝	@	.08⅛
Yellow				
Arsenic, yellow sulphide	lb.	.70	@	
Cadmium, sulphide, yellow, light, orange	lb.		@	
red	lb.		@	
Chrome, light and medium	lb.	.21	@	
C. P.	lb.	.21	@	
Dipped goods	lb.	1.25	@	
Ochre, domestic	lb.	.02½	@	.03½
imported	lb.	.03½	@	.05½
Oil soluble aniline	lb.	1.60	@	
Rubber makers' yellow	lb.	2.50	@	3.50
Zinc chromate	lb.	.40	@	

COMPOUNDING INGREDIENTS

Aluminum flake (carload)	ton	33.00	@	
hydrate, light	lb.	.22	@	.25
Ammonium carbonate (lump)	lb.	.07½	@	.10
Asbestine	ton	20.00	@	25.00
Barium, carbonate	ton	60.00	@	70.00
dust	ton	85.00	@	
Barytes, pure white (f. o. b. works)	ton	28.00	@	
off color, carload	ton	20.00	@	
uniform floated, carload	ton	28.00	@	
Basofor	lb.	.05	@	
Beta-naphthol	lb.	.37½	@	.40
Blanc fixe	lb.	.04½	@	
Bone ash	lb.		@	
Carrara filler (factory)	ton.	16.00	@	
Chalk, precipitated, extra light (f. o. b. factory)	lb.	.03½	@	.04¼
heavy (f. o. b. factory)	lb.	.02½	@	.03¼
China, clay, Dixie	ton	22.00	@	
Blue Ridge	ton	22.00	@	
domestic	ton	7.50	@	9.00
imported	ton	16.00	@	24.00
Cotton linters, clean mill run (factory)	lb.	.01¾	@	.02¼
Diatomite	lb.	.03½	@	
Fossil flour (powdered)	ton	60.00	@	
(bolted)	ton	65.00	@	
Glue, high grade	lb.	.30	@	.40
medium	lb.	.24	@	.30
low grade	lb.	.17	@	.19
Graphite, flake (400-pounds bbl.)	lb.	.10	@	
amorphous	lb.	.05	@	
Ground glass FF. (bbls.)	lb.		@	
Infusorial earth (powdered)	ton	60.00	@	
(bolted)	ton	65.00	@	
Liquid rubber	lb.	.15½	@	
Mica, powdered	lb.	.15	@	
Phenanthrene	lb.	.08	@	.10
Pumice stone, powdered (bbl.)	lb.	.03	@	.08
Rotten stone, powdered	lb.	.02½	@	.04½
Rubber paste	lb.		@	
Silica, aluminum	ton	25.00	@	28.00
gold bond	ton	28.00	@	
silver bond	ton	22.00	@	
Soap bark, crushed	lb.	.12	@	.13
Soapstone, powdered gray (carload)	ton	12.00	@	
Starch, powdered corn (bags)	cwt.	2.43	@	
(bbls.)	cwt.	2.81	@	
Talc, powdered soapstone	ton	20.00	@	25.00
Terra blanche	ton	22.00	@	25.00
Tripoli flour, air-floated, cream or rose (factory)	ton	30.00	@	
white (factory)	ton	32.00	@	
Tyre-lith	ton	95.00	@	
Whiting, Alba	cwt.	15.00	@	18.00
Columbia	cwt.		@	
commercial	cwt.	1.15	@	1.20
Danish	ton	18.00	@	
English cliffstone	cwt.	1.75	@	2.00
gilders	cwt.	1.20	@	1.35
Paris, white, American	cwt.	1.40	@	1.50
Quaker	ton	13.00	@	
Super	ton		@	
Wood pulp, imported	ton		@	
XXX (f. o. b. plant)	ton	36.00	@	
X (f. o. b. plant)	ton	35.00	@	
Wood flour	ton	35.00	@	40.00

MINERAL RUBBER

Elateron (c. l. factory)	ton		@	
(l. c. l. factory)	ton		@	
Gilsonite	ton	$70.00	@	
Genasco (c. l. factory)	ton	50.00	@	
(l. c. l. factory)	ton	52.00	@	
Hard hydrocarbon	ton	35.00	@	45.00
Soft hydrocarbon	ton	35.00	@	40.00
320 M. P. hydrocarbon (c. l. factory)	ton	50.00	@	55.00
(l. c. l. factory)	ton	57.50	@	
300/310 M. P. hydrocarbon (c. l. factory)	ton	40.00	@	
(l. c. l. factory)	ton	45.00	@	
M. R. X	ton		@	
Pioneer, M. R. (c. l. factory)	ton	46.00	@	
(l. c. l. factory)	ton	48.00	@	
Raven M. R.	ton		@	
Robertson, M. R. pulverized (c. l. factory)	ton	87.50	@	
M. R pulverized (l. c. l. factory)	ton	90.00	@	
M. R. (c. l. factory)	ton	62.50	@	
M. R. (l. c. l. factory)	ton	65.00	@	
Rubrax (factory)	ton	50.00	@	
States "A" (l. c. l. factory)	ton	45.00	@	
No. 1 (l. c. l. factory)	ton	40.00	@	
Synpro, granulated, M. R. (factory)	ton	60.00	@	72.50

OILS

Avoilas compound (bbl.)	lb.	.16	@	
(kegs)	lb.	.18	@	
Castor, No. 1, U. S. P.	lb.	.11	@	
No. 3, U. S. P.	lb.	.09	@	
Corn	lb.	.07½	@	
refined	cwt.	9.10	@	
Cotton	lb.	.08	@	
Glycerine (98 per cent)	lb.	.18	@	.19
Linseed, raw	gal.	.73	@	
Linseed compound	gal.		@	
Palmoline	lb.	.10	@	.13
Palm niger	lb.	.06¾	@	
Peanut	lb.	.08	@	
Petrolatum, standard	lb.	.06	@	.08
Petrolatum, sticky	lb.	.08	@	.10
Pine, steam distilled	gal.	1.12	@	1.35
Rapeseed, refined	lb.	.07½	@	
blown	lb.	.08	@	
Rosin	gal.	.40	@	.43
Synpro	gal.	.38	@	.65
Soya bean	lb	.07½	@	
Tar	gal.	.32	@	.34

RESINS AND PITCHES

Cantella gum	lb.	.50	@	
Cumar resin, hard	lb.	.09	@	.13
soft	lb.	.09	@	.13
Tar, retort	bbl.	12.00	@	
kiln	bbl.	11.00	@	11.50
Pitch, Burgundy	lb.	.05	@	
coal tar	ton	25.00	@	
pine tar	lb.	.03½	@	
ponto	lb.	.10	@	
Rosin, K (bbl.)	280 lbs.	5.80	@	
strained (bbls.)	280 lbs.	5.40	@	
Shellac, fine orange	lb.	.90	@	

SOLVENTS

Acetone (98.99 per cent, drums [6.62 lbs. per gal.])	lb.	.12½	@	.13½
Benzol (water white, 90% [7.21 lbs. per gal.])	gal.	.25	@	.31
pure (drums, extra)	gal.	.27	@	.33
Carbon bisulphide (drums [10.81 lbs. per gal.])	lb.	.07	@	.07½
tetrachloride (drums [13.28 lbs. per gal.])	lb.	.11	@	.13½
Paracymene (factory)	gal.	1.00	@	
Motor gasoline (steel bbls.)	gal.	.24½	@	
73@76 degrees (steel bbls.)	gal.	.37½	@	
68@70 degrees (steel bbls.)	gal.	.35	@	
Naphtha, V. M. & P. (steel bbls.)	gal.	.25	@	
solvent (drums extra)	gal.	.28	@	
Toluol, pure (7.21 lbs. per gal.)	gal.	.28	@	.34
Turpentine, spirits	gal.	.62	@	
wood	gal.	.60	@	
Xylol, pure (7.21 lbs. per gal.)	gal.	.40	@	.43
commercial	gal.	.28	@	.35

SUBSTITUTES

Black	lb.	.08	@	.15
White	lb.	.10	@	.17
Brown	lb.	.12	@	.16
Brown factice	lb.	.07	@	.15
White factice	lb.	.08	@	.17
Paragol, soft and medium	cwt.	6.81	@	
hard	cwt.	6.81	@	

VULCANIZING INGREDIENTS

Lead, black hyposulphite (black hypo)	lb.	.40	@	
Orange mineral, domestic	lb.	.11¾	@	.13½
Sulphur chloride (jugs)	lb.	.18	@	.20
(drums)	lb.	.07	@	.08½
Sulphur, flour, Brooklyn brand (carloads)	cwt.		@	
Brooklyn brand (less carload)	cwt.		@	
Bergenport brand (bbls.)	cwt.	2.55	@	
(bags)	cwt.	2.30	@	
superfine (carloads, factory)	cwt.		@	

(See also Colors—Antimony.)

WAXES

Wax, beeswax, white, commercial	lb.	.55	@	
ceresin, white	lb.	.14	@	
carnauba	lb.	.20	@	
Montan	lb.	.09	@	
ozokerite, black	lb.	.30	@	
green	lb.	.30	@	
paraffin	lb.	.03½	@	.08
sweet wax	lb.	.12	@	

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THE FORDNEY TARIFF BILL

In theory the Fordney Tariff Bill should prove most effective for the protection of American industry. It aims to levy on manufactured articles imposts that will cover the difference between the lower overseas and the higher American cost of production, and safeguard American industries from unfair and perhaps ruinous competition. Yet in actual operation in its present form it might handicap exports and so defeat its avowed purpose, and its efficacy will hinge very largely on the question of appraisal. This involves an issue of transcending importance which is: Shall the United States take the goods of foreigners at their own, or at the American valuation?

It is intimated that unless Americans accept the price ratings given by foreign shippers, often subject to misstatement and exchange fluctuation, our neighbors overseas may retaliate. Be that as it may, American manufacturers are quite willing to take a chance on such retaliation. Certainly no open or covert threats should scare our lawmakers into surrendering the nation's just and logical prerogative of fixing the values of imported goods as rated in the domestic rather than in the foreign market. As a whole the rubber trade is not stirred by the terms of the bill. Hard rubber and some other lines need more protection but no tariff bill is fair to all.

SCIENCE IN RUBBER PLANTATIONS

Rule of thumb methods in the growing of rubber and in the manufacture of rubber goods were profitable when both industries were young and competition mild. Their day, however, is past or passing, and scientific production alone promises success. This has been notably found in the manufacture of rubber goods in the past ten years. A very brief survey of the progress, chemical, mechanical and industrial, shows an advance in scientific knowledge that is marvelous.

That crude rubber production must come under the same law of survival is obvious. It is, therefore, most encouraging to examine the reports that come from the Far East where a brilliant corps of scientists are tirelessly at work upon the problems incident to rubber cultivation. As a preliminary, it may be noted that the many diseases and pests that threatened the Hevea have been halted or exterminated by the British and Dutch savants. Of just as great importance, however, is the work in tree selection that is going on, notably in Medan, Sumatra, under Dr. Heusser.

Briefly, the learned botanist secured records of yield of thousands of trees. From this he observed that one or two trees out of every thousand were big producers of latex. The difference ran from 4 to 10 times as much as the daily product of the rest of the other trees. These big producers were then tested for the dry rubber content of the latex, which was found to vary from 15 to 52 per cent. These selected trees with a latex content from 30 to 35 per cent are called "mother trees," as they are designed to breed the plantings of the future. This is done by budding from the mother tree upon one-year-old Hevea seedlings. Thousands of these buddings have been made and tapping results are eagerly awaited. It is not too much to say that the promise of success is there.

STANDARDIZATION AND SIMPLIFICATION

Mindful not merely of the benefit to its own country of more general standardization and simplification, the American section of the International Chamber of Commerce, of which John J. Raskob, vice-president of E. I. du Pont de Nemours & Co., is a leading member, has been urging at the London conference the adoption of such a policy as tending to promote an early return of world-wide normal conditions. The American committee is convinced, it says, that the stagnant stocks of commodi-

ties and congestion in distribution are positively due to lack of standards and excess variety of fabricated products. Proper cooperation and general adoption of engineering standards would no doubt go a long way toward eliminating waste and duplication in the making of commodities in styles, sizes and sorts that are not only confusing but that serve no useful purpose.

Much is being done by private initiative, the United States Bureau of Standards, and the Fabricated Production Department of the Chamber of Commerce of the United States, toward popularizing the slogan, "Standardize and simplify." Were it to be adopted also by the International Chamber of Commerce the friends of real industrial reform might well congratulate themselves on the achievement, as it would indeed be an augury of better times in the very near future.

DETECTING THE INDUSTRIALLY UNFIT

Employment managers can find in the United States Navy's system of detecting the unfit and classifying the fit for various kinds of work much that should be helpful to them in dealing with industrial applicants. Even more than the Army, has the Navy stressed the need of mental as well as physical and other tests. In making the mental test the Navy does not content itself with determining merely the normality or feeble-mindedness of a candidate, but it gets the applicant to reveal in a brief, agreeable, standardized interview his real personality; and accordingly is he indexed and graded. The old-time application blank has been found to be as misleading as the letter of recommendation. It is elusive and one-sided, leaving largely with the man himself the determination of his ability; and undesirables cannot be trusted to record their failures and deficiencies. Under the Navy plan not only is the candidate judged by his appearance, attitude, manner, etc., but he must show whether or not he is a shiftless wanderer, a failure in his school days as well as in his manhood, a man who could not hold any job a year, or one who perhaps is a chronic invalid, whose ailments may be vague enough to him but are very real to a mill manager who must have only "live ones" in his employ, and whose constant struggle is to keep his labor turnover down to normal limits.

EXPENSIVE HOARDING

Trying hard after the great war to regain its stride, industry in general has no more pressing need than ample liquid capital. Yet we are told by Federal statisticians that a vast amount of funds that should be available for the financing of world enterprises, and that might be easily conserved, is being hoarded. It is stated that of the approximately $65,000,000,000 aggregate annual income of the people of the United States actually less than $20,000,000,000 is now reinvested as productive capital. Economic and financial experts well realize the significance of this colossal wastage, and they have proposed a veritable host of plans for the replenishing of the world's lost capital. While many of them are admirable, none is conceived in a fairer, more whole-hearted, more helpful, or more economically sound spirit than that of the United States Government Loan Organization.

To aid the nation's industries and raise the workers' morale, the Government is making a special appeal to employers to urge and enable their helpers to invest some part of their savings, no matter how small, in Treasury savings securities ranging in denomination from 25-cent thrift stamps to $1,000 certificates. To their great credit numerous employers not only have assured the Government of their support but have been vying with one another to see how large a percentage of their workers they can engage in the commendable work of providing for the "rainy day," and for industrial prosperity.

One of the first to appreciate the merits of the Treasury Department's plan was J. J. Voorhees of the Voorhees Rubber Manufacturing Co., Jersey City, New Jersey. In referring to the introduction of the plan in his factory, he says: "I am sure the plan will be successful because my employes realize it is the easiest and most convenient method by which they can save with a minimum amount of effort on their part."

AS TO THE "GYP"

Considering the word that has made a place for itself in the tire trade; whence comes it, and exactly what does it mean? When derived from "gypsy" it refers to a sly, irresponsible individual, a wandering, unscrupulous trader. As a noun and not an abbreviation, it means a vulture, with all of that foul bird's appetite for offal. As a verb it relates to trickery and thievery. Thus the trade stigmatizes the maker of, or dealer in, misbranded or unbranded tires, the creator of cut prices, the expert in the tricks incident to the depraved trader. Not bad as modern word creations go.

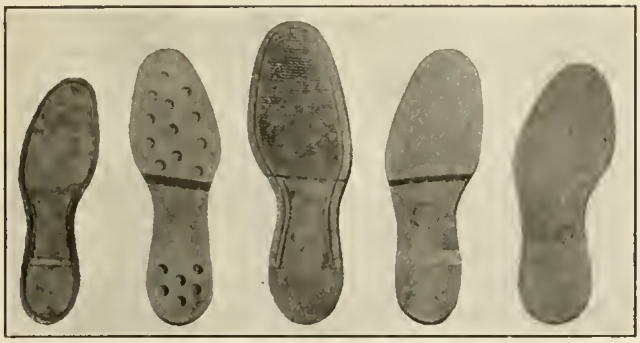
While so many large growers of cotton in the United States, discouraged by a temporary recession in prices, have greatly reduced their acreage this year, Secretary of Commerce Herbert C. Hoover, with a confidence born of great faith in the future of American industry and fortified with ample information as to national and international needs, has planted 600 acres of his 1,200-acre ranch in the San Joaquin Valley, California, to Pima cotton. It may be true that the cotton demand is now light, and that the carry-over is large, but everything indicates that the demand will soon come back strong, that before long the pendulum must swing the other way, and that real advantage for the cotton-grower lies in being ready to meet the returning demand at advancing prices, rather than in limiting production to bare, present necessities.

The Rubber Sole Up to Date

The Question of Health—Popular Fallacies Concerning Rubber Soles—Wide Use for Rubber Soles—Marketing and Production—Quest for Soling Compounds—Types of Soling Compounds—Unusual Types of Rubber Soles—Modern Shoe Machinery Used—Rubber-Sole Testing Machines

A QUESTION OF HEALTH

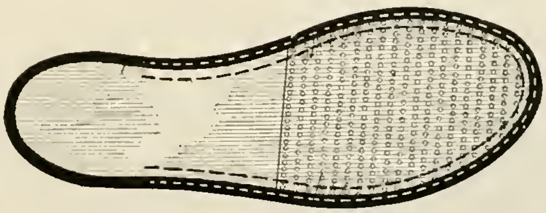
With the drug stores of the world packed with cold remedies, and civilized man coughing, expectorating, suffering, and dying from colds, preventatives should be taken into account far more than they are. What has been done in guarding the throat and nasal passages by isolating coughers, fining the spitters,



Types of Rubber and Rubber-Fiber Soles

and insisting upon pure air night and day, is excellent. One source of cold-catching, however, is almost totally neglected, and that is through the feet. Here are the largest and most active pores. They are constantly at work throwing off poison. If chilled, this work stops, congestion is brought on, and a cold is the result.

Not that dry cold feet are a menace. It is the cold feet brought about by outside wet or dampness that does the harm. A prolific source of colds is the leather sole, thick or thin, from which the natural oil has been removed. While such a sole may wear well, there is also its quality of absorbing water quickly and as quickly drying out. Such soles, just as soon as they are damp, should no longer be worn, because in their quick drying-out the cold is taken. In other words, take off damp or wet shoes at once, or, better still, wear waterproof soles and let the damp earth, wet grass, or slushy sidewalks do their worst. Certainly, thus shod, there is no danger of catching cold through the feet.



Grosjean Cord Sole

The waterproof rubber sole, if of proper thickness, also keeps the feet much warmer than leather, and without the use of cumbersome insoles; and this means better circulation of the blood. Such equalization of the blood current in turn means less congestion in the respiratory and other organs sensitive to hyperemia or overfulness of the blood vessels; and hence less likelihood of the development of many maladies commonly attributed to this cause. With such a sole it is possible to dispense with the wearing of rubbers and overshoes except in the most stormy weather. Walking may be one of the best forms of exercise, yet every step means more or less jar on the spinal cord and the brain, which is reduced by the elastic and flexible rubber sole that acts as a cushion. Many a sufferer from rheumatism, sciatica, backache, headache, and various nervous ailments has been afforded marked relief by substituting rubber soles for the harsher though time-honored ones of leather.

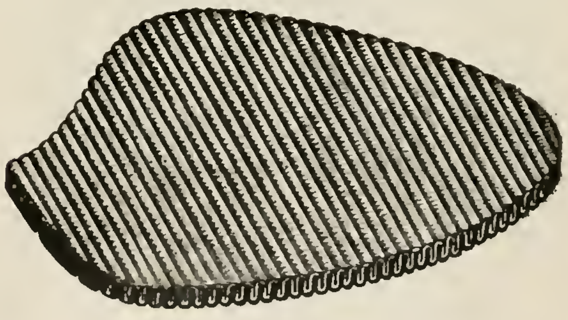
POPULAR FALLACIES CONCERNING RUBBER SOLES

Many people who ought to know better still cling to the belief that rubber soles act like poultices, that is, that they burn and draw the feet, while leather soles allow the feet to "breathe." The best that can be said of both notions is that they are like half-truths and that they lack scientific proof. Doubtless the earlier makes of soles contained too much rubber and were too heavy, and this caused as much discomfort to people with sensitive feet as the wearing of thick rubber boots. However, in recent years, there has been a wonderful improvement in the manufacture of rubber soles, former sole faults having been quite overcome by intelligent cooperation on the part of the rubber chemist, superintendent, and sales manager.

If rubber really burned or drew the feet there should be some complaint made by the great number of people who mostly unknowingly but with evident satisfaction wear rubber-fiber insoles, which are now used in a large percentage of good quality shoes. As for leather soles allowing the feet to "breathe," the fact is only too patent that the bottom of any well-made leather shoe, composed as it is of layers of tough tanned hide, waxed fabric, and other such material, is simply impermeable to air; and if the feet "breathe," they do so through or above the upper. It is familiar experience that the rubber sole is a boon to sufferers from swollen and tender feet and to those afflicted with corns and bunions; nor does the rubber-soled shoe have to be "broken in" as is necessary so often with leather shoes. Orthopedic surgeons are quoted as saying that the rubber sole allows the muscles of the foot to flex and function more naturally than leather.

WIDE USE FOR RUBBER SOLES

Apart from even the question of health, the modern rubber sole has many points in its favor. It is remarkably durable, often wearing three times as long as a good leather sole, affording miners, marketmen, tanners, abattoir men, and others a perfect foot protection; it saves the shoes of farmers who must walk in moist alkaline fertilizers; its noiseless tread, if placed on children's shoes, affords much relief to tired mothers, and it is a certain advantage to policemen, soldiers, sailors, marines, hunters, hotel, hospital, and other workers. Being an electrical non-conductor, it can safeguard firemen, linemen, motormen, conductors, and others from possibly fatal shocks; it greatly lessens for brakemen, firemen, engineers, and others the harmful vibration of trains and gives them a surer



Foster Crimped Rubberized Fiber Sole

footing on car-steps; and it also provides bicyclists, golfers, hikers, fishermen, yachtsmen, and others with an ideal shoe sole.

MARKETING AND PRODUCTION

Despite the fact that the rubber sole had proved its right to

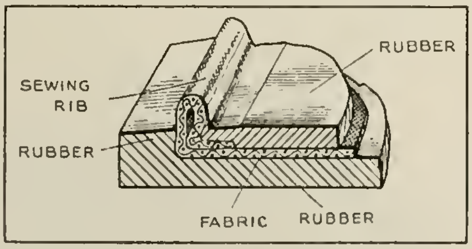
a foremost place in the footwear market, it had to fight long and hard for recognition. Some manufacturers of leather shoes persisted in fostering the fallacy that rubber soles did more to harm than to help the feet, and were so wedded to old standards that it was only after insistent calls that they timidly ventured to make shoes with rubber soles as "original equipment." Retailers were equally reluctant to buy or display them, and many unprogressive repair men took every opportunity to "knock" them. The objections made by the cobblers were that the rubber soles tore too easily while being stitched, that they could not be edged or finished as nicely as leather soles, and that bulges or air pockets often developed under the soles. But the man who wanted rubber soles on his shoes, and knew their merits, often thought that the real reason why the cobblers disliked putting on rubber soles was that they wore too long.

Foster Friction Plug Rubber Sole

Now manufacturers are turning out shoes with rubber soles that cost half the price of leather ones and require fewer operations to attach and finish them, yet are "tailored" as modishly as any leather shoe. Finding that wearers are rapidly discovering the advantages of rubber-soled shoes, retailers are actually adding to their stock and variety, and may soon be pushing sales. The up-to-date repair man scoffs at the idea of any good rubber soling tearing while being sewed on a shoe—a trouble easily avoided by not pulling the stitches too tight. The rubber sole edges, he says, can be buffed and finished in as dressy a fashion as though of leather; and as for bulges or air pockets in the sole center, they need not occur if a workman spreads his cement on evenly. Ordinarily only a full sole is cemented, the taps being generally nailed on. Another objection that is no longer raised is that rubber soles tend to break across the foot. Many of the old-time fiber soles did thus discredit the industry, but the modern sole does not crack.

The rubber soling which will eventually find the widest market is that which most fully meets these requirements: high tensile strength, energy of resilience, light weight (a gravity that will not exceed 1.15), a close grain that will resist cutting, attractive appearance ("blooming" stock being decidedly passé), and the property of holding its original life even in rough service. As a result of intensive research and incessant experimenting, rubber sole manufacturers are now producing several articles that quite possess this exacting combination of qualities, and which are as far ahead of the old-fashioned fiber sole as the nitrogen-tungsten lamp is above the original carbon filament bulb.

While according the ingenious and enterprising manufacturers their proper share of credit, it may be said that several circumstances favored the development of the modern rubber sole. The war sent the price of leather up to an almost prohibitive price, thus renewing an interest in leather substitutes, and caused a sharp inquiry for rubber or fiber soles. The price of crude rubber dropped to an unheard-of low figure, and the price of reclaimed rubber began to fall rapidly as the value of crude declined, while the volume of rubber scrap, especially discarded tires, which afford an excellent and tough material for soling compounds, began to increase immensely. Indeed, the large amount of high-grade reclaim that has been available of late has played no small part in quantity production of the modern rubber sole.



Winslow Rubber Compound Turn Sole

QUEST FOR SOLING COMPOUNDS

Visioning the time when cattle-raising and leather production would fail to keep pace with the growth of population, and realizing the need of soles that would have all the merits and none of the deficiencies of those made of leather, yet be much cheaper, rubber manufacturers began making soles nearly half a century ago. The early products were heavy, awkward, and practically all rubber. In trying to overcome old prejudices and capture the public fancy a host of compounds was tried, but the results were very discouraging. Then came the fiberized rubber sole, an admirable effort to overcome the shortcomings of the old rubber soles, and which met with a generous popular response. The qualities were as various as the fillings, which included practically every fibrous substance from leather refuse to silk waste and paper pulp.

Costly mistakes were made in marketing. Manufacturers of some of the best goods blundered by making too many different sizes and shapes, either making it hard for shoe men to apply the soles or requiring them to carry too large an assortment. They specialized too much and standardized too little, and made no sustained advance. Some unscrupulous makers injured the trade greatly by flooding the market with inferior soles for which extravagant claims were made and which only aroused resentment against the whole rubber sole industry.

Finally came the modern rubber sole, a real achievement, utilizing all that was good in the soles that went before, obviating all that was bad, and even eclipsing leather to a marked degree while selling much more cheaply. Earlier mistakes in distribution were also avoided. The needs and convenience of manufacturer and repair man were studied, and the material was supplied in stamped-out soles and taps in standard forms and sizes; or in blocks, strips, and sheets from which the shoemaker or cobbler could cut out his own patterns of full and half-soles. The rapidly-growing popularity of these goods, the satisfaction widely expressed, and the lack of fault-finding amply indicate that the modern sole has won the public approval.

TYPES OF SOLING COMPOUNDS

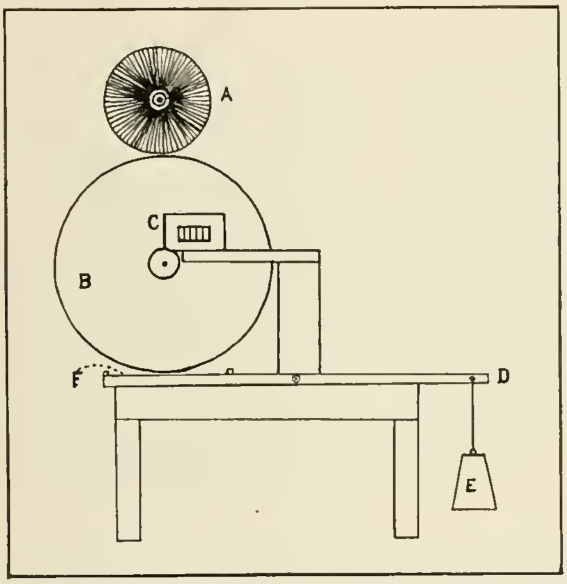
The search for a suitable sole stock to take the place of leather has for many years been conducted by some of the foremost experts in the rubber industry, and numerous patents have been issued in this country and abroad for fabricated materials designed to supplant sole leather. Nearly all of the mixtures thus far used, or proposed, have a certain percentage of wool, cotton, or leather fiber mixed with rubber and vulcanized, the amount of fiber varying from 10 to 25 per cent. Leather fiber figured prominently in the earlier compounds, but now it is rarely used in excess of 5 per cent, the remainder of the fiber content being either of wood or cotton in a flocculent state. A typical modern fiber sole compound is the following:

	Per Cent
Leather fiber	3 to 5
Other fiber	5 to 15
New rubber	18 to 20
Corn oil substitute	5 to 7
Asphaltum	2 to 5
Reclaimed rubber	10 to 25
Zinc oxide	18 to 20
Magnesium carbonate	1 to 6
Sulphur	1 to 6
With whiting, lithopone, and litharge.	

A Danish sole leather substitute which has given good results is composed of 3 pounds of Pará rubber, 12 pounds of oil of turpentine, mixed after the rubber has dissolved in the turpentine with 3 pounds of 30 per cent ammonia. When the rubber mixture acquires a grayish-white color 45 pounds of leather pulp, which has been exposed to ammonia fumes, are added and the whole kneaded to an even mass.

An English formula for a leather-rubber which, though simple, gave much satisfaction, provided for 20 pounds of caoutchouc, 20 pounds of ground rags or other fiber, and 2 pounds of sulphur.

A non-slip American compound is made up of these ingredients: rubber, 18 pounds; litharge, 10 pounds; whiting, 20 pounds; flowers of sulphur, 11 ounces; lampblack, 8 ounces; and to which



A—Wire Brush; *B*—Grindstone; *C*—Speed Counter; *D*—Lever on Which Sample Is Tested; *E*—Weight Forcing Sample Against Grindstone; *F*—Box for Rubber Soling Sample

Device for Testing Rubber Soling Compounds

is added coarse emery or other gritty substance in weight equaling the rubber and the other ingredients.

A leather compound designed primarily for horseshoe pads, but which it was stated could be used also for soling, is as follows:

	Parts
Fine Pará rubber	5
Reclaimed rubber	3
Golden sulphuret of antimony	5
Lime	8
Magnesia	2
Zinc oxide	1
Rubber saturated and coated fibers	19
Sulphur	5
Total	48

The batch is vulcanized under 2,000 pounds pressure for 40 minutes. If a more heat-resistant compound is desired, 2 parts of asbestos fiber are added to the other 48 parts, the fiber being either natural or rubber-coated.

An artificial sole composition calls for crude rubber, ground frictioned fabric, sulphur, and an alkali ground up in a mixing mill.

Standard soling for a large percentage of the high-grade rubber shoes now worn is made up of four layers: rubber tread surface, sheeting and friction, felt and cork, and sheeting lining.

UNUSUAL TYPES OF RUBBER SOLES

A rubber sole having for its tread strands of stout cord held together with rubber and stretched across the sole between the toe and the shank—the shank and the heel being of rubber only, or of rubber and fabric—is a comparatively recent invention. In making the sole, after the pattern is stamped from a thin strip or sheet of rubber, the cords are drawn under and over the surface of this strip and held in place above with another and stouter strip or sheet of rubber. The tread strands are cemented with rubber solution to the under side of the lower strip, and the whole vulcanized.

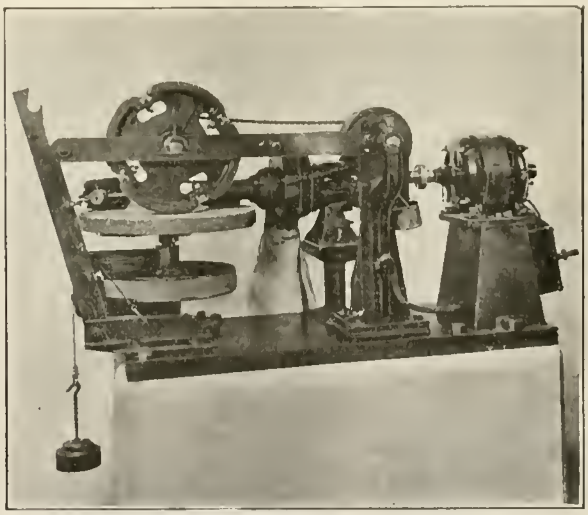
While knurling and corrugations are much used on the soles of rubber boots, rubber sole manufacturers either dispense with them or use such "anti-skid" features in a much more modified form. The typical patterns shown in the illustration vary from the soles having perfectly plain surfaces to the soles having doubly-thickened taps and heels, soles with many small concavities like vacuum cups on thickened tap and heel portions, and soles having crosswise ribbing and other designs intended to give the wearer a firmer foothold. A rubberized crimped or fluted fiber sole and a friction-plug rubber sole having a toughened fabric inset in tap and heel are other types that have found favor.

MODERN SHOE MACHINERY USED

One of the impediments to the progress of the rubber sole has been the fact that such soles have not been adapted to modern shoemaking machinery. Unable with standard apparatus and ordinary factory methods to attach rubber soles to uppers in the making of turn-shoes with single-faced stitches, manufacturers, even though well-disposed toward the innovation, naturally sidestepped the problem, and through this circumstance rubber soles failed to attain the vogue that they had fairly earned. Finally United States Patent No. 1,296,894 was granted to Sidney W. Winslow, Jr., of Beverly, Massachusetts, and assigned to the United Shoe Machinery Co., of Paterson, New Jersey, that met just such a condition, and whereby a rubber compound turn sole could be produced which would enable a manufacturer of leather shoes to make an attractive and serviceable rubber-soled turn shoe with his regular machinery. The inventor contrived a rubber compound sole having imbedded by vulcanization in its upper side a low, upturned, folded fabric sewing-rib following the outline of the sole and but a short distance from the edge. Thus another great difficulty was surmounted and incidentally a decided impetus given to the rubber sole industry. The practically correct compound having been found, an ideal method of attaching the rubber soles to uppers had been devised, capping the climax, as it were.

RUBBER SOLE TESTING MACHINES

Despite the fact that they have produced a material that amply fills every reasonable requirement and more, rubber sole manufacturers are not yet wholly satisfied. They continue making and



Bureau of Standards Rubber Sole Testing Machine

testing out new compounds in the hope that a still better product may yet be evolved. Simple but efficient is the device used for determining the toughness or wearing quality of the various samples of soling. A grindstone about 8 inches in diameter and 3 inches thick is mounted on a stand. Touching it above is a revolving wire brush which keeps the stone clean, and beneath the stone is a pivoted wooden lever. A sample of soling is fastened to the lever near the grindstone and a 15-pound weight is hung upon the other end of the lever, thus pressing the sample

against the stone. Each piece of soling is thus held until the grindstone has just about worn a hole through it, and an attendant notes the comparative resistance made by each sample to the abrasive action of the whirling stone, the revolutions of which are also indicated by a counter attached to the shaft. This machine can be made easily and cheaply in any shop.

A more elaborate contrivance, employing similar principles, is used by the United States Bureau of Standards in Washington, D. C., for determining the relative values of the materials used for soling army boots and shoes.

Applying and Repairing Rubber Belting

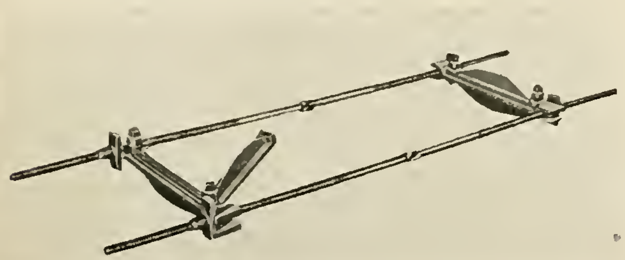
A Bit of History—Leather Belting—Rubber Belting—Wide Field of Usefulness for Rubber Belting—Field Work in Applying and Repairing—The Leather Lacing—Best Lacing Method—Hinge Joint Lacing—Lace and Lap Fastening—Making a Back Splice—Lap Splicing—Diamond Lap Splice

A BIT OF HISTORY

Rubber belting has been manufactured in the United States since 1836, even before vulcanization was discovered by Goodyear. It was at first a monopoly under the Goodyear patents controlled by Henry Edwards, of Boston. Later it became one of the important lines manufactured by all of the leading mechanical rubber goods producers.

LEATHER BELTING

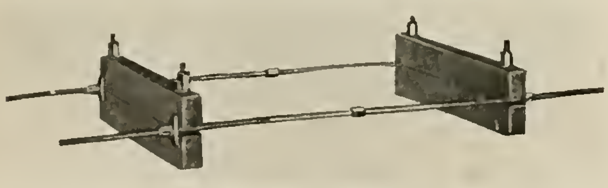
Leather belting for a great many years had been regarded as the only practical material, combining strength, flexibility, gripping power, and endurance, suitable for transmitting power. Excellent as it was and is, machinery users early noted several serious shortcomings in it.



Steel Belt-Stretcher

Generally speaking, the leather belt worked well indoors, and even outdoors when the weather was dry, but in the presence of much moisture the leather relaxed and lost much of its grip, necessitating the use of various devices to take up the slack. Cold usually hardens and heat warps leather belting.

Then, too, the leather belt is limited in width, due to the nature of the material; and generally, in the flat form, it could be used only on one side. Too often the leather belts twisted, ran out of line, due to uneven width or thickness, even some apparently high-grade belts being subject to troublesome distortion. Not the least objection was the gradually growing dearness of first-class leather belting. The canvas or cotton belt in various forms was often substituted for the leather in the hope of overcoming some of the drawbacks of the leather belt, but while it is still employed to a large extent in certain lines, it absorbs dampness too easily, is not easily repaired, and unless exceptionally well made, stretches too much.



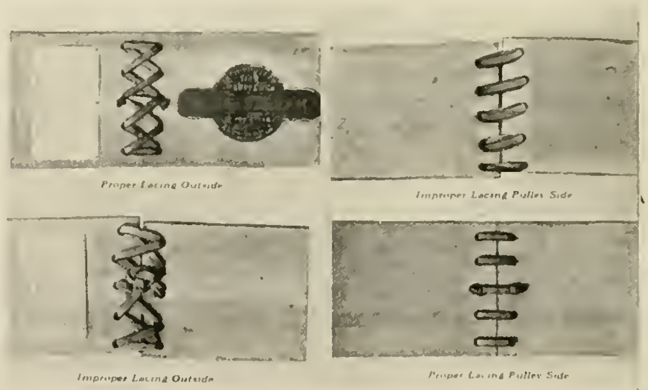
Wooden Belt-Stretcher

RUBBER BELTING

The rubber belt, on the other hand, has all the merits rightly attributed to the time-honored leather belt, practically none of the shortcomings, and many additional advantages. Like tires, footwear, and other rubber goods, the modern rubber belt is the result of remarkable evolution in manufacturing. The earlier belts had all the inherent faults of a product of an undeveloped industry and many of the later ones were better made but far too much was expected of them, and the disappointment of too confident buyers hurt the industry. Finally, through the confidence and enterprise of rubber manufacturers, and after a great deal of experimenting and rigorous testing, the practically perfect rubber belt of today was put on the market and soon found favor with progressive industrial managers in all parts of the world. To them it has become indispensable for a host of purposes.

WIDE FIELD OF USEFULNESS FOR RUBBER BELTING

The well-made rubber belt is remarkable for its long life. Instances are cited where main-drive belts of rubber have stood up under the hardest strain for twenty years before renewal was found necessary. The rubber belt is not readily affected by heat, cold, dryness, or moisture, and it can be constructed so as to be impervious to the action of acids, gases and steam. Hence it is preferred for mills, mines, cement works, sugar refineries, bleacheries, grain elevators, oil wells, concentrating plants, dredging machines, and for numerous other purposes where power has to be transmitted or materials conveyed, often under most adverse surroundings. So efficiently is the modern rubber conveyor belt made that it has largely replaced those of iron and steel for handling ores, coal, stone and other rough abrasive materials, and it can be used in situations where a metal conveyor would be impossible. Its latitude as to construction is practically limitless; in other words, it can be made to suit the most varied service conditions.



Single Row Lacing

Presenting a very smooth surface to the pulley and being very pliable, the rubber belt obtains exceptional cling or adhesion, with correspondingly greater transmission of power. This saving in slippage, or greater friction, means a power saving in favor of rubber over leather belting of from 25 to 40 per cent. If a rubber belt slips it is usually due to overloading. Vibration in machinery is noticeably less, and wear consequently reduced, with rubber belting, as on account of its even surface, uniform strength

and thickness, and freedom from torsion and flapping, it carries machinery along steadily.

Other points in favor of the rubber belt are that it eliminates differences between the two sides of a belt in pulling quality. While leather belting gives a gradation of strength in three plies, single, double and triple, rubber-covered belting will afford a range varying from 3-ply to 8-ply, or, in the case of friction-surfaced belting, 3, 5, 7, 9, 11, 13, and 15-ply. Not the least important feature in favor of rubber belts is that they stretch less in service than those of other material and thus save much loss in the labor of tightening belts.

Field Work in Applying and Repairing

The application or fastening of the ends of all belts, except those made endless, was a problem that vitally interested all belt makers. It was what is termed field work and any belt catalog gave specific directions as to methods of lacing and of replacing. Not only this, but manufacturers supplied the most tenacious cements; all because the life of the belt and its satisfactory work depended upon proper application. While thus teaching belt users to apply belts they were actually showing them how to repair them. It therefore happens that field work in belt repair is well advanced, although not as yet standardized.

The tools used are of the simplest sort: a belt punch for cutting the holes, cement can, hand sticker, brush and a belt-stretcher. The stretchers are to bring the ends of the belt together, and while there are a variety of kinds involving the use of rope winds, and toggles, those in general use are steel or wooden clamps through which two steel rods are run into heavy nuts. The take-up is effected simply by turning the threaded rods as far as may be necessary.

Double Grip Lacing

Efficient operation of a rubber belt is dependent much more upon proper fastening than many belt users realize. Proper fastening means getting the maximum amount of power transmission, conversion, or diversion for which a belt has been specially selected. It means a more steady drive and freedom from jerks, flapping, vibration, and side-sway, and it means for the belt less wear and longer life, economic factors of no small importance, especially where many or very expensive belts are used considerably. This anxiety may not give much concern to those who have their rubber belts, for high speeds or heavy drives, made endless or continuous at the factories from which they are bought and at which they are made up according to specifications.

But even the best rubber belts may stretch somewhat through long use or through working under adverse conditions; or it may be found desirable to shorten an original endless belt so as to work it on pulleys closer together. In that event the belting must be dealt with in just the same way as material bought in the roll and fitted to machinery by the purchaser. Not only must the utmost care be exercised with regard to fitting and measuring the belt, but also as to the mode selected and the materials chosen for fastening the ends of the belt together. It is a truism that a chain is no stronger than its weakest link, and so, also, is it a fact that a rubber belt in service is no stronger than its fastening.

The Leather Lacing

The oldest and, despite its slowness, still the most favored method of fastening belt ends together is that of leather lacing. While still done largely, and often successfully, by rule of thumb, the lacing of rubber belts can be and to a fair degree has been well-standardized. It is only by adhering to certain well-settled rules concerning the fastening of belts that real satisfaction can be assured. The quality and the cutting of the thongs used in lacing rubber belts are of primary importance. The United States Navy Department is exacting in this regard. Its specifications require that all thongs for lacing belts shall be cut only from green slaughterhouse hides. They must be cut lengthwise from the hides and must have in the various sizes a tensile strength per square inch of at least as much as that indicated in the following table:

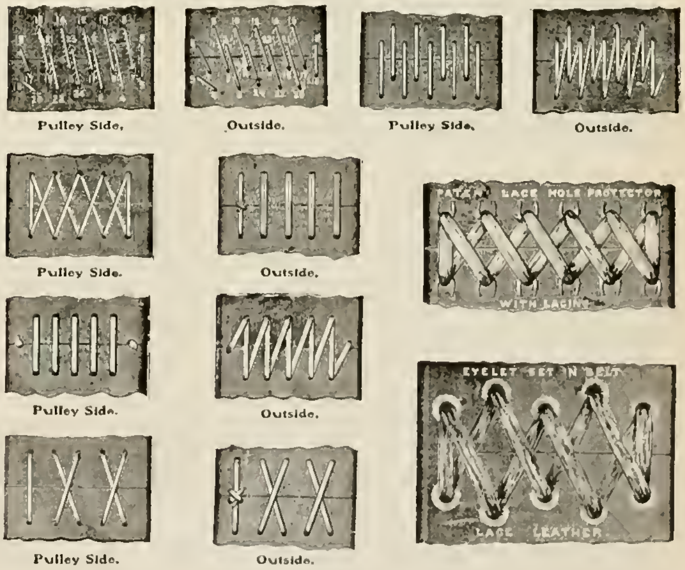
Width ....inches	1/4	5/16	3/8	7/16	1/2	5/8	3/4
Strength ....*pounds*	95	125	155	165	180	205	230

In the choosing of a lace heed should be given to the kind of drive, the diameter of the pulleys, the speed of the belt, the power transmitted, and the safety of workmen. As a general rule the lacing for a rubber belt is selected with regard to the width of the belt, the thinner kinds being used for the light, narrow belts, and the stouter for the broad, heavy belts. Lacing will vary in thickness from 1/64 to nearly 1/8 of an inch.

Proper lacing being provided, the first step in fastening a rubber belt is to square the butt ends perfectly. It is not safe to depend merely upon marking the ends with a pencil and then cutting. It is better to get a carpenter's square with which to outline the ends, and then cut accordingly. That will insure a true joint. If the ends of the belt are not cut perfectly, or if the tension put in the lacing is not uniform in both sides of the belt, the latter will have a tendency to run crooked and by striking cone edges, belt shifters, or other projections soon damage itself.

Having squared the belt ends, and finding that they line together perfectly, holes should be punched just large enough to allow the lacing thong to pass through them and distant in single-row lacing 3/4 to 1 inch from the ends of the belt, being careful to remove no more material from the belt than is really necessary in order to avoid weakening the belt. For the smaller belts a 1/4-inch lace will usually suffice; for belts from 4 to 8 inches wide, a 3/8-inch lace; for belts from 8 to 15 inches, a 1/2-inch lace; and for belts over 15 inches, a 3/4-inch lace. For unusually large, heavy belts a 1-inch lace is often used.

Before lacing it would be well to verify the measurement taken for the belt length by drawing a steel tape tightly around the pulleys to be used, and in order to allow for possible stretch to



Other Ways of Lacing

cut the belt a trifle shorter in about this proportion: For 3, 4, and 5-ply belts allow 5/32-inch per foot; for 6, 7, and 8-ply belts allow 1/8-inch per foot; for 9 and 10-ply belts allow 3/32-inch per foot.

Best Lacing Method

While single-row lacing may serve well in an emergency and even last long in some cases, the double-row or double-grip lacing

method is preferred by experts as being far more certain and durable. It is illustrated on the preceding page, and consists in punching two rows of holes in each belt-end, the second row to be the same distance from the first as that is from the end of the belt, so that each hole in the second row centers between the nearest two holes in the first row. The holes and lace size should be as shown in the following table:

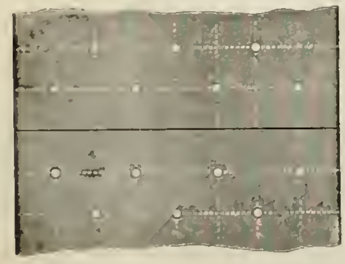
Width of Belts Up to	Size of Hole, Inch	Size of Lace, Inch	Distance of First Holes from Ends of Belt, Inches	Distance of First Hole from Edge of Belt, Inches	Space Between Holes, Inches
3 ....inches	5/32	¼	½	⅜	¾
3 to 6...........	3/16	⅜	¾	⅜	1 to 1¼
6 to 12..........	1/4	⅜	1	½	1½
12 to 18.........	5/16	½	1¼	1	1¾

Proportionate allowance should be made for larger belts.

The lace should be started in the center hole in the first row to the opposite hole in the second row and continued in such a way that the lace shall be straight and smooth on the pulley side, and crossed on the back of the belt. Having been begun in the center, the lacing should be looped through the holes first toward one edge, brought back to the center, crossed to the other edge, and then continued back to the center, finishing with both ends of the lacing in the same hole, but entering it from opposite sides of the belt. A hole is then made with a belt awl about ½-inch from the hole at which the lacing was started and finished, both ends of the lacing are tucked through this awl hole, pulled tight and cut off, leaving ends about ½-inch long.

SPACING HOLES FOR DOUBLE-GRIP LACING

The ends of the belt having been squared accurately, after the centers of the outer holes in the first row have been determined according to the aforementioned table, the intervening distance is divided into an even number of spaces made as nearly equal as possible to the distance that the outer holes in the row are from the edges of the belt, but taking care that the division length does not exceed this distance between the outer holes and the butt joint.



Laying Out Lace Holes

Holes are then punched at every point in the first line, and at the intermediate points in the second row, the diameter of the holes being about three-fourths the width of the lacing.

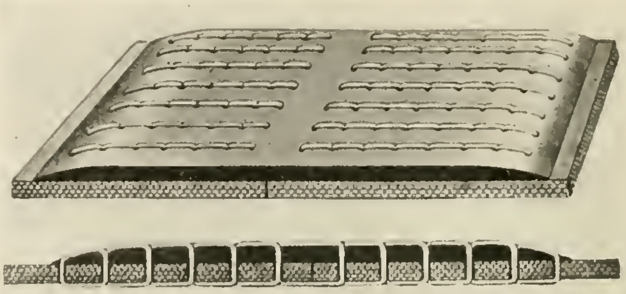
In making holes in rubber belts many good mechanics prefer to cut oval-shaped holes with double strokes of a round punch, but experts always use an oval punch, leaving the longer diameter of the oval parallel with the belt sides. A pointed awl is advised, instead of a punch, by some manufacturers.

HINGE JOINT LACING

Where leather lacing is used on small rubber belts running at high speed over small pulleys it is considered advisable to make the lace form a hinge. In this case the holes are punched in the staggered form used for the double-grip lacing already described, and the lacing is also started at the center; but instead of lacing straight, the leather strip is passed over and under, always lacing toward the outside.

LACING AND LAP FASTENING

Many users of belts 12 inches wide or over have found the following lacing and lapping method very satisfactory. Up to and including 12-inch belts, the latter are cut with 12 inches to spare, but beyond that size the excess is the same in inches as the belt is wide. If the belt is 4-ply, take off two plies on one end back 12 inches or more, according to the width as here illustrated. Then take the same amount off the other end, in such a way that the two prepared ends lap squarely together. The illustration shows the lap made as directed and the holes punched for lacing. If the belt has three plies, two plies should be taken off one end and one ply off the other; for 5-ply, three and two plies, respectively; for 6-ply belts, three plies off each end, and so on, all being punched as shown in the illustration.



The Back Splice

Light lacing is used for all 3-ply belts, and proportionately thicker lacing for the heavier and wider belts. The holes punched should be the smallest possible to admit the passage of the lacing. No cement is necessary if directions are closely followed.

MAKING A BACK SPLICE

On wide belts run at high speed, or where there is great strain and it is not convenient or desirable to use a cemented or riveted lap splice, a back splice will add much to the life, safety, and efficiency of a butt-jointed belt, although it is not suitable for belts running under an idler.

In making a back splice the butt ends of the belt are brought tightly together and a piece of belting put over the united ends as a reinforcement. This piece is usually equal in length to the width of the belt, but in some cases it may be made as short as half the width or as broad as one and one-half the width. The ends of this reinforcing piece should be skived to a feather edge, otherwise the splice will bump in passing around pulleys. It is fastened with leather lacing or rivets.

Fig 1.

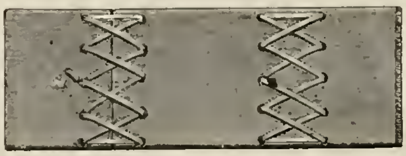


Fig. 2.

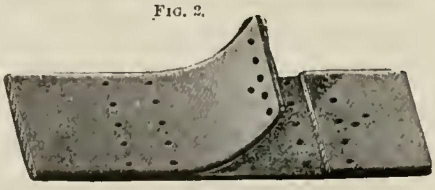


Fig. 3.

Lace and Lap Fastening

LAP-SPLICING

When it is not convenient to get an endless belt from a manufacturer, a very satisfactory lap splice may be made by a careful mechanic that will be serviceable on belts of all sizes and particularly on those of much breadth. The ends having been cut absolutely square, the splice is made by "stepping" the ends of the belt for a distance equal to or greater than the width of the belt, being careful not to cut a lower ply while cutting for the one above. Hence a 4-ply belt should have four "steps," a 6-ply, six "steps," etc. The measurements of the steps should be equal.

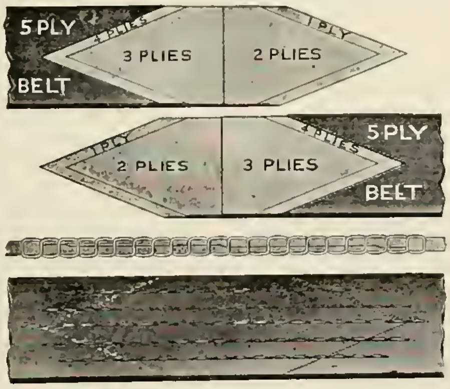
The scarfed surfaces are then given at least three coats of good rubber cement, allowing each to stand about an hour before joining the belt ends. The "stepped" ends are then carefully fitted together, clamped tightly, and allowed to dry for an hour or two. When dry the splice may be finished with fine leather lacing or machine stitching. Some use copper rivets placed 1½ inches apart.

The Lap Splice

Some recommend a jacket of rubber-covered duck for protecting the lacing, the space inside the lacing being filled with pieces of duck and the whole covered with a large piece, all secured with rubber cement and dried under pressure. This protection is especially urged when fine lacing in small holes is used. If the jacket is provided, it need be placed only on the driving face of the belt, unless a tightener is used, in which case both faces should be similarly jacketed. The strips and cover should be thoroughly rolled or pounded onto the belt.

DIAMOND LAP SPLICE

Another method of making a lap splice is known as the diamond lap splice. It is made in a manner similar to the ordinary lap splice, except that the ends are cut pointed, instead of square, with right angle and diagonal lines, as shown in the illustration. The edges of the plies should be scarfed to insure a close fit.



Diamond Splice

The length of a diamond splice should be: for a belt 6 to 9 inches, inclusive, 24 inches; 10 to 15 inches, 30; 16 to 24 inches, 36; 26 to 32 inches, 42; and 34 to 48 inches, 48. This length is figured from the extreme points at either side, and takes in the square in the center and the triangular spaces at either end of the splice. Lap splices are advised for belts 16 inches or more in width.

AN EXPLOSION OF HARD RUBBER DUST[1]

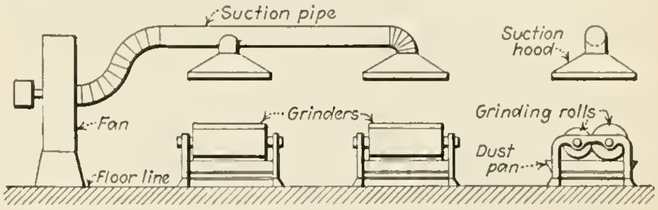
The results of investigation of a recent explosion in the hard rubber scrap grinding department of a large industrial plant are given in a report by David J. Price[2] and Hylton R. Brown[3] of the Bureau of Chemistry, United States Department of Agriculture. The salient points of this investigation are here abstracted from the report.

REDUCTION OF HARD RUBBER SCRAP

The rubber scrap is first broken up into pieces about the size of a pea. In some cases this material is heated in large tanks. It is then ground between steam-heated rolls or in one of the various types of pulverizers. Sifters are used to separate any coarse particles from the rubber dust, and this coarse material is returned to the grinders. During this process large quantities of very fine dust are produced which tests have shown will explode violently under favorable conditions. Considerable sulphur dioxide gas is frequently produced during rubber grinding and in many cases no provision is made to remove this gas from the building. In such cases the atmosphere of the grinding department becomes a bluish color while grinding is being done.

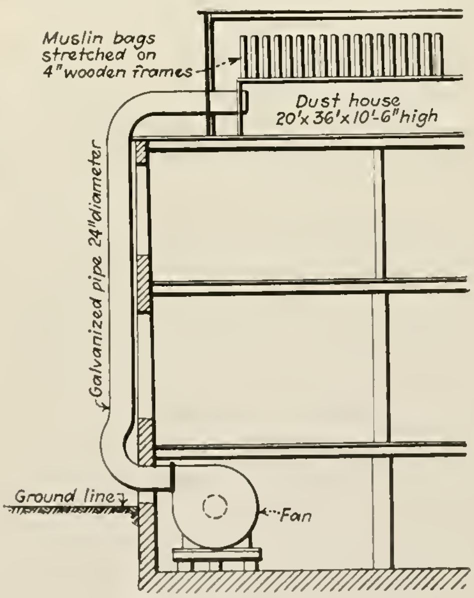
EQUIPMENT ARRANGEMENT

In the plant where this explosion occurred the grinding department was located in the basement of a two-story brick building. The space allotted to this work was about 60 by 120 feet. The basement was about ten feet deep but only six feet was below the ground level. Windows were provided above the ground line for light and ventilation. Various types of grinding machines were installed with the motors necessary to operate them. These motors were of different makes, but were all of the squirrel-cage induction type. All switches were of oil-immersion type and the fuses were of the non-arcing type inclosed in covered steel boxes. The electric lights were of the drop-cord type of installation and were not provided with vapor-proof globes or guards. A suction system was provided to remove the dust from the building. The dust was drawn into hoods located over the grinding machines and then into the fan, whence it was blown through a 24-inch galvanized pipe into a dust-house located on the roof of the building. This pipe ran up the outside of the building and had two right-angle turns, one where the pipe came out of the basement window, and the other where it turned to enter the dust-house on the roof. The dust-house, which was of frame construction with corrugated metal sheathing, consisted simply of an expansion chamber with a number of muslin bags stretched on wooden frames through which the air escaped, while the dust fell to the floor of the dust-house. The dust produced during the grinding was so fine that a large quantity was drawn into the collecting system, and this made it necessary to clean the dust-house frequently.



Chemical & Metallurgical Engineering.

Side and End Views of Grinders and Hoods



Chemical & Metallurgical Engineering.

Dust-Collecting System

EXTENT OF EXPLOSION

The explosion, which the evidence indicates originated in the basement, occurred about 4:35 a. m. The first explosion was

[1]Chemical and Metallurgical Engineering, April 27, 1921, page 737.
[2]Engineer in charge development work, Bureau of Chemistry.
[3]Assistant in grain dust explosion prevention.

quickly followed by a second and some families living near the plant report hearing three distinct explosions. The explosion evidently propagated to the first floor of the building, where the windows, doors and one corner of the brick wall were blown out. It also propagated through the suction system to the dust-house, which was completely demolished.

ORIGIN OF EXPLOSION

The fact that so much damage was done to the fan and exhaust-pipe would indicate that the explosion had built up considerable force by the time it reached this point in the system. It is believed that the explosion originated in or near one of the grinding machines and was caused by foreign material entering the grinder, by a broken electric light, or by a lighted match. The flames propagated throughout the basement, where the employes were severely burned, and extended to the first floor. The flames entering the suction hoods flashed through the suction pipe to the fan, where they met their first obstruction and built up the pressure which blew out the weakest side of the casing, the one containing the inlet opening. The flames also propagated through the fan into the exhaust pipe, built up sufficient pressure at each bend to rupture the pipe and continued into the dust-house on the roof of the building, where enough dust was present, estimated at about 125 pounds, to cause an explosion which completely wrecked the house. It must be remembered that this is only a theory of what happened during the explosion, built on the knowledge obtained during the investigations of previous explosions in industries where the conditions and some of the installations were similar to those in the hard-rubber grinding industry.

RECOMMENDED PRECAUTIONS IN HARD RUBBER GRINDING

1. The grinding department should be segregated from the remainder of the plant and, if possible, operated independently of other units.

2. The building containing the grinding department should be of heavy framework with light walls and roof so as readily to permit the release of pressure from the building should an explosion occur.

3. Good ventilation should be provided and where gases heavier than air are produced during the process, the air should be drawn out of the room near the floor and fresh air admitted near the ceiling.

4. Where fine dust is produced an efficient dust-collecting system should be installed. The old-style dust-room, where large clouds of dust are in suspension, should be eliminated. The dust should be collected as near as possible to the point of origin and conveyed through pipes with fewest bends to the collector, which should be located outside of the building or vented to the outside air. If sharp turns are necessary in the pipe line inside the building, place a vent at the bend, leading to the outside air with a cap which will be blown off should any high pressure occur at this point. Drawing explosive dusts through a fan should be avoided where possible. A suction through the collector or an induced air current is preferable.

5. Special precautions must be taken to prevent metal entering the grinding machines. This is the only way to guard against ignition of dust by sparks struck in the machines. A vent from the machine to the outer air often assists in preventing a disastrous explosion by providing a direct means of escape for the primary explosion within the machine.

6. Where clouds of explosive dust are produced, electric lights should be inclosed in vapor-proof globes and be properly guarded to prevent accidental breakage. All switches and fuses or electrical equipment in which sparks might be produced should be located in a separate room or at least inclosed in fire-proof and dust-proof boxes.

7. Rules against smoking and carrying matches, where conditions are favorable for a dust explosion, must be rigidly enforced and special attention be given to prevention of hot-boxes on machinery operating in dusty atmospheres.

8. Cleanliness is the best general precaution to adopt for the prevention of dust explosions. A disastrous dust explosion cannot occur in a clean plant, because the flames cannot propagate unless dust is present to be mixed with the air in sufficient quantity. From 0.02 to 0.04-ounce of dust per cubic foot of air is usually sufficient to form an explosive mixture. The plant should be kept scrupulously clean, especially overhead structures where dust accumulations could be thrown into suspension in the air by a sudden jar or shock.

The Determining Factors for the Life of a Pneumatic Tire[1]

By William G. Nelson[2]

There are five very important and very decisive factors for determining the life of a pneumatic tire. Each has a direct bearing upon the other, and a weakness in any one will prove a death blow to the ultimate mileage which a tire is supposed to give. These five factors are: rubber and compounding materials, fabric, construction, vulcanization and usage.

RUBBER AND COMPOUNDING MATERIALS

The rubber and compounding materials are comprised of rubber, fillers, softeners, accelerators and vulcanizing agents. A mixture of rubber, sulphur and other materials is called a compound. There are various kinds of compounds used in a tire, as tread, carcass friction and skim coat, breaker friction and skim coat, and side-wall. The tread must have good wearing qualities, good appearance, and coordination with the carcass. By this last phrase is meant the ability to properly adhere to the remainder of the tire. Good wearing qualities are obtained by properly compounding suitable materials and curing agents with high-grade wild or plantation rubber. The most finely divided fillers, such as zinc oxide, gas and lamp black and similar mineral fillers, are extensively used, due to their microscopical fineness, which gives high tensile strength, good stretch, and resistance to abrasion, cutting and aging. Friction and skim-coat stocks are so compounded as to give good adhesion to the fabric and a cushioning effect between the plies of fabric. These stocks are composed almost entirely of rubber, softeners, sulphur and accelerators. The vulcanizing agent which is sulphur, and the accelerators, excepting the rubber, are the most important parts of a compound. An accelerator is a material which accelerates the chemical combination of the sulphur with the rubber. Since the action of accelerators is so erratic in mixing, calendering, and vulcanizing, only experienced men should undertake the handling of these agents. The side-wall must have good appearance, as it holds one of the most conspicuous places on the tire. It is used for the protection of the fabric against chafing and moisture. Since it is continually exposed to atmospheric conditions it must have good aging qualities rather than high tensile strength or long stretch.

All compounds that come in contact with each other must have good adhesion after vulcanization. The factors that bear upon this condition are: type of rubbers selected; kind and amount of fillers, sulphur, and accelerators; mixing and calendering of the compound; building of the tire; and finally the degree of vulcanization.

[1]Paper read at the meeting of the American Institute of Chemical Engineers, Detroit, Michigan, June 20-23, 1921.

[2]Chief chemist, Morgan & Wright, Detroit, Michigan.

FABRIC

Fabric is the foundation upon which the tire is built. It is used to give stability and strength. There are two well-known classes of tires, the square-woven fabric and the cord fabric. In the square-woven fabric tire the threads in each ply run in both directions, alternating over and under as in a piece of ordinary cloth. In the cord fabric tire the threads or cords in each ply run parallel with the exception of a few small cross threads used simply to hold the cords in place while they are being impregnated with the rubber compound. The life of a tire would be greatly increased if internal friction could be eliminated. The internal friction caused by intermittent distortion of the tire in use is the result of the friction of the threads upon each other and the strains and stresses set up in the rubber compound. Naturally the fabric which gives the least amount of internal friction will give the longest life to the tire.

Since square-woven fabric cannot be thoroughly impregnated with rubber compound, the places where threads cross will be left bare and at these points flexing will cause a sawing action and the generating of frictional heat. It has been demonstrated very clearly by experiment that, when the temperature resulting from mechanical action reaches 230 degrees F., vulcanized rubber ceases to function as an adhesive compound, and crumbles into minute particles which fail to resume their original condition, causing the compound to lose its function in the tire. This causes separation, weakness, and finally a blow-out. It may be interesting to know that 265 degrees F. is not an uncommon temperature reached in a tire when driven at high speed over the road; this is particularly true of large truck tires.

In the case of cord fabric each thread is embedded in the rubber compound and the internal friction is reduced to a minimum. The ideal condition would be to have each cotton fiber of thread embedded in rubber but of course this is not practical and on account of weaving difficulties this has not been accomplished. Since cord fabric comes closer to the ideal condition, the time is not far distant when it will entirely supplant square-woven fabric in the carcass of the tire. A step in this direction will be made when the cost of producing cord tires is sufficiently reduced to successfully compete with the square-woven tire. A brief summary of the advantages derived from the use of cord tires would include easier riding, due to greater resiliency; saving of gasoline and oil; saving of machinery and more miles per dollar.

Fabric is also used in the breaker and chafing strips. The breaker fabric is covered with a rubber compound that will act as a binder between the soft cushion stock and the stiff tread stock. The breaker fabric is used to give this compound stability and therefore decreases the separation between the tread compound and the cushion. The chafing strips are used for protection and reinforcement.

At this point something should be said about the mixing of the rubber and ingredients, and the calendering or application of the compound to the fabric. There are so many factors that enter into the mixing that they can be only briefly described here. Breaking down of the rubber by mechanical action changes it from a tough, hard state to a tacky, plastic condition. This influences the impregnation of the fabric, tackiness, blooming and other physical qualities, and also the vulcanization. The thoroughness of incorporation of the compounding elements has an influence upon uniform vulcanization and wearing conditions. In order to eliminate to the highest degree the variable conditions inherent to milling, calendering, building operations and vulcanizing, it is necessary to have every process standardized and a rigid inspection to hold to a minimum the factor of the human element. Therefore all reputable manufacturers analyze thoroughly all compounding materials and rigidly inspect all fabric before these elements enter into the tire, and also carefully control the degree of vulcanization in the finished product.

TIRE CONSTRUCTION

Tire construction is an art in itself. It is like the building of a machine, and just as much care must be used in designing a tire as is used in designing a finely adjusted machine. As nearly every tire is built on an iron core and vulcanized in a mold, the space occupied by the tire is constant and is filled with a unit composed of many variables. Therefore, when the fabric is frictioned and skim-coated it is held to a gage of a maximum or minimum variation of two or three thousandths of an inch. Likewise all other parts, as top cushion, breaker, tread, bead and side-wall, are held to a maximum or minimum gage. The proportion of the fabric to the rubber compound must be properly balanced. The addition of an extra ply or the increase of the thickness of rubber compound may destroy this balance and materially weaken instead of strengthen the tire. It has been demonstrated many times by actual service tests that the correct distribution of rubber compound in the tire will increase its life several thousand miles; or the changing of the sulphur one-half of 1 per cent in a single compound will cause an equal variation in the mileage. There are many faults in a finished tire that may be attributed to improper construction, as wide overflow, wrinkling of breaker and plies, incompletely filled molds, and weakness in the beads. These are usually remedied by changing the construction but, in some instances the proper results can be obtained by changing the compound, the process of vulcanizing, or redesigning the equipment.

VULCANIZATION

There is probably no phase of tire manufacture that receives more attention than the vulcanization of the tire and still there is no phase that is more problematical. The proper degree of vulcanization is an empirical condition existing in the various components of a tire which is determined by results obtained by road tests. Either an undervulcanized or an overvulcanized tire will give low mileage; even if a single part, such as cushion, breaker, or tread compound, is over or undervulcanized, the entire shoe will give poor results.

The controlling factors in a compound to obtain this empirical state are the sulphur, accelerators, rubbers, milling and calendering, time and temperature of the cure. Any one of these conditions will materially affect the state of vulcanization. The proper manipulation of these variables is a chemist's job and requires great care, thought and experience. It is absolutely essential for the chemist to have a laboratory fully equipped to make comparative physical and chemical analyses, to develop new compounds, and try out new compounding ingredients. Various types of rubbers made by different methods of coagulating, washing and drying have different vulcanizing ranges and optimum cures, that is, the state of maximum efficiency when vulcanized, therefore great care must be exercised in their selection for a compound. Furthermore, the optimum cures of all compounds must be so adjusted that in the finished product every component of the tire has simultaneously reached its maximum efficiency. Excessive milling causes the compound to vulcanize more slowly but more uniformly; decreases the tensile strength, and increases the stretch. These actions can be explained by the breaking down of the rubber molecule into its polymeric stages, each stage having its own particular range and optimum cure with its corresponding tensile and stretch. The slower a compound is vulcanized to its optimum cure, the better resistance to aging it will have; therefore low vulcanizing temperature and long time is preferable for quality of product, but owing to the demands of quantity production, higher temperatures and shorter times are resorted to. The scientific explanation of the effect of time, temperature and mechanical action upon quality of product is a problem for research and it is high time that some of these problems were given proper investigation by the scientific men of today.

USAGE

If the tire is neglected and abused while in service, all the care used in testing and selecting the rubbers and the compounding

materials, analyzing the fabrics, standardizing the operations, and maintaining an experienced organization in order to make the most uniform and perfect product will be of no avail. A pneumatic tire is designed and built to contain air, or an inert gas, under pressure, and there are no recommendable substitutes for it on the market today. The greatest danger that befalls a tire in service is underinflation. Proper inflation is to the life of a pneumatic tire what proper food is to the life of a living being. Eighty per cent of the failures in tires can be traced to underinflation. Briefly the results of underinflation are early separation in all parts of the tire, rim cutting, abnormal development of frictional heat, greater power and fuel consumption, rupturing of the fabric, splitting of tread, and abnormal strain throughout the tire.

The Society of Automotive Engineers and the Tire and Rim Association, and all the large manufacturers of tires have agreed upon standard pressures to be used in tires and these pressures should be adhered to religiously in order to obtain the highest mileage. Overloading is another abuse that is often imposed upon a tire which causes an early breakdown of the carcass and finally a blow out. Other causes for premature failures are: improperly fitting rims, which cause rim cutting, thus exposing the fabric to moisture and chafing; misalinement of wheels, which causes excessive tread abrasion; running over curbs, deep ruts, stones, nails and glass which causes breaks and cuts in the tread and carcass; sudden braking which causes tread abrasion and separation; turning corners at high speed which causes excessive strains on the fabric and later a rupture; overheating which causes separation; and sun exposure which causes checking.

The ultimate desire of every motorist is to obtain the most miles per dollar per tire with the advantages of riding on a cushion of air, and the only way for him to obtain his desire and retain these advantages is to use common sense in the use and care of the pneumatic tire.

INTERESTING LETTERS FROM OUR READERS

DYES IN TOY BALLOONS NOT POISONOUS

Recently *The New York Herald* printed the following statement attributed to the New York State Health Department: "Some of the dyes used in coloring toy balloons are capable of causing a severe inflammation when brought in contact with the skin while in a moist condition."

In refutation of the threat against the toy balloon industry implied by this misleading statement, the following conclusive letter from a well-known authority is published.

To the Editor:

Dear Sir: Replying to your favor of July 5, we have no objection whatever to your publishing our name in refutation of the statement that the dyes used in the manufacture of toy balloons are dangerous to children.

The strange part about this is that it is partly true and half the truth sometimes is worse than a direct untruth. If children ate the dyes used in toy balloons, there probably would be some ill effects, but the percentage of dye used in toy balloons is probably less than 1/10th of 1 per cent, and furthermore, these dyes are entirely insoluble either in saliva or aqueous solutions, because they are either resinates or oleates of aniline colors, and it is utterly impossible to imagine how a child sucking the toy balloons could absorb enough to do even the slightest damage.

We would like to find out who originally sent out this report, and what evidence a man had to entitle him to make this statement.

New York, N. Y. Toch Brothers.

DANGER FROM TOY GAS-BALLOONS NEGLIGIBLE

The New York Sun prints a statement from the chief inspector of the New York Bureau of Combustibles that toy balloons filled with hydrogen gas were dangerous in the hands of children, and the sale should be prohibited. That this agitation against the use of toy balloons is not justified by facts is clearly explained in the following letter from a competent authority.

To the Editor:

Dear Sir: Replying to your letter of July 13, it is quite evident that the Bureau of Combustibles of New York City is emulating the example set by the London County Council, of London, England, which early in the year legislated against the use of toy balloons filled with hydrogen gas on the grounds of fire hazard, and the possibility of injury resulting if the gas should explode.

We feel, and so, indirectly, said to the London County Council, that the danger from these causes was really negligible for the reason that toy balloons do not hold enough hydrogen gas to start a conflagration, or to injure people, except under very unusual circumstances. We have known of cases where toy balloons inflated with hydrogen gas were either purposely or carelessly exploded by means of cigarettes or matches, but have never known of any serious accident or damage resulting from such misuse of the balloons.

Furthermore, until within the past year or two when the manner of inflating toy balloons with hydrogen gas was greatly simplified by the introduction of hydrogen gas cylinders, the percentage of balloons inflated with hydrogen gas was very small as compared to the quantity made and sold.

A concerted effort is now being made by London interests to have the London County Council annul this arbitrary ruling, and in our judgment the agitation which is being started in this country against toy gas balloons is really unjustified by facts. If put into effect, such rulings will be the cause of depriving kiddies of a most entertaining form of amusement.

New York, N. Y. Manufacturer.

REGARDING SAPONIFYING AGENTS FOR WAXES

To the Editor:

Dear Sir: In The India Rubber World, May 1, 1921, Dr. Dannerth mentions the saponification of waxes, such as carnauba, candelilla, beeswax, etc., that are converted into soaps by boiling with alcoholic potash.

If it is not practical to use alcoholic potash, or ordinary potash to saponify these waxes, could monohydrate of soda be used with as good results? What properties does potash contain that are different from strong soda, such as monohydrate? Is there any difference in the action of the two alkalies on wax, provided enough is used of each kind to make a saponification?

Philadelphia, Pennsylvania. Inquirer.

In the experimental work of the chemical laboratory, alcoholic potash is generally used for saponifying oils, fats and waxes because experience has shown that the saponification proceeds more readily when that agent is employed. Then too, the soap obtained as a result of the potash saponification is a soft soap and is therefore more desirable for laboratory manipulation.

In the practical work of the factory, caustic soda or sodium hydrate, as it is sometimes called, is found to saponify in a satisfactory way. The product is, of course, a hard soap. Commercial oleic acid saponified with caustic soda will yield a common brown soap, which dissolves in water with relative ease. The soap prepared from stearic acid and caustic soda is, however, much more difficultly soluble in water. For that reason the soap maker generally uses a mixture of the two acids when making commercial soaps. It will be found that soaps in general are soluble in 90 per cent denatured alcohol.—Frederic Dannerth.

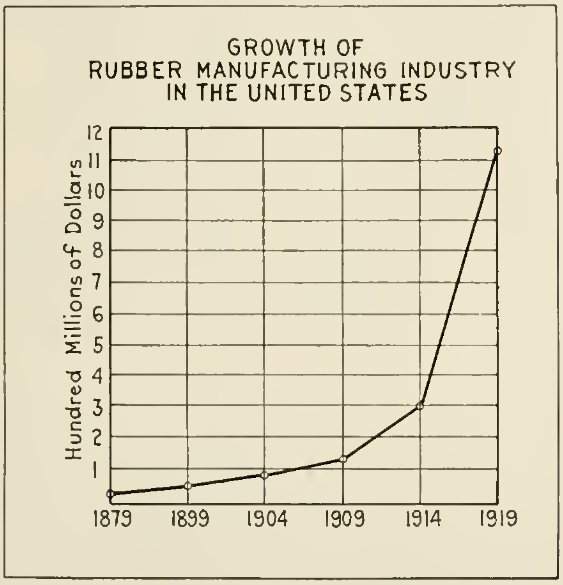
The Ohio Rubber Co., Cincinnati, Ohio, is marketing "Howard's Ideal" bathing garters, on which it has applied for a patent. At one end of a straight strip of inch-wide rubber is inserted a double-headed bone button. Perforations about ¾-inch apart in the other end stretch over this button to fasten the garter and at the same time make it adjustable.

An Analysis of the Preliminary Summary of the Manufactures of Rubber Goods

From Report of the Bureau of the Census, Department of Commerce, 1914-1919

By Richard Hoadley Tingley

PRIOR to 1899 rubber manufacturing as an industry had not found itself. In the twenty years previous to that time its advance had been slow, gradually increasing in value from $25,000,000 in 1879 to about double that figure in 1899. But the twenty years that have since elapsed have seen the manufacture of rubber goods emerge from a comparatively insignificant industry of less than $50,000,000 a year to figures well above the billion-dollar mark, an increase of something like 278 per cent. Most of this advance came about between 1914 and 1919, when the total value of all the products of rubber manufacture in the United States increased nearly four-fold, the two items of automobile tire casings and inner tubes amounting, in the latter year, to more than double the value of the entire rubber manufactured product in the former.



Official figures of values and percentages of increase have been tabulated as follows:

GROWTH OF THE RUBBER MANUFACTURING INDUSTRY

	Value	Total Increase Per Cent	Yearly Increase Per Cent
1879	$25,310,000	....	....
1899	49,212,000	94.4	9.4
1904	80,848,000	64.3	12.8
1909	126,404,000	56.4	11.3
1914	300,994,000*	138.2	27.6
1919	1,138,216,000*	278.1	55.6

*Establishments assigned to other classifications report, in addition, products valued at $7,574,000 in 1919, and in 1914, products valued at $752,503.

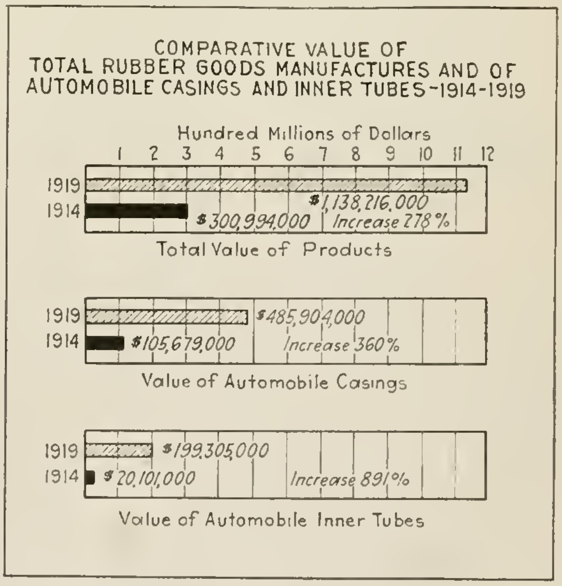
The Bureau of the Census has recently published a preliminary statement of the results of its 1920 canvass of the rubber manufacturing industry, which includes information received from 475 plants for the year that ended December 31, 1919, as compared with that reported by 342 establishments in 1914. The final report will probably not be available for several months to come and the Bureau states that its preliminary figures are subject to change and correction as may become necessary upon further examination of the original reports. Those who have followed previous comparisons of this kind, however, will realize that no marked amendment of present figures may be looked for.

Although THE INDIA RUBBER WORLD published last month some of the tabulated comparative results contained in the preliminary report, a further analysis of the subject matter will not be out of place in order to bring out the relative values, and increase in values, of the different classes of rubber manufactures, which can best be illustrated graphically.

The greatest contrast, as well as the largest totals, are seen in the figures bearing on the tire industry, where the number of casings for automobile tires increased from 8,022,000 in 1914 to 22,727,000 in 1919, and the value of these products increased from $105,679,000 to $485,904,000 in the same period, an advance of 360 per cent. During these five years, also, the number of inner tubes for automobile tire casings increased from 7,908,000 to 39,700,000, and their value from $20,101,000 to $199,305,000, the per cent of increase being 891.

In 1919 there were manufactured 3,422,000 casings and 1,393,000 inner tubes for motorcycles and bicycles, representing a value of $11,892,000 and $2,904,000, respectively, the total value of these two items being $14,796,000. In the census report for 1914 these amounts and values are not separated. Combined, however, the total of the two is 3,728,000 in number, and $6,906,000 in value. The value of the two items taken as a whole represents an increase of $7,890,000 between the years under review, or 114 per cent.

There were 8,255,000 solid tires of all kinds made in 1919, of a total value of $52,992,000. This compares with a value of $13,736,000 in 1914, an increase of 285 per cent. This advance is due in a very large measure to the increase in the use of the motor truck in commercial work of all kinds, including not only short, but comparatively long hauls. The rapid increase in the use of motor trucks in freight haulage became apparent in the early part of last year. The slump of a year ago caused a halt in this comparatively new industry—as it did in all industries. There are many, however, who expect to see a much greater

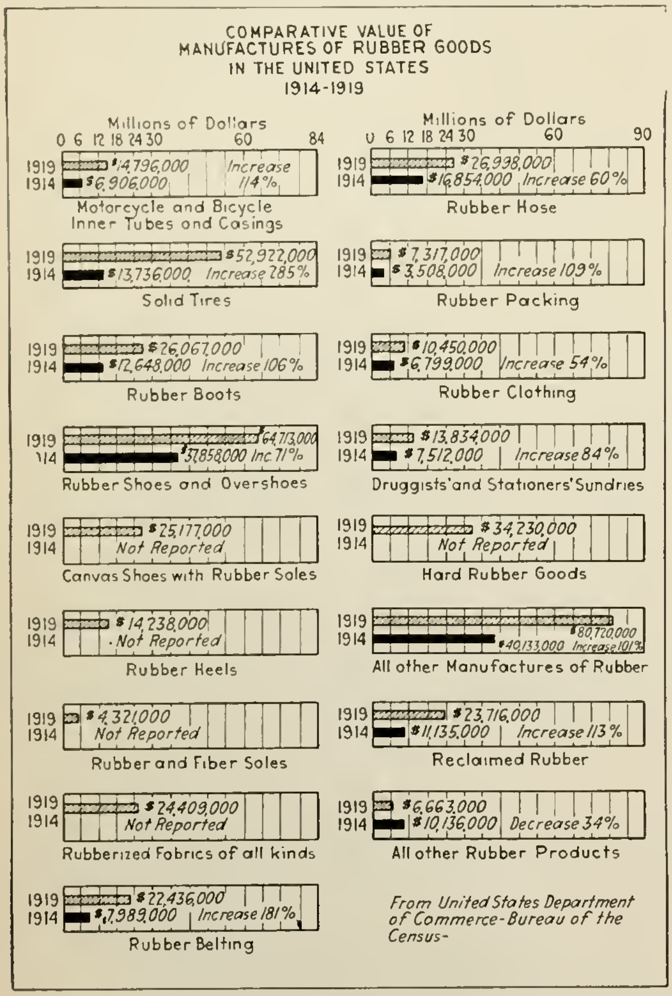


advance in the general use of trucks within the next few years than has already taken place. "Truckportation" has, apparently, come to stay.

Next to the increase in the manufacture of automobile and truck tires comes that of rubber belting, a 181 per cent advance, from a value of $7,989,000 in 1914, to $22,436,000 in 1919. Rubber belting is closely followed by rubber packing, with an increase of 109 per cent. from a value of $3,508,000 to $7,317,000.

Rubber hose manufactures rose from $16,854,000 to $26,998,000, a total advance of 60 per cent for the period.

The manufacture of rubber boots has shown a healthy growth from 4,025,000 pairs to 9,208,000 pairs, and from a value of $12,648,000 in 1914 to $26,067,000 in 1919, an increase of 106



per cent. In rubber shoes and overshoes the advance has not been so rapid, although the volume of business in these commodities is far ahead of that of rubber boots in both of the years compared. The increase has been from 57,212,000 to 66,195,000 pairs, and from $37,858,000 to $64,713,000, or 71 per cent increase in value.

The volume of the country's business in druggists' and stationers' supplies has increased 84 per cent, from $7,512,000 to $13,834,000.

There were $10,450,000 worth of rubber clothing manufactured in 1919, as against $6,799,000 in 1914, the increase being 54 per cent. Of rubberized fabrics for automobiles and carriages, 14,429,000 yards were made in 1919, valued at $10,697,000. Rubberized fabrics for all other uses amounted to 17,630,000 yards, and in value to $13,712,000. The total of these two items amounts in yards to 32,059,000, and in value to $24,409,000. The 1914 report is silent on both yardage and value and a comparison of the growth of this branch of the industry cannot be made.

The manufactures of canvas shoes with rubber soles amounted to 19,896,000 pairs in 1919, valued at $25,177,000, although no 1914 comparisons can be made. The same may be said of rubber heels and fiber soles, the former aggregating a business of 126,572,000 pairs valued at $14,238,000 in 1919, the latter of 18,437,000 pairs, valued at $4,321,000. The fact that no report for 1914 is available is not to be wondered at, because these "human shock absorbers" had hardly found a place in the market as far back as that time.

The reclaimed rubber industry, which includes rubber produced and sold as such, or on hand, is also increasing rapidly—113 per cent in the past five years, from $11,135,000 to $23,716,000.

Strange as it may appear, also, the census report gives no figures for 1914 on the manufactures of hard rubber goods, although the 1919 volume of business amounted to $34,230,000.

Classified under "all manufactures of rubber" the report lists a total business in 1914 of $40,133,000, against $80,720,000 in 1919, an advance of 101 per cent. Under the caption of "all other rubber products," the report notes a decrease in volume of 1919 business when it states that this item amounted to $10,136,000 in 1914 and to $6,663,000 in 1919, a decline of 34 per cent. It is more than possible, however, that this decline may be accounted for by differences in classification in the two years.

The preliminary census report does not contain information regarding the number of plants engaged in the manufacture of this or that product, nor of the number of employes in the various branches of the industry. Other statistical information is also lacking which is contained in the final report for 1914. These data will doubtless be forthcoming in the final 1919 report that will follow.

The preliminary report does, however, give the geographical distribution of the 475 plants in operation in 1919 among the states, which shows that Ohio, with 96 establishments, is the leading rubber manufacturing state in the Union. New Jersey comes next with 73 factories, followed by Massachusetts with 56. Then follows New York with 43 and Pennsylvania with 32. Connecticut, California and Illinois come into line with 26, 22 and 21 plants, respectively. Indiana has 16 and Rhode Island 10. Iowa and Wisconsin each operate 9 factories. In Missouri and Oklahoma there are 8 plants in each state. Michigan has 7 and Texas 6. In Colorado and Washington there are 4 each. In each of the states of Georgia, Kansas, Minnesota and Nebraska there are 3. Maryland, North Carolina, Oregon, West Virginia and Delaware each have 2 rubber factories, and in Kentucky, Louisiana and Maine there is a single factory in each state.

RUBBER FINGERS IN ORANGE WASHING

Rubber plays a new rôle in connection with machines used for washing oranges by means of a series of revolving brushes operating under running water. Vertical elevators which carry the oranges to the washers have a series of curved, iron fingers which, while they served their purpose very well, nevertheless occasioned a large percentage of loss by bruising the fruit.

A rubber manufacturer recently came to the relief of the orange packers with rubber tips like finger cots for the conveyor prongs, and now the fruit passes to the washing machine undamaged; and, it is stated, the cost of washing has been lessened and the work expedited.

Government roads built in the Philippines have afforded a good opportunity for the sale of automobiles and tires in these islands, according to Harris Waite, Goodyear salesman, who returned recently after a two years' stay in the Philippines. Several truck fleets are being used by the planters and the automobile is growing in popularity throughout the islands, for both business and pleasure.

Dynamic Balance and Construction of the Pneumatic Tire[1]

By William Roberts[2]

It has always been a puzzling problem to secure perfect running balance of an automobile pneumatic tire. To combine long life of bearings and accuracy of operation in any machine where the speed of rotation is great, the revolving parts must be in perfect balance. Lack of running balance produces not only

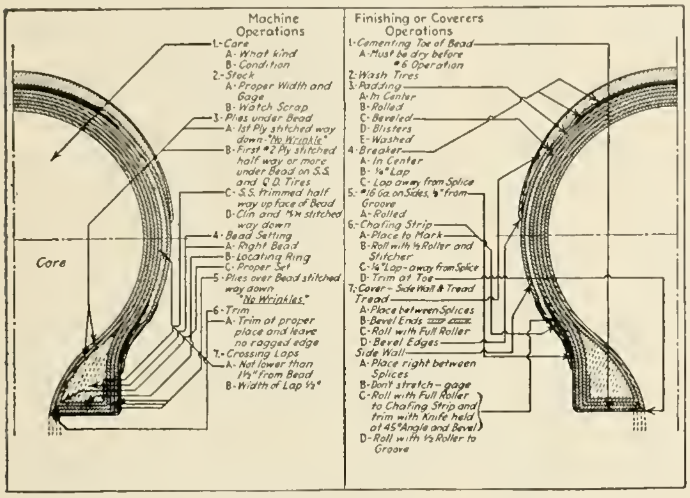


Fig. 1. Straight-Side Tire Construction—Machine and Hand Operations

a vibration of the unbalanced parts but of the whole machine. For instance, if a tire is not balanced it will wear unevenly and therefore reduce the mileage.

MILEAGE OF TIRE REVOLUTIONS

The following table will show the various tire sizes with the number of revolutions per mile and 3,500 miles.

Size, Inches	Circumference in Inches	Revolutions Per Mile	Revolutions Per 3,500 Miles
26	81.7140	775.38	2,713,830
28	88.	720.	2,520,000
30	94.2856	672.	2,352,000
31	97.4284	650.32	2,276,120
32	100.5712	630.	2,205,000
33	103.7140	610.91	2,138,185
34	106.8568	592.94	2,075,290
35	110.	576.	2,016,000
36	113.1428	560.	1,960,000
37	116.2856	544.86	1,907,000
38	119.4284	530.52	1,856,820
39	122.5712	516.92	1,809,220
40	125.7140	504.79	1,766,765
41	128.8568	491.70	1,720,950
42	132.	480.	1,680,000
43	135.1428	468.84	1,640,940

THE EFFECT OF UNBALANCED TIRES

At every revolution, when the heavy side of the tire comes in contact with the road, it receives more wear besides transmitting vibration to the running motor. If the fly-wheel or crank of an automobile engine is badly "out of true" the whole car will shake. Not only are vibrations unpleasant, but they are very destructive to the engine, the bearings, the chassis and the joints. Sometimes a tire delivers a mileage of 15,000 miles and to all appearances is in good condition except that the breaker strip is beginning to show. That tire has through some mishap, or just plain luck, been in perfect running balance.

Some tire manufacturers have tried to balance tires by drilling holes in the bead and filling them with lead, but this has not proved successful for two reasons. (1) When the inner tube is inserted, the weight of the valve stem throws it out again. (2) It weakens the strength of the bead and eventually the tire.

[1] This article may not be reprinted without permission of the author, who reserves all publication rights.
[2] Consulting production and efficiency engineer.

Running balance is a subject of constantly growing importance. Exact symmetry of form is no guaranty of running balance.

VARIABLES IN TIRE CONSTRUCTION

From an engineering standpoint an endeavor will be made to show where some variables in the construction of a tire might be remedied. The construction of a straight-side tire, both the machine and hand operations, is illustrated in Fig. 1. In the machine operation, the stock required under *A* calls for proper width and gage. The gage of the fabric after it has been frictioned and skim-coated should be constant with a variation of about .002 to .003-inch. If the gage of the stock varies, it will cause either buckles or shy sidewalls in the finished tire. Operation 3 is the first place where one of the largest variables in the construction of a tire commences; that is obtaining the correct tension of the fabric as it is applied to the core. To keep this tension constant is one of the greatest difficulties for the following reasons. (1) Where the stock is lapped it is much stronger and requires more tension so that the sides can be stitched down properly without causing wrinkles. (2) When the operator cuts off the correct length, he can give it only approximately the same tension that it receives when it is directly applied with the machine.

PROPER BEAD LOCATION

A great deal of care should be taken in the next operation, 4, that of setting the bead. To eliminate a great deal of trouble in mashed beads and imperfect tires, a device shown in Fig. 2 may be employed with a great deal of success. This tire-building template is used to inspect the proper location of the bead. The "present method" shown in dotted lines is crude and frequently results in faulty bead location. The template-gage, however, is fool-proof and cannot be twisted in use, thus insuring proper bead location. It makes possible the inspection of the bead location after the next ply of fabric is stitched over it, thereby avoiding dislocation of the bead and an imperfect tire.

In applying the various plies of fabric, a great deal of care should be taken to distribute crossing laps so as to balance the tire, and as stated under number 7, the laps are not to cross

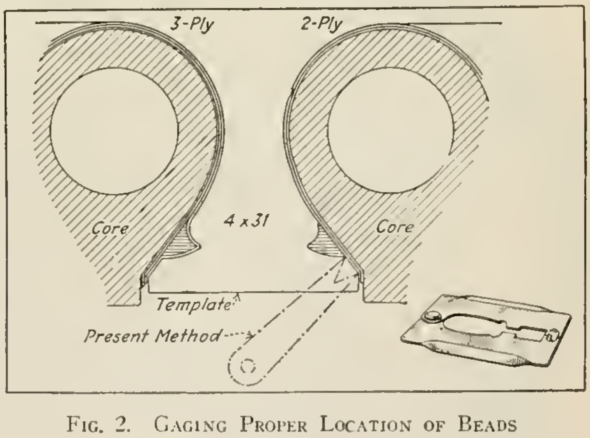


Fig. 2. Gaging Proper Location of Beads
Insert—Tire-Building Template

lower than 1½ inches from the bead. The reader will now begin to see variables that occur in tire building and that this particular case cannot be worked out with a positive result because the manufacturer relies on the operator to use his sense of judgment. Some of them should certainly receive credit as their judgment is sometimes really uncanny.

TUBING MACHINE TREADS

There are two kinds of treads. the tubing and the calender machine tread. The tubing-machine tread which is less costly than the latter, is not always uniform in shape, due to carelessness in feeding and maintaining uniform temperature of the stock. A tubing machine can be operated more efficiently and give the desired results if the temperature of the machine can be kept constant. Although it is water-cooled, the operator is usually relied upon for his sense of touch and feeling.

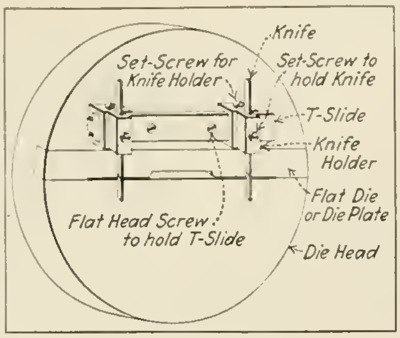


Fig. 3. Flat Die-head for Tubing Treads

A very good design of a flat die head for tubing treads is illustrated in Fig. 3, and has been used with a great deal of satisfaction.

ALLOWANCES FOR TREAD MEASUREMENTS

After the treads are extruded from the tubing machine they are put into books and placed on racks to cool. This is to allow for variations in width and shape while cooling. When the treads are cool they are cut to a given weight, plus or minus one ounce, with a variation in specified length of plus or minus three inches. The treads are then replaced in books and sent to the tire room where they are to be assembled on the tire carcass.

Before the tread is put on the tire carcass it is again weighed for specified weight with no variations, except that of length in which an allowance of plus or minus three inches is still maintained. This is a final check to avoid error—a rule that is not always adhered to by the weighers as many cases have been seen where a tread was stretched as much as ten inches.

ASSEMBLING TREADS

There are two methods of assembling treads used by the tire finishers. The first, which gives the best result, is to stretch the tire as it is put around the carcass, first one end and then the other. The second, which should be barred and actually is prohibited by some of the inspectors, is to stretch the tread around the carcass until the ends meet and then pull the tread from the carcass, thereby shifting the stretch. Here again the operator is relied on to give the uncured tread an even stretch so as not to affect the contour of the tire. If it is stretched too much at one spot, it may be the cause of a shy tire. Stretching the tread is essential so that the edges of the tread can be rolled down on the sides without wrinkling. Some tire companies have eliminated this variable by a mechanical device.

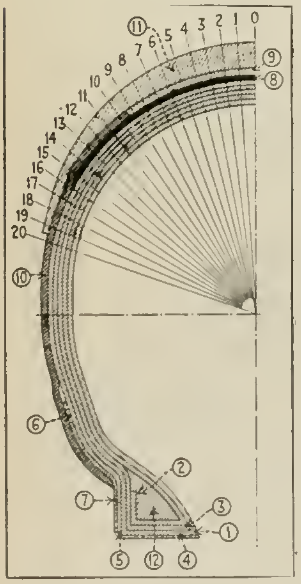


Fig. 4. Pneumatic Tire Lay-Out

MAKING AND ASSEMBLING CALENDER TREADS

The calender tread, which is the best-formed tread and can be kept very near constant, is a more costly operation. The most common method of running calender treads results in many treads being scrapped, due to air blisters. To eliminate this a tubing machine arranged back of a calender could be used. The tread is then applied to the tire in the same manner as the tubing-machine tread.

CALCULATING WEIGHT OF UNCURED TREAD

A formula for figuring weight of cured or uncured tread is shown in Table I. To use this formula a lay-out of the tire has to be made similar to that shown in Fig. 4, first laying out the

Table 1

Formula for Figuring Weight of Cured or Uncured Tread

Rubber Specific Gravity	Weight in Lbs. Per Cu. In.
1.35	.04883
1.36	.04919
1.37	.04955
1.38	.04990
1.39	.05027
1.40	.05064
1.41	.05100
1.42	.05136
1.43	.05172
1.44	.05208
1.45	.05245
1.46	.05281
1.47	.05316
1.48	.05353
1.49	.05389
1.50	.05425
1.51	.05462
1.52	.05498
1.53	.05534
1.54	.05570
1.55	.05606
1.56	.05642
1.57	.05679
1.58	.05715
1.59	.05751
1.60	.05787
1.61	.05823
1.62	.05860
1.63	.05895
1.64	.05932
1.65	.05968
1.66	.06004
1.67	.06040

A = Area reading of planimeter for uncured tread.
a = Area reading of planimeter for cured tread.
C = Circumference of tire.
V = Cubical contents of uncured tread.
v = Cubical contents of cured tread.
W = Weight of uncured tread.
w = Weight of cured tread.
K = Diameter of core.
F = Thickness of plies of fabric.
P = Thickness of padding.
B = Thickness of breaker.
R = Weight of cubic inch of uncured rubber.
r = Weight of cubic inch of cured rubber.

$$C = [K + 2(F + P + B)] \times 3.1416$$

$$V = C \times A \qquad v = C \times a$$

$$W = V \times R \qquad w = v \times r$$

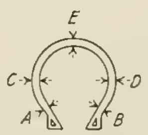
(W) should correspond to (w) within 2 or 3 ounces. If there is more difference in weight than that specified above, use the following formula to get proper area for uncured tread, which will make (W) and (w) correspond.

$$\frac{w}{R \times (C - 3)} = A$$

Note—[Explanation of $(C - 3)$]—Three is subtracted to allow stretch on uncured tread so that the edges of tread can be rolled down on sides without wrinkling.

core outline and then the contour of the tire from the dimension on the mold. Then around the core lay out the thickness of the

Result of Using 50% Scrap in #378 Stock on 4½"-34 Non-Skid S.S. Tires



5 Plies Fabric .047" Gage

To obtain the following results, two 4½"-34 Tires #1,345,580 and #1,345,464 were used.
From each tire, five sections were taken and all the rubber was removed from fabric and readings were taken with micrometer.

Tire #1,345,580						Tire #1,345,464					
Section	A	B	C	D	E	Section	A	B	C	D	E
1	.186	.182	.184	.181	.192	1	.178	.180	.179	.178	.175
2	.181	.181	.180	.178	.190	2	.181	.178	.176	.177	.185
3	.180	.177	.175	.175	.183	3	.185	.187	.179	.182	.182
4	.185	.175	.180	.178	.186	4	.189	.186	.184	.183	.195
5	.178	.180	.175	.175	.182	5	.191	.191	.187	.184	.195
Average for 5-Ply	.182	.179	.179	.178	.187	Average for 5-Ply	.185	.184	.181	.181	.186
Actual for 1-Ply	.047	.047	.047	.047	.047	Actual for 1-Ply	.047	.047	.047	.047	.047
Compression for 1-Ply	.036	.036	.036	.036	.037	Compression for 1-Ply	.037	.037	.036	.036	.037
Difference	.011	.011	.011	.011	.010	Difference	.010	.010	.011	.011	.010

Result:- Compression of each ply from .010" to .011"

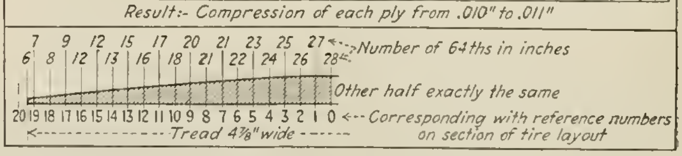


Fig. 5. Upper—Method of Obtaining Thickness of Fabric Plies. Lower—Lay-Out for Determining Tread Measurements

various plies of fabric. The thickness of the fabric should not be laid out for its actual thickness but for the thickness of the fabric after it is vulcanized, or when it has received its final cure. To give a clear idea of how this is established, two tires are generally cut up, taking at least five sections from each tire and stripping off all the rubber, tread, breaker and padding. Then measure the thickness of the plies of fabric at *A*, *B*, *C*, *D* and *E* as shown in Fig. 5. The average per ply is then taken which gives the desired result. The padding and breaker are then laid out as shown in 8 and 9 in Fig. 4 and then comes the side-wall 10

that leaves the cavity for the tread 11. To get the correct measurements and area of this cavity, construction lines are drawn every one-quarter inch on the bottom of the tread cavity, as shown in the line construction in Fig. 4. Using these construction lines as points of measurements in the thickness of tread, a lay-out such as shown in the lower part of Fig. 5 will give a correct form of tread as it should come from the tuber or calender. In

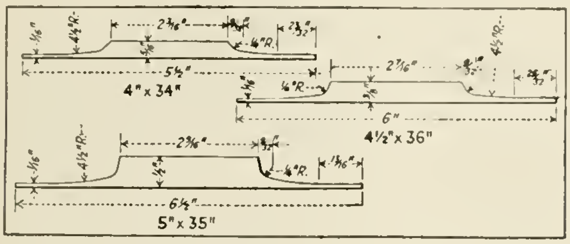


Fig. 6. Cord Tire Tread Profiles

like manner shapes and forms of treads can be figured out and designed for cord tires, as shown in Fig. 6.

THE PLANIMETER

A word might be said here as to the planimeter instrument. Quite a number of people interested in the rubber industry are not familiar with this instrument which is illustrated in Fig. 7.

This ingeniously devised instrument is an indispensable aid to the calculations and computations necessary in the work of tire construction engineers, as it affords the most simple and convenient method of measuring the area of plane surfaces on drawings and

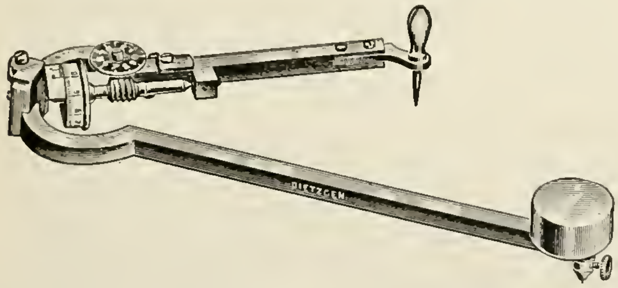


Fig. 7. Planimeter for Measuring Area of Plane Surfaces

plans. Accurate results can be obtained when the instrument is properly used. In cases of irregular surfaces, the results obtained cannot be equaled in accuracy by any compass and scale method of mensuration; and the time saved by using the instrument in such cases is very considerable. There are two types of planimeters: the polar planimeter and the rolling planimeter.

The polar planimeter, as its name implies, revolves with its tracer arm around a pole, and is therefore limited in its application by the length of the two arms, so that larger areas have to be

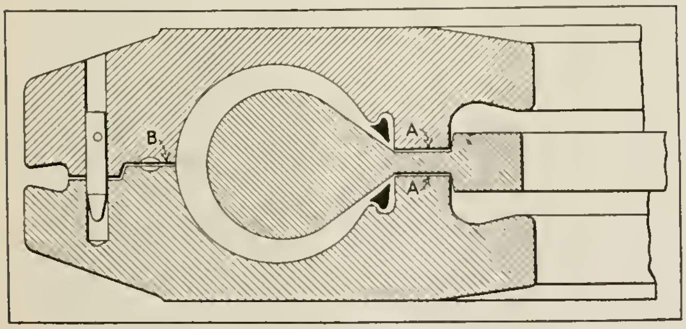


Fig. 8. Dirty Cores Cause Shy Side-Walls

measured in sections. The rolling planimeter differs from the polar planimeter in that it moves on two broad rollers. As the travel of these rollers is not limited, areas of any length, but not exceeding in width the movement of the tracer arm, can be measured in one operation. Contrary to the prevalent idea, planimeters are not difficult to use, but are very simple to operate.

THE NEED OF CLEAN CORES

Although a tire may be accurately designed and perfectly constructed, it does not always follow that the vulcanized tire will be a perfect product. One reason for shy tires is illustrated in Fig. 8. If the cores are covered with cement and dirt when assembled in the shells, the result is shown at *A*, and consequently there will be a large opening at *B*, allowing too much overflow, which prevents proper compression, causing shy sidewalls. The remedy is to keep the cores perfectly clean.

IMPORTANCE OF PERFECT CORE ALINEMENT IN MOLDS

Another instance of a perfectly good tire being spoiled in curing is illustrated in Fig. 9, where the core and built-up tire are placed off-center in the lower shell with the result shown at *A*

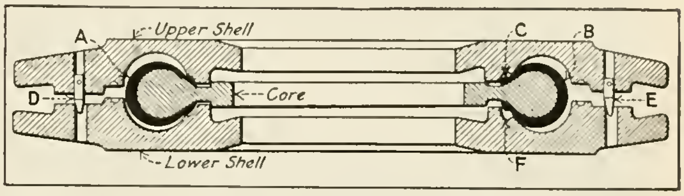
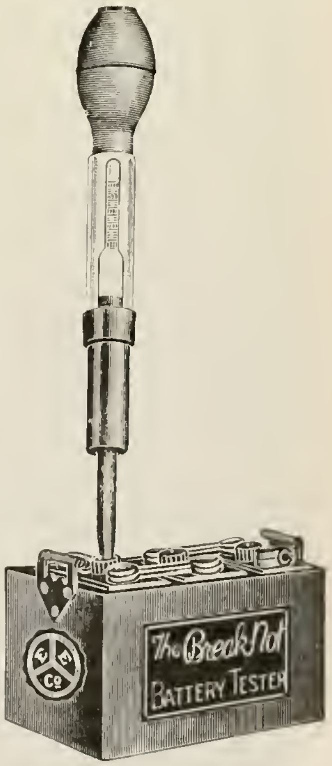


Fig. 9.—Misplacing Tire in Lower Mold Causes Imperfect Tires

and *B*. Thus when the upper shell, guided by dowel pins, is applied to the lower shell, the misalinement shown at *D* and *E* occurs, causing a greater overflow at *A* than at *B*. Uneven overflow results in open spaces through which live steam enters, causing shy tires. The remedy is perfect alinement of the tire and core, and the avoidance of moisture or water at *F*, which would turn into steam under this heat and cause imperfect beads.

A BATTERY TESTER NOT EASILY BROKEN

Car owners whose cars are equipped with a storage battery will be interested in the "Break-Not" battery tester. This hydrometer syringe is so constructed as to eliminate to a large extent the use of glass, and make it possible to carry in a tool box without danger of breakage. The manufacturer guarantees the accuracy of the tester. The float has large figures on the scale which are easily read and red danger marks indicate whether the battery is empty, half charged or fully charged. The bulb is large and made of strong red rubber. The other parts are: glass jar, hydrometer and rubber jar or tip; all of which are interchangeable and replaced without difficulty. The "Break-Not" comes packed in a strong chip-board mailing tube, with metal screw cover, and complete directions for making storage battery tests. — E. Edelmann & Co., 341 East Ohio street, Chicago, Illinois.



The "Break-Not" Battery Tester

A Brief Analysis of Tire Fabric Manufacture

By H. R. Whitehead[1]

In the early history of tire fabric manufacture it was deemed advisable to use nothing but Sea Island cotton which is the longest staple cotton grown. It was also thought that it was necessary to subject this to the combing process in order to obtain a superior quality of fabric. However, within the last few months there has been a general trend toward careful thought concerning cotton and the necessity of the combing process in the manufacturing of tire fabric.

CAREFUL CLASSIFICATION NECESSARY

One thing most certain in regard to cotton to be used is that it should have careful classification whether it be Sea Island, Peruvian, Peeler, Brazilian, Arizona, or any other type of cotton. Cotton does not run uniform in grade and staple from year to year or from consignment to consignment. Therefore, one of the most important men to consider in the textile mill is the cotton classifier. He should thoroughly examine every bale of cotton that is received by him and whenever a bale is found that is not up to the type specified, it should be rejected and not accepted at an allowance—a practice which is being carried on by a majority of the mills in all lines of fabric manufacture. While a gray or yellow tinged cotton is not necessarily detrimental to quality, a cotton that has met weather conditions which may damage the staple should not be used at any price. If this cotton is not examined by somebody thoroughly conversant with climatic effects upon cotton, a quality fabric will not be manufactured, no matter how carefully the cotton may be handled in the process of manufacture.

Today, one of the most vital points for the tire manufacturer to consider is the proper cotton to use in making up his fabric specifications. Within the past few months the writer knows that one of the largest cotton research bureaus of the country has been making flexing tests on the various growths of cotton and it will probably be surprising to some of the readers of this article to know that our own American peeler cotton has shown far greater flexing properties than all the other kinds of cotton with which we are familiar. Similar tests are being carried on with carded fabrics against combed fabrics and the result will be known in due time. If these reports continue favorable, it will mean a saving of millions of dollars to tire manufacturers, and it will also be a wonderful help to our American cotton growers and American cotton itself.

THE PICKING PROCESS

The rst process in manufacturing, after the cotton has been received at the mill and classified, is to arrange ten or twelve hales around the bale breaker and tear from each bale a sheet of cotton, similar to the method in which a sheet of paper is torn from the pad on which it is made, throwing a sheet from each bale at the same time upon the conveying apron. By a series of spikes placed upon an inclined apron, and a spiked doffer beater, the cotton is hroken into small particles and by suction of a fan it is carried any distance required and dropped into bins for aging purposes, or conveyed directly to the opener picker, where it is automatically brought between two feed rolls. These rolls carry the cotton forward to a revolving beater that forces the cotton away from the feed-rolls and underneath which is a series of wires through which the impurities of heavy seed, not entirely removed by the gin, are driven to the floor below. Meanwhile, the good cotton passes along, automatically forming into a sheet, and is wrapped under compression into a roll of continuous yardage similar to the winding of a roll of wrapping paper. The object of the picking process is to remove only the coarser impurities.

CARDING THE COTTON

From the picker the cotton is carried to the cards, and here the finer impurities, which the picker has not taken care of, are removed. This is accomplished by placing at the back of the card the roll of cotton which has been taken from the picker and passing it through a feed-roll set, where the cotton is immediately acted upon by a drum entirely wound by saw-tooth wires. This drum drives beneath the card the coarser impurities left by the picker, the good cotton passing along to a large cylindrical drum wound with needle-point wires. Over this drum is a series of flats covered with needle-point wires, with the points so bent that there is a pulling action between the flats and the cylindrical drum, whereby the finer impurities are removed by a vibrating stripping comb which strips the impurities from the flats and winds them into a roll at the front of the card as a waste product. Another cylindrical drum situated directly in front of the one previously mentioned removes the good cotton, and a high-speed vibrating comb removes the good-quality cotton from the smaller drum. The cotton has all the appearance of a very fine spider's web when it is removed from the smaller drum, and by passing the web through a trumpet containing a very small hole, it is carried through the coiler automatically to a can placed under the coiler, which is removed when filled. The next step in combed goods is the sliver-lap machine, which forms a series of rope-like strands into a lap, or roll, formed similarly to that at the picker, only in smaller dimensions.

THE COMBING PROCESS

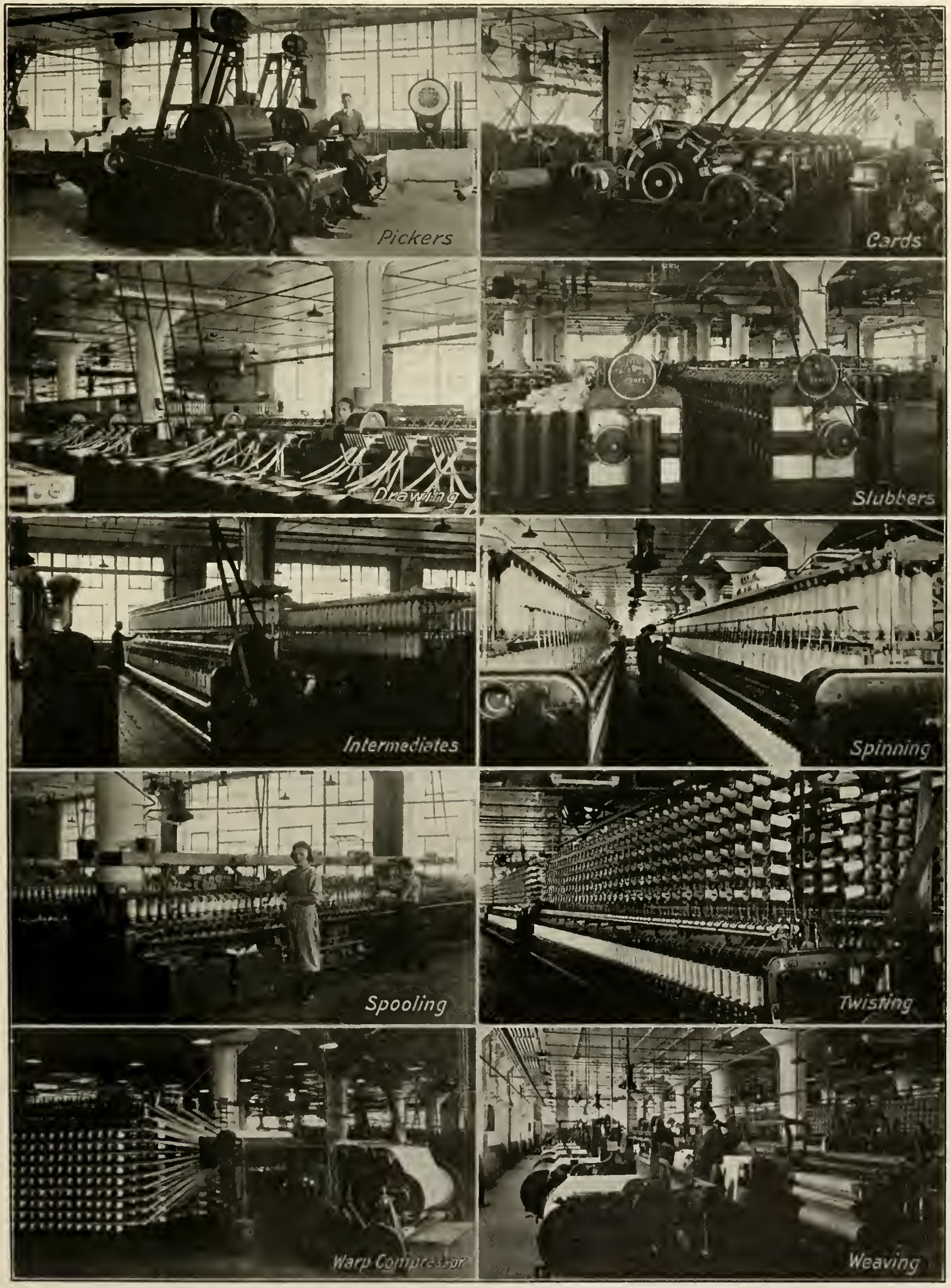
From the sliver lap the roll is conveyed to the ribbon-lap machine, which forms a lap very similar to the sliver lap. From here it is taken to the comber, the object of which is to remove any short fiber that the card has failed to remove. However, in the action of the comber the fibers must be straightened, due to the peculiar action of the comber upon them. In so doing, the spirality of the cotton is lost, and this matter has been the cause of a great deal of discussion as to the merits of combing in the production of tire fabric.

Originally, combing was practiced particularly on fine dress goods, or any particular fabric requiring very high counts of yarn, and especially on mercerized yarn. There is no doubt that a yarn of a higher luster and slightly cleaner is produced by the combing process. However, there is a question in the minds of some of our best textile men as to whether or not, for tire fabric purposes, the elasticity taken from the yarn in the combing process does not offset all the advantages claimed for it. The writer has discussed this matter with several textile men, and after exhaustive tests he believes that the comber is absolutely unnecessary in the manufacture of tire fabric. However, as before stated, research work is going on, and it is an experimental matter for the rubber companies to ascertain for themselves the bearing which this statement may have on their future product.

THE DRAWING FRAME

At the end of the comber the cotton is coiled into a rope-like form similar to that at the cards and is carried to the drawing frame. By a series of doublings of a number of the rope-like strands at the hack of the drawing frame and the use of a series of rolls increasing in speed from the back rolls to the front rolls, the rope-like strands are condensed at the front of the machine into one single strand. The weight of this one strand is equal to the weight of one of the strands at the back of the frame, or any weight which is required. The doubling process

[1]General Superintendent, Textile Division, The Mason Tire & Rubber Co., Kent, Ohio.



Machines Employed in Preparing Cotton, Spinning Yarn, and Weaving Fabric Used in Making Pneumatic Tires

at the back is used simply as a method of giving uniformity in weight to the finished product.

SLUBBING, INTERMEDIATE AND ROVING PROCESSES

From the drawing frame the cotton is taken to the slubber and one end of the drawing is placed at the back for each spindle on the slubber. Now begins the reduction of the rope-like strands to a fine or thread-like appearance through succeeding processes. The cotton at the slubber is wound upon a bobbin, the machine running automatically until the bobbins are full. They are then removed and taken to the intermediate frame, which is a machine very similar to the slubber, with the exception that the rope-like form at the slubber is wound from cans and at the intermediates, the bobbins from the slubber are placed in the creel at the back, and again the drawing process is used and the cotton at the front is wound upon bobbins still smaller than the slubber bobbins.

From the intermediates the cotton passes to the roving frame, which is identical with the intermediate, with the exception that the bobbin is even smaller than the intermediate bobbin. From the roving frame the cotton is taken to the spinning frame, and here the proper amount of twist is put into the cotton which will give the greatest breaking strength that can be obtained.

The necessity of the slubbing, intermediate, and roving processes is due to the fact that cotton cannot be drawn entirely by one process; that is, cotton in the carding processes should not be given a drawing process of more than five at any one machine. In the spinning room, however, it may be subjected to a drawing process as high as ten. It might be advisable to say that in explanation of the drawing processes, if one inch of cotton is entered at the back of the machine at a certain given time, it should not be stretched or drawn more than five or ten inches at the front of the machine in one given process, but must be gradually drawn through the succeeding machines as previously described.

SPINNING AND SPOOLING

Being limited at the spinning frame by the size of the ring, only a certain amount of yarn can be wound upon the bobbins. As this amount is not the yardage desired, the bobbins are taken to the spooler and the yarn upon the bobbin is wound onto the spool. As fast as one bobbin is exhausted the operator, using a very simple knot-tying machine strapped to the left hand, ties the end of another full bobbin to the end on the spool and by reason of the spool constantly revolving, exhausts the yarn from the bobbin which has come from the spinning frame. This method is continued until the spool is entirely full, when it is removed by the operator and an empty spool takes its place, and the method continued.

WARPING AND TWISTING

From the spooler the yarn is taken to the warper and from three to five hundred spools are placed in a creel. The ends from the spools are wrapped around a large warper beam revolving from thirty to sixty yards a minute. The yarn is drawn from the spools to the warper beam, forming a spool very similar to a huge spool of thread, and containing, not one end, but from three to five hundred ends drawn parallel, and giving a continuous yardage of these individual ends of from ten to twenty-five thousand yards, as required.

From the warper the yarn is taken to the twister, and in square-woven, chafing-strip, or breaker fabric, it is formed into a ply yarn. A ply yarn is composed of two or more strands of single yarn twisted together, and in the construction of the fabrics mentioned, ply yarns are entirely used. By a method of passing the yarn from the warper beam in which the yarn is separated into three strands, five strands, or whatever number are desired, the cotton passes through a set of revolving rolls, which deliver the yarn to the twister spindles. As the spindles on the twisters revolve at a high rate of speed, they immediately insert the twist desired. As soon as the yarn leaves the delivery rolls it is wound upon spools on the spindles, the yardage contained thereon being that specified in the fabric manufactured.

The manufacture of cord fabric requires one step beyond in the twisting process. The ply yarn necessarily must be cabled, as cord fabric is made from a yarn of this nature. Cable yarn is formed from the twisting of two or more ply threads together rather than from two or more single threads twisted together. The cabling process, with the exception of these facts, is exactly the same as the process of making ply yarn.

The spools are removed from the twisters and taken to the warp compressor. For each warp end desired in the fabric, a spool is placed upon a stationary spindle and the yarn passed through a porcelain eye, which is a means of guiding this thread. It is then carried to the front of the warp compressor and placed in a comb-like bar, which also guides it to the loom beam, which is very similar to the warper beam. By the rotation of the loom-beam drum and a proper tension on each individual spool, the yarn is drawn from the spools to the revolving loom beam and the fourteen to sixteen hundred ends are laid parallel upon this beam in exactly the same way as they were at the warper.

WEAVING THE FABRIC

When the loom beam is filled to capacity it is removed and taken to the loom, and as there are flanges extending on the sides of the loom beam, a tension is placed upon each individual thread so that in the succeeding process of weaving the yarn will be held taut. Each individual end is drawn at the loom, first through the harness, which contains a series of heddles, which are flat bars in the centers of which are eyes. Each heddle is supported on the harness frame and each thread is drawn through an individual eye in the heddle. Half of the threads are carried by one harness and the other half are carried by the second harness. By a cam motion, one harness is raised and the other harness lowered; that is, one-half of the ends are all carried upward and the other half are extended downward, leaving an opening directly in front of the reed, which is placed in front of the harnesses, for the shuttle of filling thread to pass between. The reed is composed of a series of wires through which spaces are formed and through which the individual threads are drawn regulating the number of threads that are required in the fabric to be made. As the harnesses open, the shuttle passes between, carrying a bobbin on which is wound the filling yarn, and as soon as the shuttle is received in the shuttle box, the motion of the loom is so timed that the harness that has been raised immediately lowers and the one that was lowered is raised at the same time, forming interlocking threads over the filling. By means of a roll at the front of the loom, as fast as the fabric is woven it is drawn at a certain speed around a take-up roll, which winds the finished fabric into a roll of any yardage desired. This method of raising and lowering the harnesses continues, and the filling is beaten into the fabric by the action of the reed, which rocks back and forth after each filling thread is placed across the warp; that is, simultaneously with the shuttle passing between the opening of the harnesses the reed is carried forward and pushes the filling thread into the fabric as desired.

The cloth is removed from the loom and carried to the finishing department where it is inspected, and any foreign matter removed by a series of brushes and shearing knives. By means of hot rolls the cloth is also calendered or laundered and the yardage determined at the same time. It is then ready to be delivered to the tire manufacturer.

The writer feels that the proper amount of research work has not been done with regard to construction of fabric, selection of cotton, and the advantages or disadvantages of the combing process. However, remarkable progress is being made, and within a short space of time he feels that manufacturers of tires will have awakened to the fact that there is an immense saving to be made in the selection of their tire fabric in the near future.

What the Rubber Chemists Are Doing

ESTATE RUBBER[1]

INFLUENCE OF HEAT

On dry rubber, heat is harmful only when the temperature rises high. The effect is stronger in proportion as the air has more access to the rubber and as more oxidation can take place. Short heating only produces a marked deterioration at 85 degrees C. (185 degrees F.) or higher. For more prolonged drying the limit seems to be somewhat lower, but in any case 50 to 55 degrees C. (112 to 133 degrees F.) is a safe temperature limit for drying-houses; when this limit is passed, a weak and sticky exterior gives warning long before the inner properties, especially the properties after vulcanization, are noticeably affected. The viscosity seems to be somewhat lowered by heating above 60 degrees C. (140 degrees F.), and only decreases markedly—at least after short heating—when the temperature reaches the neighborhood of 80 degrees C. (176 degrees F.). The rate of cure and slope are unchanged. It is only when the rubber is very strongly heated that a small decrease in the rate of cure is found. The tensile strength also decreases only at higher temperatures, probably in connection with oxidation or decomposition phenomena.

FAULTS AND DETERIORATION IN CREPE RUBBER

Faults in crêpe rubber may be many and of various kinds. Accidental admixtures caused by some oversight or negligence are of no general importance, although their causes are often difficult to trace.

SPOTS AND STREAKS

Several kinds of spots on crêpe may be caused during preparation, such as the following.

Lumps of preformed coagulum may be seen later as yellowish or violet-brown spots in the crêpe. Their quantity, however, is generally small, and when they are mixed up with the rest during compounding, no decrease in properties after vulcanization is generally found.

Violet coloration of the coagulum by oxidation on the surface which is in contact with the air may cause dark-violet or blue-black spots and streaks. This discoloration is caused by the oxidation of some non-rubber substances, and the rubber itself is not attacked. Although the small amounts of oxidation products cause a very sticky discoloration or streaking of the product, the harm to the rubber is negligible.

Some of the most common spots on crêpe are formed during drying, namely, when drying is too slow during periods of wet weather, or when the crêpe is not rolled thin enough. Orange, pink, violet, blue and dark-purple spots may develop, most intensively in the thickest parts of the crêpe. Similar spots may be formed if the dry, clean crêpe becomes moist after its despatch. For instance, from rain or sea water on the chests, or from storing on a moist cement floor, and also from packing-chests which are not dry enough. These spots are caused by micro-organisms, and as long as this exposure lasts only a short time, the exterior of the rubber may be largely damaged by the discolored spots, but the properties after vulcanization, and even the viscosity, are not harmed.

In certain cases the effect may become serious, and the properties may be very badly injured. The nature of the decomposition that causes such deterioration, and the organisms producing it, as distinct from those that cause only an innocent though very striking discoloration, are not yet known.

TACKINESS

Stickiness and tackiness may develop from very different causes, of which the principal are: (1) stickiness caused by too high temperature during drying; (2) stickiness caused by heating during milling; (3) tackiness caused by infection from soil or water; (4) tackiness caused by copper compounds; (5) tackiness caused by sunlight.

Concerning the chemical changes accompanying tackiness, relatively few data are available, and the different types of stickiness have not been separately studied and distinguished.

FAULTS IN SHEET RUBBER

Trouble from faults in sheet rubber is certainly not less than with crêpe. One great advantage of smoked sheet is that the brown smoke-color covers and makes invisible many differences in shade which may give so varying an exterior to unsmoked sheet. Even the violet discoloration, caused by oxidation on the surface of the coagulum, becomes practically invisible when the sheets are thoroughly smoked. Against this advantage in smoked sheet this form of rubber has two distinct disadvantages which tip the balance in favor of crêpe rubber, as far as trouble with the exterior goes. The first is, that the form of sheet rubber is of importance and that every deformation remains visible, while with crêpe this can be restored by recrêping. The second disadvantage of sheet rubber is formed by the larger content of serum substances which cause such faults as greasiness, mouldiness and rustiness. Tackiness may occur, of course, in sheet rubber as well as in crêpe. Spots are less important than in crêpe. Still, colored patches caused, for instance, by *Bacterium prodigiosum* may occur on sheets, and spots caused by fungi may also be found.

MOULDINESS

Perhaps the most serious defect in sheet rubber is the great susceptibility to mouldiness of the output of many estates. In former years this defect did not trouble the planters so much, as the rubber was sent away from the estate before any mouldiness could develop, and at the ports the rubber was regularly and rapidly handled and shipped. During the war, when shipment was held up, this trouble made itself felt in the producing countries, and has perhaps formed one of the most important complaints.

It may be assumed that the majority of cases of mouldiness is caused by chests getting wet during transport. If the water actually reaches the rubber, it is absorbed by the sheets, which then show large, white, opaque patches, like partly dried sheets, and with mould developing in many places, a most unsightly lot of rubber is formed, though the real harm done is generally not very great. It does not seem possible to make sheet rubber wholly immune to fungi, as indeed is the case also for crêpe.

GREASINESS

By greasiness is meant a somewhat sticky and moist feel of the sheet. In a moist atmosphere such sheet may absorb so much moisture that little drops are found on the surface, as if the sheet had sweated. It would be best to confine the term greasiness to a hydroscopicity of the sheets caused by serum substances which attract moisture from the atmosphere. This kind of greasiness is generally coupled with a strong tendency to mouldiness, and is prevented by soaking the sheets in water, after milling, so that the easily-soluble hydroscopic serum-substances are extracted. These two defects, greasiness and mouldiness, do not always go hand in hand.

The details of the origin and the cause of greasiness are not yet known. For estate practice the most important point is that greasiness may be prevented by the same means as that applied for reducing the susceptibility to mouldiness, namely, soaking the freshly-rolled sheets in water. Even dry sheets that show greasi-

[1] "Estate Rubber, Its Preparation and Testing." By Dr. O. de Vries, 1920. Abstract from Chapter 12.

ness may be cured to a large extent by soaking them in water and hanging them to dry.

As far as is known, greasiness has no marked influence on the inner properties. A direct deterioration of the rubber or real harm to the inner properties therefore is not to be feared. As this defect is so often coupled with a large tendency to mouldiness, it is quite reasonable that greasy sheets are not classed under first quality and are not accepted without protest.

RUSTINESS

"Rust" is the term applied to a thin, invisible film on the sheets which breaks and becomes visible when the sheet is stretched. On unsmoked sheets it has a yellowish-white color, on smoked sheets it becomes brown, or rust-colored. This film is formed by the growth of micro-organisms in the wet layer on the outside of freshly rolled sheets. These organisms decompose some of the serum constituents—probably the sugars—and form a very voluminous, jelly-like substance which dries to an invisible, cohesive film.

The organisms are aerobic, that is to say, they grow only when sufficient air is present. They prefer dilute solutions of serum. Soaking the sheets in water after milling does not hinder the rubber from becoming rusty. On the contrary, such sheets may show rustiness to a very large degree, if the organisms have time to develop.

It is worth while to state clearly that rustiness is caused by a *decomposition* of serum-substances by micro-organisms, while greasiness arises when *undecomposed*, hygroscopic serum-substances dry up on the sheet. Soaking the fresh sheets in water may help to prevent greasiness but does not help against rustiness.

Rustiness itself produces no changes in the inner properties of the rubber. The thin layer of harmless substances is found only on the outer surface, since air is necessary to the growth of the organisms. The interior of the sheets is not affected, and after the sheets are once dry, the changes cease, while rusty sheets, probably in connection with the changes by which rustiness is caused, are not hygroscopic.

As rustiness occurs only when the sheets are left in moist condition for some time after milling—24 hours or more, a beginning of maturation of course takes place, so that rustiness is usually accompanied by a somewhat greater rate of cure and often by a higher viscosity. O. de Vries and H. J. Hellendoorn, who investigated rustiness[2], state as follows:

"On keeping rusty sheets for several years, no deterioration takes place and the properties change in the same way as in the non-rusty controls."

Rustiness therefore must be classed among the harmless defects and should not form the base of any claim.

GAS BUBBLES

Small, eventually microscopic bubbles that are sometimes found in sheet are mostly called air-bubbles. It is, however, more to the point to call them gas-bubbles, since bubbles really caused by air may be regarded as rather an exception.

In most instances the bubbles in sheet are filled with gases which are formed in the latex and the coagulum, for instance by micro-organisms; therefore, in the first place, carbonic acid; further, probably nitrogen and some methane. On the composition of these gases very little is known as yet.

The bubbles themselves, as inclusions of innocent gases, probably have no effect at all on the inner properties of the rubber. The processes by which they are produced decomposition of serum-constituents, maturing, etc.—generally cause a somewhat quicker cure and higher viscosity so that one may expect these also in sheets with gas bubbles.

[2]Archief voor de Rubbercultuur, 2, 1918, 527 and 536.

THE VARIABILITY OF CRUDE RUBBER[1]

The author of this paper mentions the early observations and explanations of the variability in the rate of cure of plantation rubber and summarizes the work of Eaton, who concluded that there are two agencies present in plantation rubber which act as accelerators in vulcanization. These are:

(1) The vulcanization accelerating agent formed by the biological degradation of proteins or organic nitrogenous matter in the coagulum during the early stages of drying.

(2) A vulcanization accelerating agent, performed in the latex and retained by the dry rubber under certain conditions of preparation. The second substance may possibly be identical with the first, although there are certain indications that they are different.

The accelerator formed by the degradation of the proteins consists probably of an amine or amino acid, probably the former, since it is known that putrescine, which is a degradation product of animal proteins, behaves like an accelerator.

Eaton and his coworkers arrive at the conclusion that the variability in crude rubber is the variability in the amounts of accelerators which may exist before coagulation or may be formed later, and which by the processes of washing and drying are permitted to remain in the crude rubber.

EFFECT OF ADDED ACCELERATORS

The vast bulk of plantation rubber today is used in mixings in which either organic or inorganic accelerators are present in sufficient quantity to produce a fairly rapid cure. For this reason, it seems as though the work which has been done has been for the benefit of a very small amount of plantation rubber, and does not apply to the balance. We may divide the substances found in crude rubber, which may influence vulcanization, into two classes:

(1) The accelerators formed in the latex or in the coagulated rubber.

(2) Retarding agents which have been added to the latex or coagulum (such as any coagulating agent which has not been removed by washing), or substances in the smoke which are absorbed by the rubber, etc.

These two classes of substances will always react one against the other, as Eaton has pointed out. The balance between the two will determine the rate of cure. These substances are necessarily present in very small quantities, and consequently variations, which in themselves are small, will in the absence of fillers and added accelerators produce considerable effect on the rate of vulcanization and the tensile properties. When accelerators are used these differences are of little importance, because the amount of accelerator which is added to a compound is sufficient in itself to vulcanize the compound correctly, and the presence of these minute amounts of accelerators found by Eaton will have little, if any, effect on the vulcanization and tensile properties of such compounds. Not only are these differences small, but they are not necessarily indicative of the true quality of the rubber.

The author at various times has tested rubber which had different rates of cure when rubber and sulphur only were used, and found that in many cases these differences largely disappeared with the addition of two to four per cent of litharge, or 0.5 to one per cent of the common accelerators, such as aniline, hexamethylene tetramine, etc.

The whole point in discussion is that it is not sufficient to bring together rubber and sulphur, and assume the presence and action of an accelerator, merely because one method of preparation produces a somewhat more rapid cure than another. Results show that with many organic accelerators it is necessary to have the proper environment in order to develop the maximum, or even any accelerating action.

For testing the rate of cure the proper procedure would be to add to each mixture a sufficient quantity of zinc oxide to be certain that the vulcanization will take place in an alkaline medium.

[1] Abstract of paper presented by John B. Tuttle before the Rubber Division at the 58th meeting of the American Chemical Society, Philadelphia, Pennsylvania, September 2-6, 1919.

Probably 2 to 5 per cent would be sufficient for this purpose, and the results thus obtained would be of real value in determining the variation in the rate of cure, because in this way the conditions of vulcanization would be more uniform than is the case at present, and the results more truly comparable.

ONAZOTE—EXPANDED VULCANIZED RUBBER[1]

Pure rubber with or without the addition of vulcanizing materials when subjected to high gas pressures and high temperatures in an autoclave, tends on release of the pressure or on cooling, to lose the greater part of the occluded gases. The mass may be made to retain large quantities of gas under pressure by the addition of substances which reinforce or close the pores of the thin walls which constitute the reticulated structure. Substances of a waxy or resinous nature serve this purpose. The addition of such substances also lowers the pressure necessary for complete gas penetration, 75 atmospheres usually being sufficient. When using crêpe plantation rubber, high melting point ceresine wax and light magnesia in equal parts to the extent of five to ten per cent of the weight of raw rubber with sufficient red antimony and sulphur to effect hot vulcanization, are sufficient for the purpose.

As an aid in retaining the gas pressure a strongly resistant rubber skin is readily obtained by covering the raw material of the expanded rubber with a rubber compound which will not itself retain gas under pressure and will form a strong resisting cover for the gas expanded material. This skin of rubber being vulcanized to the expanded rubber interior, becomes an integral part of the whole during the process of vulcanization, and is, therefore, enabled to withstand punctures and external injury without decrease of efficiency of the expanded rubber.

The apparatus employed for producing and curing expanded rubber consists of two principal parts or metal tubes fitted with removable steel end caps. One of these shells is placed inside the other. The inner one contains the rubber and controls the pressures at the beginning and end of the process when applied to the material to be treated. Central openings through the steel end-caps are suitably arranged and fitted with adjustable check and pressure valves controlling the pressure automatically at certain stages of the process. A similarly constructed outer shell controls and operates the application of the high gas pressure to the inner one.

In making expanded rubber it is of utmost importance to provide a sealing matter of high melting point which will readily permit the gases to pass through the rubber when submitted to high gas pressure, and afterwards automatically to seal permanently gas-tight all porosity. To effect this a waxy or resinous matter is used as a flux which produces a liquid state by the action of heat and facilitating the entry of gas through the rubber.

The natural extent of pressure capable of retention by the rubber substance, without the skin support referred to above, is not over two atmospheres. To obtain a product holding a higher pressure requires the use of a substance capable of absorbing high pressure and to control the expanding action of the gas by a strong resilient skin which will not retain the gases. It is very necessary that this should be done during the expansion process.

The shell, loaded with rubber mixing and tightly capped, is placed in a heated chamber at 200 degrees F. and kept there until thoroughly heated. If a substance is required to contain five atmospheres' pressure when fully expanded, the check and pressure valves are set at 100 pounds before insertion of the shell into the outer tube or "gun." The pressure is supplied to the apparatus by means of high-pressure cylinders or a pump.

When the pressure enters the inner shell through the regulating valve, heat is applied by a steam jacket surrounding the "gun" and gradually increased simultaneously with the gas pressure until the full vulcanizing temperature is reached, which is usually about 305 degrees F.

[1]C. L. Marshall, Dunoon, Doyle Gardens, Harlesden, London, British Patent No. 162,176.

It is necessary to maintain a pressure of about 70 to 75 atmospheres until the vulcanization is complete, usually in two hours, more or less. The quality or fineness of the froth formation is determined by causing a sudden drop in pressure when the temperature has lowered to 50 degrees F. The pressure trapped in the inner shell by the automatic valve at 100 pounds acts as a resilient counter-pressure to the rapid expansion within the contents of the shell and prevents its disruption. To exhaust the pressure from the shell, a gas-releasing device is employed.

Commercially the expanded rubber described is known as Onazote and weighs only four pounds per cubic foot. This material was one of the novelties exhibited at the Fifth International Rubber Exhibition in London last June.

PLANTATION SCRAP RUBBERS[1]

Scrap rubbers generally give low values for ultimate tensile strength and elongation, the inferiority being due to the presence of foreign matter not removed by washing; the mineral constituents, particularly the particles of sand, are mainly responsible.

Repetition of earlier experiments confirm the results previously recorded, that (1) smoking usually lengthens time of cure of sheet rubber without markedly affecting the mechanical properties of the rubber, (2) that different methods of drying have little effect on the vulcanizing and mechanical properties, (3) that rubber allowed to remain in a moist condition is quick curing, and, (4) that thin crêpe rubber cures slowly, whereas blanket crêpe approximates in this respect to ordinary sheet.

[1]"Causes of The Inferiority of Plantation Scrap Rubber." Bulletin of the Imperial Institute, 18, 1920, 1-22.

CHEMICAL PATENTS

THE UNITED STATES

Rubber Compounding Mixture. A fluid mixture consisting of a resinous substance and a relatively non-volatile solvent.—George J. Chertoff, Cleveland, Ohio. United States patent No. 1,379,743.

Manufacture of Rubber. A process for preparing high-grade raw rubber direct from the latex without evaporating, drying or smoking, as follows: First, treating the latex, as soon as practicable after being tapped from the trees, with a dilute aqueous solution of alkalinized phenol to preserve the latex in a fluid and sound condition for any required length of time prior to coagulation; second, adding thereto a dilute solution of a suitable acid in sufficient quantity to neutralize the alkalinity of the preservative treatment and acidify the latex, whereby nascent phenol is liberated and energetic coagulation of the contained rubber in the latex takes place; and third, subjecting the coagulum of rubber to a mechanical dehydrating treatment.—Samuel Cleland Davidson, Belfast, Ireland. United States patent No. 1,380,640.

Art of Compounding Rubber. The method of producing vulcanized rubber by dissolving an accelerator, mixing the solution with a compounding ingredient, incorporating the mixture with rubber, and vulcanizing the rubber compound.—Clayton W. Bedford, assignor to The Goodyear Tire & Rubber Co., both of Akron, Ohio. United States patent No. 1,380,765.

Fabric for Airships and Process. The process consists in coating a basic material, proofed with rubber, with a film of oil of the class which dries by polymerization.—Henry A. Gardner, Washington, D. C. United States patent No. 1,381,412.

Fabric for Airships and Process. The process consists in treating a cloth base with a fireproofing solution, removing the excess solution by passage through a series of rollers, and coating the cloth with a dope containing an oil of the class which dries by polymerization.—Henry A. Gardner, Washington, D. C. United States patent No. 1,381,413.

Treatment of Rubber Latex. In the coagulation treatment of rubber latex which, while still in perfectly fresh condition after being tapped, has been preserved with an alkalized

phenol or phenoloid, the employment of a coagulating fluid consisting of an acidified aqueous solution of a soluble salt of magnesium for effecting the coagulative separation of the raw rubber. —Samuel Cleland Davidson, Belfast, Ireland. United States patent No. 1,381,455.

THE UNITED KINGDOM

India Rubber Compositions. Stiff air-dried glue containing 5 to 15 per cent of water is incorporated with unworked rubber in a mixing machine, the action of which produces sufficient heat to render the materials a plastic and homogeneous mixture. Preferably the temperature is allowed to rise to 280 degrees F. to evaporate much of the contained water and permit vulcanization of the product without further drying.—H. Wade, 111 Hatton Garden, London (The Goodyear Tire & Rubber Co., Akron, Ohio.) British patent No. 161,482.

India Rubber Compositions. Finely divided solids, such as carbon black or zinc oxide, which are added to rubber as pigments or fillers, are first mixed with a solution of glue or other colloid, which has been emulsified by means of a volatile liquid such as benzol or toluene. The emulsion is then mixed with the rubber, and the volatile liquid is removed during the subsequent drying process.—H. Wade, 111 Hatton Garden, London (The Goodyear Tire & Rubber Co., Akron, Ohio.) British patent No. 161,483.

Heating India Rubber. In the heat treatment of rubber for reforming or vulcanizing, a solution is employed having its boiling point at or slightly above the temperature required, the solution being at or slightly below the boiling point. Solutions of calcium chloride of various strengths are preferred, the boiling points of which rise approximately ten degrees F. for every half-pound of salt to 1½ pints of water. Articles or molds containing them may be immersed directly in the liquid, or placed in a jacketed vessel, the jacket of which contains the solution directly heated or circulated from an outside heater.—H. Gare, care of Grove Rubber Co., Limited, Bramallmoor Lane, Hazel Grove, Stockport, Cheshire. British patent No. 161,648.

Spongy India Rubber. The process of manufacturing porous or expanded rubber by vulcanization in an inert gas under pressure.—C. L. Marshall, Dunoon, Doyle Gardens, Harlesden, London. British patent No. 162,176.

Vulcanizing India Rubber. The cold vulcanization process described in patent No. 129,826 is modified by the application of one or both of the gases used at a pressure greater than that of the atmosphere.—S. J. Peachey, 5 Yew Tree Road, Davenport, near Stockport, Cheshire. British patent No. 162,429.

OTHER CHEMICAL PATENTS

GERMANY

PATENTS ISSUED, WITH DATES OF ISSUE

No. 338,295 (September 2, 1919.) Process of regenerating rubber. Xylos Rubber Company, Limited, Manchester, England, represented by Dr. W. Karsten and Dr. C. Wiegand, patent lawyers, Berlin S. W. 11.

FRANCE

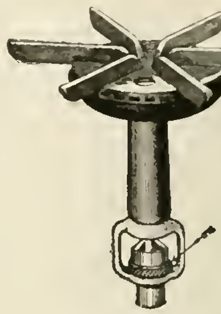
PATENTS ISSUED, WITH DATES OF ISSUE

477,054 (May 22, 1914.) Elastic mass. F. Aichlburg.
477,275 (July 28, 1914.) Process of manufacturing solid plastic masses. H. Hagendorf and A. Breslauer.
477,956 (July 9, 1919.) Process of producing diolefines (isoprene) from rubber, bodies containing rubber, homologs and analogs of rubber, as well as from mixtures of rubber and from vulcanized products with a base of rubber. H. Stern.
503,975 (December 22, 1917.) Process of making halogened hydrines. T. and E. H. Kerfoot.
504,179 (September 24, 1919.) Improvements in the manufacture of acetic acid. The Shawinigan Water & Power Co.
505,701 (August 27, 1918.) Process for accelerating the vulcanization of rubber and similar substances. Compagnie Parisienne des tissus caoutchouc et simili-cuir.
506,281 (January 31, 1918.) Continuous process of manufacturing acetone. R. P. T. Duchemin.
506,868 (December 2, 1919.) Method of treating rubber. The Hunter Dry Kiln Co.
510,187 (July 11, 1919.) Improvements in the method of vulcanizing rubber. E. Tilche.
510,197 (July 18, 1919.) Improved process of vulcanizing rubber. E. Tilche.
510,875 (February 28, 1920.) Leather and imitation leather, issued for footwear coverings for floors, belting, tires, etc. Ilic Patent Wear-proof Rubber, Leather & Fabric Co., Ltd.

LABORATORY APPARATUS

LABORATORY GAS BURNERS

The burner shown in the illustration is one of several forms made for laboratory use. It is a heating burner, without stand concerning which the makers state that it will give more heat with less gas than any other burner, due to perfect combustion. The air and gas are regulated at one time by a patent air mixer which assures economical gas consumption.


The Tirrill Burner

There is complete control of the length and color of the flame and no clogging or flashing back. Also, it holds a low flame in any draft and burns at any angle, using all kinds of gas at any pressure. — Tirrill Gas Machine Lighting Co., 50 Church street, New York, N. Y.

PAPER FILTER CONES

Perforated paper cones to protect filter papers are made by folding in the ordinary way a 5.5 cm. "hardened" filter paper and punching eight or more small holes about 2 mm. in diameter. After the cone is opened out it is fitted to the funnel, together with the main filter paper, by wetting and pressing firmly with the fingers. Some of its advantages are:

(1) Negligible cost, especially as compared with platinum. (2) Perfect fit, due to the fact that it can be molded while wet to fit each particular funnel. (3) No sharp edges to cut the overlying paper. (4) Unaffected by acids or other reagents for which filter papers can be used.

Aside from these distinct advantages some other points should be mentioned. If the cones are permitted to dry out after using (a convenient way is to leave them standing in the funnels) they retain their shape and can be used over again repeatedly. The strength of the cones is sufficient to withstand any ordinary vacuum used for filtering in the laboratory.—Seth S. Walker in *The Chemist-Analyst*.

THE NATIONAL CHEMICAL EXPOSITION

Extensive preparations are being made for the coming National Chemical Exposition, and it is predicted that this seventh annual exhibit will be a most important one, where many new phases of chemical development will be represented.

The show will be held in the Eighth Coast Artillery Armory, New York, N. Y., during the week of September 12. One of the important features of this exposition will be the fact that all the exhibits will be on one floor, while another great improvement over preceding gatherings of the kind is the securing of an auditorium with a capacity for seating 1,400 people.

Among the exhibits will be a silent chain drive displayed by the Morse Chain Co. This firm will also exhibit a number of samples of chains of different sizes, in order to illustrate the Morse rocker joint. By means of these displays the advantages to be derived from the use of this company's silent chain drives will be ingeniously advertised.

The program, as far as planned, will include the following addresses, of especial interest to the rubber industry:

"The Relation of Atmospheric Conditions to Chemical Processes," by A. E. Stacey, Jr., of the Carrier Engineering Corporation; "Drying and Drying Problems," by H. S. Landell, of the firm of Proctor & Schwartz; and an address, the title not yet stated, by E. G. Rippel, of the Buffalo Foundry & Machine Co.

Pitch Hydrocarbons Used in the Rubber Industry[1]

By Frederic Dannerth, Ph.D.

A Study of Technical Properties, Sources, Definitions and Uses of Solid Hydrocarbon Residues, Both Natural and Industrial

At a time when the market price of standard pitches varies from $25 to $50 a ton, many large manufacturers of rubber goods, and especially those making rubber-coated fabrics, might well consider the desirability of installing their own pitch-mixing departments. The manufacturer, knowing the chemical character of the materials which are put into the compounds, could then control his processes more accurately. The fact that pitch is a "specific material" for correcting microporosity, is now generally acknowledged. Aside from this it offers to the compounder a clean and practical method for incorporating finely divided carbon with the rubber compound.

The use of coal-tar for waterproofing textile fabrics dates back to about the year 1820, but the discovery that high-melting-point pitches are valuable and important compounding materials is of far more recent date. The word "pitch" as used at present in industrial work, designates all those natural or artificial distillation residues, which are black, soft and sticky at high temperatures, but hard and brittle at ordinary room temperature. In certain cases they may be tenacious or elastic at ordinary temperatures. The characteristic types are: lake asphaltum occurring in Venezuela and a nearby island; gilsonite from the mines of Utah; the residues from coal-tar, petroleum, fatty acid, and hardwood distillation.

It appears necessary to say a word about the numerical values quoted in connection with the present series of articles on organic materials used in the rubber industry.

Materials obtained from plants and animals, as a rule, have two or three properties which are quite constant, provided the material is a true *chemical* compound not admixed or adulterated with any other substance having similar properties. These three properties are called "constants." They are: the melting point, the boiling point, and the specific gravity. For example: commercial 90 per cent benzol if tested by the distillation test, will show this property: 90 per cent of the liquid will boil over or "distil" before the thermometer has registered more than 100 degrees C. Pure benzol, however, is a chemical entity, and its formula is well known to chemists. The pure article has been examined by thousands of persons, and wherever tested it is found to boil at a temperature close to 80.5 or 81 degrees C. It has a freezing point of 4 degrees C., which means that it goes over into the solid form of crystals at that temperature. It has a specific gravity very close to 0.880 compared with water at 20 degrees C.

In the case of oils, fats, waxes and resins the fluctuation in the numerical values is at times very obvious. In such cases the chemist concludes that he has before him substances not chemically pure and of indefinite chemical composition. For that reason it is customary to differentiate between "chemically pure" substances and "commercial materials." Specimens of commercial materials are frequently found to be admixed with other materials in indefinite proportions, or it may simply be that they have been carelessly prepared.—The Author.

SPECIFICATIONS

The choice of a pitch for compounding purposes will depend in a great measure on the purposes for which the finished rubber product is to be used. In other words, the "external influences" to which the finished rubber goods will be exposed. The questions which the consumer must keep in mind are these:

1. Will the black color of the pitch interfere with the use to which the finished product will be put?
2. Does it impart any peculiar or unpleasant odor to the goods?
3. Is the melting point of the pitch so low that the finished product is too supple—that it has not enough "spring" or "come-back" to it?
4. Does it contain any matter which will volatilize below the temperature at which the rubber compound will be vulcanized? In other words, will the pitch cause blistering?
5. What is the influence of high-pressure steam, volatile organic solvents and oils on rubber compounds containing this pitch?
6. Do the rubber compounds containing it resist abrasion?
7. What is the maximum percentage which can be used to advantage in a recipe for a given type of rubber compound?
8. To what extent will compounds containing this pitch resist abrasion, hammer blows, and other physical influences?
9. What is the best form in which to deliver it to the compounder so that it can be mixed uniformly in the shortest possible time? Should the pitch be granulated?
10. Is the vendor willing to deliver it in metal drums to avoid the danger of wood-splinters in the compound?

DEFINITIONS

The use of bituminous materials for building roads, pavements, and roofing, as well as for plastic masses, has led to the formal definition of many of the terms used in the industry. Some of the most important of these are:

1. Asphalts. Solid or semi-solid native bitumens; solid or semi-solid bitumens obtained by refining petroleum; solid or semi-solid bitumens which are combinations of those already mentioned with petroleums or derivatives thereof. They melt upon the application of heat, and consist of a mixture of hydrocarbons and their derivatives. They are of complex chemical structure, largely cyclic and bridge compounds.

2. Bitumens. Mixtures of native or pyrogenous hydrocarbons with their non-metallic derivatives. These materials are soluble in carbon disulphide.

3. Asphaltenes. The components of the bitumen in petroleum, petroleum products, malthas, asphalts, and solid native bitumens which are soluble in carbon disulphide, and insoluble in paraffine naphtha (gasoline).

4. Carbenes. The components of the bitumen in petroleum, petroleum products, malthas, asphalts, and solid native bitumens, which are soluble in carbon disulphide, but insoluble in carbon tetrachloride.

5. Petrolene. That part of the bitumen which is soluble in petroleum spirit is designated as petrolene. This extraction is to be carried out first, and the extraction with carbon disulphide is carried out secondly. It is of particular importance in the case of petroleum pitches.

6. Free carbon. That part of a pitch which is insoluble in

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all of the volatile organic solvents is designated as free carbon to distinguish it from that carbon which is chemically combined with other chemical elements. In the examination of coal-tar, a determination of this carbon is found to be of great value. Among the solvents which have been used by coal-tar chemists for the test are: carbon disulphide, aniline, glacial acetic acid, benzene, toluene, and xylene.

NATURAL ASPHALT PITCH

Trinidad asphaltum with 56 per cent bitumen is obtained from Asphalt Lake on the island of Trinidad, off the coast of Venezuela in South America. Bermudez asphalt contains about 75 per cent bitumen, and is found in Venezuela. The analysis of refined Bermudez asphaltum shows in round numbers:

	Per Cent
Bitumen soluble in carbon disulphide	75.0
Organic matter not bitumen	3.5
Non-volatile mineral matter	21.5
	100.0

Carefully refined Bermudez asphaltum shows as high as 90 per cent of actual bitumen. These asphalts are by some considered to be alteration products of petroleum hydrocarbons, resulting from evaporation and oxidation.

Another type of rather pure solid bitumen is known as gilsonite, and is found on the Uintah Indian reservation in Utah. As early as the year 1900, the annual production was approximately 7,000,000 pounds, and the demand for the material as a waterproofing agent and as a raw material in rubber works has increased this figure. The chemical analysis of gilsonite shows that the amount of matter soluble in carbon disulphide varies from 90 to 95 per cent.

An examination of natural pitches should invariably include a determination of "*Loss on heating to* 150 *degrees C.* (about 300 degrees F.) *for five hours*," as it has been found that some of them contain a considerable amount of volatile organic matter.

COAL-TAR PITCH

Coal-tar is a thick, viscous liquid obtained in gas-works when bituminous coal is heated to high temperatures in retorts. By this operation gas is driven off and after purification it is collected in suitable tanks; ammonia is also driven off as a gas and is absorbed by sulphuric acid. Some of the fumes which distil off are very heavy and for that reason they condense shortly after leaving the hot retorts, as a tarry mass which is collected in suitable "tar-wells." From here the molasses-like tar is pumped into tank cars and delivered to the coal-tar refinery, a separate and distinct industry. The coal-tar refiner subjects the material to a series of distillation processes whereby he removes (1) water, (2) light oil, cut at 200 degrees C., (3) middle oil, cut at 270 degrees C., and heavy oil, cut above 270 degrees C.

The hard pitch which remains in the still after the third or anthracene oil fraction is distilled off, constitutes the material known in commerce as "hard pitch." If the distillation is stopped at 270 degrees C., the material which remains in the still will be "soft pitch," with a melting point below 90 degrees C. (195 degrees F.).

TESTS

The tests usually applied to coal-tar pitch are mostly physical. Specific gravity is determined in the manner used for solids. Evaporation loss is determined by exposing in an air bath at 160 degrees C. for seven hours. Melting point is determined by heating a cube of pitch in water while it is suspended from a wire. Free carbon is determined by extraction with toluene and benzene in an Underwriters' extraction flask.

Coal-tar is a mixture of hydrocarbon distillates, mostly *unsaturated* ring compounds, and coal-tar pitch, being a solid residue of this material, contains the same type of chemical substances. It will be recalled that the petroleum pitches contain mostly cyclic and bridge compounds.

HARDWOOD PITCH

In the process of distilling such woods as oak, beech and maple, a number of products are obtained as in the case of coal distillation. Acetic acid, alcohol, and wood-tar are obtained as liquids, while charcoal remains in the retort at a temperature of about 427 degrees C. (800 degrees F.).

The tar is later distilled separately and the oils which come off are collected and fractionated up to a temperature of about 200 degrees C. At the end of this distillation the hard-wood pitch remains in the retort. It can be produced in grades which melt at 100 degrees C., or as high at 150 degrees C. The former would show about 95 per cent of matter soluble in chloroform, while the latter would contain not much more than 50 per cent of matter soluble in that liquid. A pitch of melting point 100 degrees C. may contain as much as 40 per cent of matter soluble in (denatured grain) alcohol, and will show about 1.250 specific gravity.

PETROLEUM PITCH

When liquid native bitumens (petroleum) are treated with a current of air while they are being heated, the volatile parts of the petroleum are driven off and an asphalt-like product known as "blown petroleum pitch" is obtained. This is sometimes called Byerlite. Thomas T. Gray, the American petroleum expert, claims that the asphalt residues from crude petroleum so closely resemble the natural asphalts that the two cannot be distinguished with certainty.

The melting point of these pitches is determined by the ball and ring method. This depends on the use of a steel bicycle ball weighing five grams, which is allowed to drop through a disk of asphalt 16 millimeters in diameter. In the petroleum industry, the bitumen soluble in petroleum spirit has been designated as "petrolene," and the part soluble in carbon disulphide has been called "asphaltene."

Pennsylvania petroleum is a "paraffine base" oil, as it yields solid hydrocarbons of the paraffine series, while California petroleum has an "asphalt base." It is rich in asphalt and contains practically no solid paraffines, although it contains a large proportion of nitrogen bases of the pyridine and chinoline series.

The penetration test is carried out to determine the consistency or hardness. To this end, a sample is subjected to the impression of a weighted standard needle for a specified time at a specified temperature. The penetration of the needle is then recorded on a dial of the penetrometer.

The buyers of petroleum asphalt usually specify the proportion of petrolene and asphaltene which they desire in the product, and these specifications depend upon the use to which the asphalt is to be put. The petroleum spirit extraction is first conducted and the carbon disulphide extraction is then made on the residue.

STEARIN PITCH

In the meat packing industry this material is otherwise known as "candle pitch" or "candle tar." It is obtained as a retort residue in the manufacture of distilled fatty acids. In modern soap manufacture it is customary to first separate the valuable glycerol (glycerine) from the tallow or the vegetable oils. The remaining part of the oil or fat is the fatty acids. In order to obtain them in a state of relative purity they are distilled, preferably in vacuum retorts.

In certain cities the recovery of grease from kitchen garbage has been introduced. The grease expressed from garbage is very dark-colored, and the fatty acids split off from the grease are likewise rather dark-colored, so that they must be distilled two or three times in order to obtain the crisp, white, stearic acid of commerce. The pitch which remains in the retort as a residue will have a melting point anywhere from 50 to 100 degrees C., and will contain appreciable amounts of saponifiable matter. This is in fact the characteristic of the pitch obtained from the fatty acid refineries. The ash or non-volatile mineral matter will be less than 5 per cent, and the matter soluble in carbon disulphide

may run as high as 85 per cent. The specific gravity of this stearin pitch will average 1.000 specific gravity.

It has been found to be impractical to produce these pitches in such grades that the melting point would be about 150 degrees C., as the material in the stills is decomposed at a point far below that temperature. One of the unique applications of stearin pitch has been in the manufacture of rubber-coated fabrics. Coal-tar pitch if used alone would give a coating too brittle for practical purposes, but if a certain percentage of stearin pitch be used in the compound, this objection is overcome and the whole compound can be worked out without much difficulty.

LABORATORY TESTS

The laboratory tests used to determine the fitness of these materials for use in rubber compounding include a determination of: (1) the melting point; (2) penetration of a needle point; (3) non-volatile mineral matter; (4) matter volatile below 290 degrees F.; (5) specific gravity; (6) free carbon; (7) fixed carbon; (8) matter soluble in various organic solvents; (9) saponifiable matter.

LABORATORY METHODS OF TESTING

1. Melting Point (By the Ball and Ring Method). A ring of metal, 6 millimeters thick and 16 millimeters in diameter is filled to the level with solid asphalt. This can be done by filling the ring rounding full with asphalt, cooling in cold water for a few minutes, and then cutting off the excess with a hot knife. There shall be no air bubbles inside the ring. A steel bicycle ball 10 millimeters in diameter, weighing 5 grams, is then placed in the center of the asphalt. The ring is hung on a level with the mercury bulb of a thermometer, the point being immersed in a beaker of water. For asphalt pitches melting below 50 degrees C. the water should have a temperature of about 5 degrees C. at the start. For pitches melting below 65 degrees C., about 20 degrees C. at the start. For pitches melting above 65 degrees C., about 25 degrees C. Heat the water and beaker at the rate of about 5 degrees C. per minute. Note the temperature at which the ball and pitch begin to drop rapidly on leaving the ring. This is usually about one centimeter below the bottom of the ring. This temperature is recorded as the melting point or "dropping point" of the pitch.

Melting Point (By the Cube Method). This method was developed in the year 1900 to be used on coal-tar pitches. It is not well suited to pitches of the type of stearin pitch, which are tacky, slimy or sticky at the point of melting. Cubes of pitch are made in a mold having a hole one centimeter square. A beaker of about 600-cc. capacity is used. The cube of pitch is suspended by means of a wire, so that it is exactly 2 cm. from the bottom of the beaker. The water is heated by a Bunsen burner at the rate of about 5 degrees C. per minute. For high-melting-point pitches the water is replaced with glycerol, cotton oil, or calcium chloride solution. When the cube of pitch drops and just touches the bottom of the beaker, the temperature of the surrounding liquid is noted, and this is recorded as the melting point (by the cube method). The thermometer should be so placed in the beaker that the bottom of the mercury bulb is on a level with the cube of pitch.

2. Penetration. The consistency or hardness of pitch can be determined by noting how far a point or surface of an instrument will penetrate the pitch, provided the indenting object has a definite weight, the pitch has a definite temperature, and the point or surface is allowed to act on the surface of the pitch for a given number of seconds. The instruments used for this test are designated as penetrometers, and different types have been devised by Dow, and Bowen, and Richardson. This apparatus must not be confused with the plastometer, which is used to measure the extent to which a small flat or hemi-spherical surface will deform a substance which offers elastic resistance. The plastometer can be used on vulcanized rubber goods.

3. Non-volatile Mineral Matter. The ash contained in pitches varies from about one per cent in pitches of hardwood, coal-tar and petroleum, to five per cent in stearin pitch and 22 per cent in Venezuela asphaltums. For making the test, a piece of asbestos ⅛-inch thick is provided with a hole large enough to take a porcelain crucible. The pitch is weighed off in the crucible and the mass is ignited with a small blue flame.

4. Matter Volatile Below 290 Degrees F. As the majority of rubber compounds are vulcanized between 280 and 300 degrees F. (138 and 149 degrees C.), it is important that compounding materials should contain nothing which will volatilize below those temperatures. If a pitch has been "cut back" with a low-boiling oil, the vapors of this oil may volatilize during vulcanization and cause "blowing" or "blistering" of the rubber product. Effects such as these are very much desired in the production of sponge rubber, but for other articles they merely cause defects and products with blisters.

5. Specific Gravity. The weight of the pitch per cubic foot is of interest and importance to the rubber compounder, because pitches of high specific gravity will naturally increase the weight of the finished rubber product "per cubic foot." Generally, a pitch with a specific gravity of less than 1.300 will be preferred. The test may be made in water kept at a temperature of 20 degrees C. By determining the weight of a sample of about one cubic inch, in air and then in water, one can by simple arithmetic calculate the relative weight of the pitch.

6. Free Carbon. A sample of the pitch weighing less than five grams is weighed off accurately, and placed in a Schleicher and Schill fat-extraction thimble, in the Soxhlet cup of an Underwriters' extraction apparatus. Pure toluene (toluol) is used for the extraction. The process is carried on until the major portion of the solubles has been extracted, and then the sample is extracted with coal-tar benzene. When the benzene coming from the thimble is no longer colored, the extraction is complete. The thimble is dried in a steam bath and finally in an oven at 110 degrees C., after which it is weighed.

The amount of free carbon varies all the way from one per cent in hardwood pitches to 40 per cent in coal-tar pitches. This is an item that does not appear important at first thought. Now if it were possible to offer to the rubber goods manufacturer a material which contained, say, 50 per cent of a "fine carbon," together with other substances which would not detract appreciably from the valuable physical properties of the rubber compound, such a pitch product would be of considerable interest. It would be a great step forward if "fine carbon" could be incorporated with rubber compounds while in the form of a pitch. One of the technical considerations noted by the producers of pitches has been to produce a pitch of high carbon content which would at the same time have a suitable melting point, as the pitches now being made with melting points of 300 to 350 degrees F. are not actually "high carbon" pitches.

Although benzene and toluene have been found to be the solvents best suited for determining "free carbon" in coal-tar pitch, the makers of stearin pitch usually use carbon disulphide for this test. It has in fact been observed that various solvents act differently on any one pitch, so that it becomes necessary to observe and note the action of each.

7. Matter Soluble in Organic Solvents. The volatile organic liquid solvents which have been used at various times to obtain a closer knowledge of the constituents of pitches include: (1) benzene, (2) toluene, (3) xylene, (4) petroleum naphtha, (5) chloroform, (6) carbon disulphide, (7) acetone.

It will be found for example that about 92 per cent of a hardwood pitch is soluble in acetone. The matter soluble in carbon disulphide is about 85 per cent of stearin pitch and 95 per cent of Utah gilsonite. The petroleum naphtha used for extraction is that known as 85 to 90 degrees Bé. (or 0.650 specific gravity). By some chemists, the matter insoluble in the principal organic solvents is recorded arbitrarily as "free carbon," as it is a well-known fact that carbon is unaffected by practically all of the solvents.

Table Showing Properties of the Principal Pitch Hydrocarbons

	Hardwood No. S	Hardwood No. H	Stearin "S"	Stearin "P"	Stearin "M"	Asphaltum	Gilsonite	Coal-tar	Petroleum
Non-volatile mineral matter	<1%	<1%	2.8%	4.0%	4.7%	21.5%	......	<0.5%	0.0
Loss on heating to 290° F	......	......	0.8%	0.5%	0.9%	......	......	0.0	......
Saponifiable matter	?	?	65.0%	15.0%	16.1%	0.0	0.0	0.0	0.0
Soluble in acetone	92.0%	50.0%	<1.0%	none	none	......	......	<1.0%	......
Soluble in carbon disulphide	......	......	84 %	......	......	75 %	>90%	6 %	......
Soluble in petroleum naphtha	......	......	70 %	......	71 %	......	......	16 %	37%
Free carbon	1.0%	30.0%	15.8%	......	71.0%	......	......	40.0%	......
Specific gravity	1.20	1.20	1.02	1.10	0.99	......	......	1.35	1.12
Melting point, degrees C. (ball and ring)	80	120	60	100	109	100	160	149	<100
Penetration test, 5 seconds	......	......	......	......	0.4 mm. / 77° C.	......	......	......	......

8. Fixed Carbon. In some laboratories it has become customary to determine the percentage of "fixed carbon" in pitches. This must not be confounded with "free carbon." Free carbon is that which actually exists in the original material as elemental carbon, while fixed carbon is applied to carbon which remains after incomplete combustion of the substance. It was originally determined on coals and other fuels, and the methods used in coal analysis are used by some chemists in pitch analysis. Generally speaking, the determination of free carbon is decidedly more important than the other determination.

9. Saponifiable Matter. This test is based on the fact that if a fat or plant oil is warmed with a solution of potash in alcohol, the fat or oil is converted into a soap. The test for saponifiable matter is carried out by means of a half-normal solution of alcoholic potash. About two grams of the substance to be tested are weighed off accurately in a suitable flask; 25 cc. of the half-normal solution are now run into the flask, and the whole is gently warmed until complete saponification has taken place. Next add 1 cc. of phenolphtalein indicator-solution, and titrate with half-normal hydrochloric acid. Now conduct a "blank test" by titrating 25 cc. of the original solution of half-normal alcoholic potash. The difference in the volume of the acid used in the two cases equals the cc. of the potash solution, which were neutralized by the substance which was tested. This is then calculated to milligrams of potash for each gram of substance originally weighed off.

In other words, the Koettsdorfer number or "saponification value" indicates the number of milligrams of potassium hydroxide required for the complete saponification of one gram of the substance. In the case of stearin pitches it is found that they generally contain from 15 to 20 per cent of this saponifiable matter. As the pitch is the retort residue from the distillation of fatty acids, the pitch naturally contains a residuum of these fatty acids and this shows up in the test as "saponifiable matter." By the very nature of the case, the other pitches do not show anything when subjected to this test.

ACTIVITIES OF THE RUBBER ASSOCIATION OF AMERICA

SUMMER OUTING CANCELLED

The twentieth annual summer outing of the Association, which was scheduled to be held at the Seaview Golf Club, Absecon, New Jersey, was cancelled on account of the small number of members who had indicated their intention to attend. It was deemed advisable to omit this outing in the interests of economy.

MEETINGS

The Traffic Committee held a meeting July 18 at The Rubber Association offices. Matters of interest were discussed.

The Executive Committee of the Tire Manufacturers' Division met at The Rubber Association offices July 27.

At the Association headquarters, Leader-News building, Cleveland, Ohio, the regular semi-annual meeting of the Tire and Rim Association was held. There was a good attendance, and subjects of importance were discussed.

DIVISIONS AND COMMITTEES

A suggestion regarding the advisability of holding regular quarterly meetings of the Tire Manufacturers' Division as a whole, in addition to the monthly meetings of its executive committee, has been received with favor. It has been considered best, however, to postpone the first of these contemplated quarterly meetings until September. Early in that month notices will be issued designating the date, hour and location of the meeting.

RULES GOVERNING CRUDE RUBBER TRANSACTIONS TO BE REVISED

Representatives of the Crude Rubber Committee of the Association and the Rubber Trade Association of New York are attempting to harmonize the sets of rules governing their respective bodies. This is being done in an endeavor to make these rules and regulations cover more satisfactorily the prevailing conditions, and represent more truly common trade practices. A joint committee will submit recommendations to the Crude Rubber Committee and the Rubber Trade Association. Suggestions will be welcomed from other members of the Association who are not represented on these committees.

NEW RATINGS FOR USED SOLID TIRE BASES

Old metal bases upon which solid tires were mounted, and from which the tires have been removed, are now rated as sixth class in car loads, according to the new ruling of the Official Classification Committee. This rating shall apply if shipments are described as scrap metal wheel bases having value for remelting or scrap purposes only.

NEW TRANSCONTINENTAL RATES

The transcontinental railroads have reduced freight rates on crude rubber from Pacific coast ports to Chicago and St. Louis and Minnesota and Wisconsin points from $1 to 75 cents per 100 pounds, minimum carload weight 80,000 pounds. It is expected that at a later date this lower rate will also apply to Indiana and Ohio points.

OUTSIDE VALVES FOR DISK WHEELS

The Tire and Rim Association has been actively endeavoring to induce the disk wheel manufacturers to design their wheels in such a manner that tire valves will be accessible from the outside. It is thought that the necessity of inflating disk-wheel tires from the inside has resulted in under-inflation with detriment to tires and unsatisfactory service.

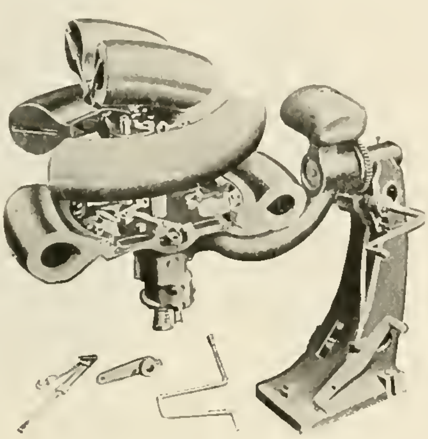
SUMATRA RUBBER

The report for the year ended August 31, 1920, of The United Serdang (Sumatra) Rubber Plantations, Limited, gives the rubber crop harvested at 3,789,951 pounds against an estimate of 3,366,000 pounds and a previous year's total of 3,084,945 pounds. The average net sale price, including unsold portion of the crop, was 1*s*. 10.93*d*. a pound. The cost of production, f. o. b. port of shipment, including provision for depreciation, etc., but excluding loss on exchange (of 24*d*. a pound), was 1*s*. 2.22*d*. a pound. At the commencement of the year 789,372 trees were being tapped, this number being decreased, owing to thinning out and resting, to 771,791 by the end of August, 1920. The crop was harvested from an average bearing area of 9,640 acres, and the average yield was at the rate of 4.82 pounds a tree or 393 pounds an acre.

New Machines and Appliances

A NEW TIRE-BUILDING CORE

The Giant "Time Saver" is the newest development in tire-building cores used for building the tire and removing it preparatory for the air-bag and final cure. According to the old method when the tire was completed on the core, it required three or four men approximately 15 minutes to remove the tire from the core with chain or air hoist. This operation is difficult, the tools required are clumsy and the handling of the core is a great strain on the men.



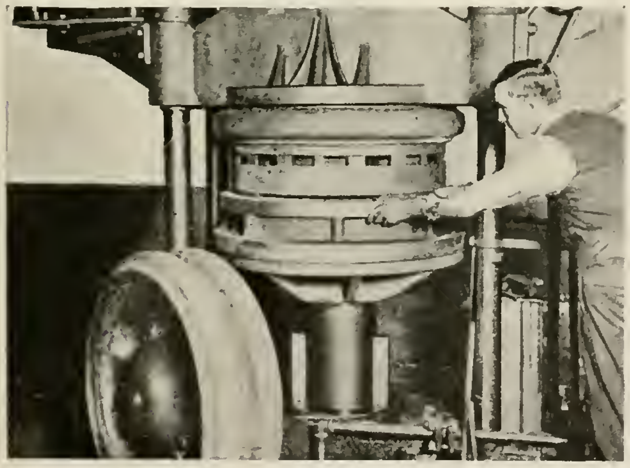
The Giant "Time Saver" Core

It is said that one man can remove any giant-sized tire from the "Time Saver" building core and reassemble it in about six minutes. The operation can be done directly on the tire building stand without removing the core.

If it is desired to build the carcass on the building machine and finish the tire on the building stand, the whole core can be transferred from machine to stand or vice-versa. The operation of fastening the core to the machine or stand requires shifting of but one lock lever that engages the face plate of the machine, or chuck to the chuck body, or core. The chuck body part of this new core is made so that any core within the range of 36 by 6, 38 by 7 and 40 by 8 sizes may be attached thereto.—De Mattia Bros., Garfield, New Jersey.

HYDRAULIC PRESS FOR APPLYING TRUCK TIRES

The press shown herewith is designed to force solid rubber truck tires, with their rims, on and off truck wheels in the most convenient, quick and efficient manner.



S. L. Type Solid Tire Press

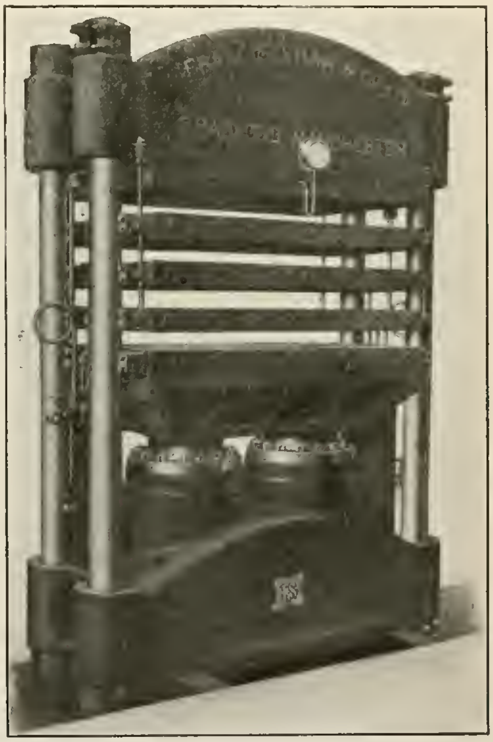
The head on this press is a solid steel casting. The base is formed by strain-rod lug extensions cast on the head of the hydraulic cylinder. Cold-rolled steel strain-rods connect the head with the base. The cylinder is of open-hearth cast steel. The pump is mounted on an extension cast on the cylinder. The circular platen is of cast steel also. It is guided by an exceptionally long ram bearing in the cylinder throat. The rams are of semi-steel outside, packed with U-leather packing which is the most convenient form to repack when worn out.

The motor, mounted on the bracket on the left side of the press, drives the pump through a belt. Direct-connected motor drive through gears can be provided if desired or the press may be equipped with a power attachment to be driven by a belt from a line-shaft.

The press may be equipped with a lifting device for inserting and removing the wheels and their tires. The hydraulic lift attached to a press will lift the heaviest truck wheel by manipulating a valve while the pump is in operation.—The Hydraulic Press Manufacturing Co., Mount Gilead, Ohio.

HYDRAULIC VULCANIZING PRESS

A hydraulic vulcanizing press, 66 by 39 inches, specially designed for large production of rubber heels and soles, is here shown. It is operated by two 16-inch rams at one ton per square inch, giving a total pressure of 400 tons on the steam plates. The press is sunk somewhat below the floor level to render the four openings easily accessible. The molds are charged and discharged by one operator at each side of the press.



Shaw's Heel and Sole Press

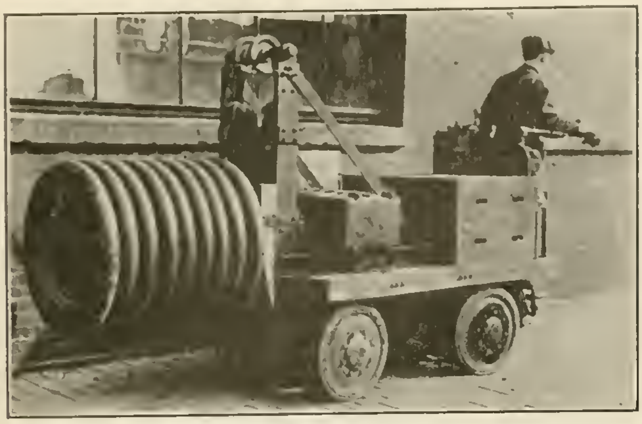
A special feature not employed on American-made presses is to be noted in the split nuts at top and bottom of the side rods. When screwed to position these are held fast by a couple of transverse bolts which pass through lugs on one side of the nut and insure its tight grip on the rod.—Francis Shaw & Co., Limited, Manchester, England.

TRUCK FOR CARRYING TIRE MOLDS AND CORES

A factory truck has been specially designed to handle tire molds and cores. By means of this new type of truck the molds, or cores, supported on a long ram, can be readily transported about the plant.

The mechanism of the truck consists of a carriage mounted on rollers, running vertically between channel guides and lifted by an electrically-driven cable hoist. The hoist motor is controlled by a small reversing switch mounted on the dash and its operation in both directions is limited by suitable switches. The truck has a capacity of 2,500 pounds, spaced evenly on the ram.

While originally designed for use solely in rubber manufacture, the truck has been found practicable in handling wire in

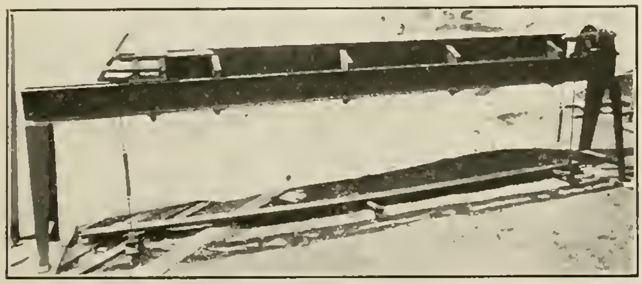


The Baker Truck

coils, for transporting rims, or any other material of this description.—The Baker R. & L. Co., 2180 West 25th street, Cleveland, Ohio.

INNER-TUBE WRAPPING MACHINE

A simple lathe for wrapping inner tubes is shown in the accompanying illustration. The base consists of two channel irons carrying the head and tail stock centers. The machine is in-



Tube Wrapping Lathe

tended for belt-driven operation under control of a foot-treadle. This type of machine is inexpensive but effective for its purpose.—The Banner Machine Co., Columbiana, Ohio.

A NEW TIRE-REPAIR AIR-BAG

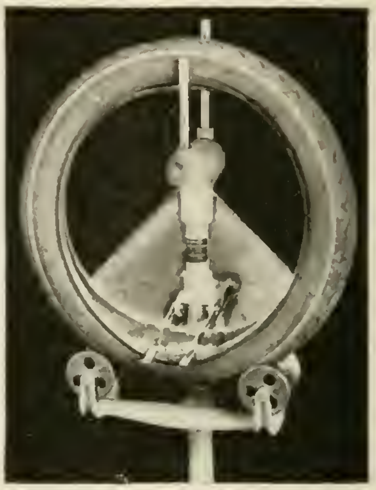
An inflatable air-bag containing an internal device for steam-heating the compressed air is shown in the illustration. This arrangement makes it possible to use a full head of air for pressure and to immediately heat this air with the inside heating coil to the temperature best suited to the job.

Fredd's Heating Air-Bag

This method results in a better and speedier cure on sectional jobs by curing from both sides during the entire process. The steam circulates in the heating device inside the bag raising the temperature of the compressed air which in turn transmits the heat to the tire.—Fredd's Vulcanizing Plant, Hancock, Michigan.

MACHINE FOR SCIENTIFIC TIRE INSPECTION

Repair men should be sure that every tiny nail head and small break or cut have been located and that the tire is perfectly repaired before leaving the shop. Also does the factory manufacturing tires desire unquestionable inspection which will strengthen the output record of "flawless tires."



Ramsdell Tire Inspection Machine

The tire-inspection machine here shown is sturdily built of metal, weighs about 125 pounds, and occupies a floor space of 15 by 24 inches. For inside inspection the tire is placed upon the two rollers and supported in an upright position by two braces. The tire is spread by pressure on the foot-lever, and a slight movement will swing the tire around in either direction upon the rollers. For tread inspection the bead rests on the two rollers and is easily revolved.

In addition to making inspection scientifically accurate, tubes, reliners and patches can be quickly placed when the tire is on the machine.—The Russ Manufacturing Co., Cleveland, Ohio.

PORTABLE ELECTRIC GRINDER

While the new portable electric grinder shown herewith is of special interest to the tire-repair man and vulcanizer for roughening tires, it may be used either for a hand or a bench grinder. For the latter purpose a quick detachable base and an adjustable tool-rest are furnished. Besides the base the equipment comprises two five-inch by one-inch grinding wheels, a wire-brush wheel and a rag-buffing wheel.

Portable Tire-Roughening Grinder

The tool has pistol-grip and trigger switch which gives the operator full control over it at all times, making it unnecessary to shift either hand to start or stop it.

This grinder has several new and distinctive features and is designed after the most approved grinder practice. It has grease lubrication throughout, forced air-cooling, chrome nickel-steel gears and shafts, and aluminum alloy housing. The entire mechanism is protected from dust and other foreign matter.—Black & Decker Manufacturing Co., Towson Heights, Baltimore, Maryland.

HERMETIC AIR-BAGS—A CORRECTION

The uniform and equal expansion of the Hermetic air-bag is due to a patented method of construction whereby the air-bag is built upon an air-tight container of ring form similar to an inflated inner tube. Ordinarily, air-bags are built on straight mandrels, as are inner tubes. The result is a thick heavy splice where the ends

are brought together, that does not have the same expansion and contraction as the rest of the air-bag.

SPECIAL TIRE REPAIR MACHINES

TIRE SPREADER

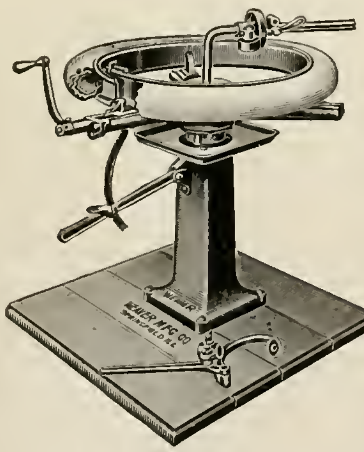
It is mechanically doing the simple operations—the minute saved here and there—that in the aggregate cuts the big slice off overhead expenses. Take, for example, spreading tires to look for punctures, blowouts, or other injuries. It is essential to do this thoroughly yet no man could inspect a tube as rapidly by hand as with the simple device shown herewith. The tire casing is placed upon the rollers on top of the stand and the hooks of the spreader-jaw envelop the bead of the tire. As the foot-lever is pushed downward, the casing is spread open for inspection.

Weaver Tire Spreader

When the break has been located, the hooks carried at each corner of the auxiliary buffing plate are thrown over the bead of the casing, holding it permanently in a convenient position for repairing. The buffing plate is convex in shape and conforms snugly to the underside contour of the casing. This gives a solid backing to perform the operations necessary for vulcanizing. The wide base enables the heaviest passenger-car tire to be supported without overbalancing the spreader. It is strongly made to withstand the abuse of service, yet weighs but 70 pounds and is easily carried to any part of the shop.

UNIVERSAL TIRE CHANGER

A tire changer, invaluable to the garage or repair man, suitable for changing all sizes and styles of demountable rim tires, is here shown. Every operation in the handling of the tires and rims is done by means of smooth-finished rollers or by steady contracting or expanding pressure, without injury even in the most stubborn cases. Three heavy jaws radiate from the center and are worked by screws controlled by the crank-handle. These grip the rim and hold it securely. The horizontal arm which carries the rollers and other attachments is manipulated by hand. In position the tire rim rests within a pocket at the base of each jaw.



Weaver Tire Changer

The outer lip engages the lower edge of the rim and draws it inward, as the jaws contract, by means of the crank handle. As soon as the rim is contracted, the tire is lifted off. In remounting the tire the operation of the jaws is reversed, using an expanding pressure directed against the inside of the rim by a reverse motion of the crank handle.

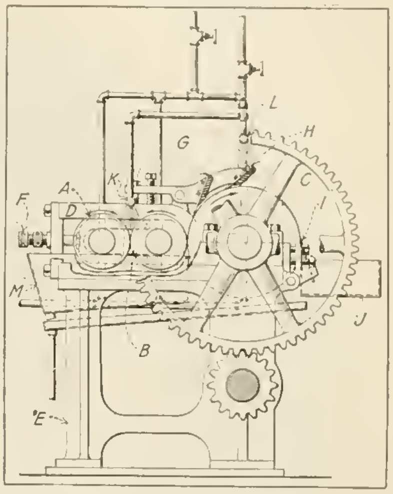
The appliance is adapted also for forcing sprung rims closed; removing lock rings and corroded tires, or mounting plain clincher tires.—Weaver Manufacturing Co., Springfield, Illinois.

MACHINERY PATENTS

MACHINE FOR CLEANING PLASTIC MATERIALS

Crude chicle and low-grade guttas used in the preparation of chicle substitute and in the manufacture of plasters and adhesive tissue always contain foreign matter that cannot be removed by an ordinary washer.

The mill here shown effects thorough cleaning of soft plastic materials by a single treatment. The machine consists of three parallel rolls *A*, *B* and *C*, set in the same plane in housings *D* resting on a supporting frame *E*. These rolls are cored and piped for temperature control and can be adjusted by screws *F*. A series of scrapers *G*, *H* and *I* adjustably contact on roll *C* for the removal of the cleaned gum which falls from scraper *I* into a receiving pan *J*.



Plastic Gum Washer

In practice, water is sprayed on the rolls through the sprayer *K*, and the previously heated gum is fed between the rolls *A* and *B* where it is subjected to a stream of water. The gum adheres to the rollers and is thoroughly washed by being carried through the heated water in the pan *M*. The gum, carried by the roll *B*, is gradually transferred to roll *C* which, traveling in the direction of the arrow, carries it to the scraper *G* and under the spray *L*. Scraper *G* is adjusted against the roll *C* to prevent the passage of any but very small particles of foreign matter, thus partially cleaning the gum.

The gum is then carried by the roll to scraper *H* adjusted to leave only a minute clearance from the surface of the roll and holds up all the remaining foreign matter. A minute film of cleaned gum is left on the roll and passes to the scraper *I* which removes it and permits it to drop into pan *J*. In time all the gum passes under the scrapers and collects in the pan *J* thoroughly cleaned.—Albert Suehy, Jr., Newark, New Jersey. United States patent No. 15,060. Reissued March 8, 1921. (Original No. 1,247,173, dated November 20, 1917.)

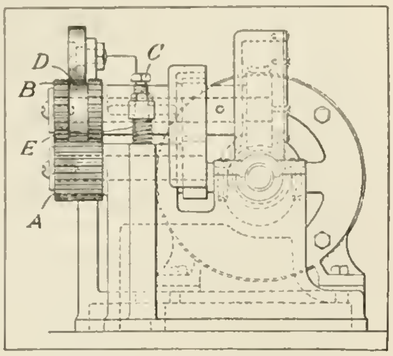
BOOTS CURED UNDER DIFFERENTIAL PRESSURE

In the manufacture of rubber boots by the differential method, the various parts are assembled upon a hollow last which is perforated at the sole, thus bringing the interior of the last into communication with the fabric lining of the boot. During vulcanization the exterior of the boot is subjected to a fluid pressure greater than that of the pressure within the interior of the last and boot in order to remove any entrapped fluid.

The effect of the differential of pressures during the heat of vulcanization may force the rubber coating of the lining through the latter and into contact with the last. The adhesion resulting greatly resists stripping the boot from the last. To obviate this there is interposed between the lining of the boot and the last a cheap, light-woven porous fabric, such as cheese-cloth, which will become incorporated into the boot structure by adhesion to the lining, and is sufficiently strong to withstand the strain necessary to pull it from the surface of the lining when desired.—John Alm and James Hughes, assignors to the Goodyear's Metallic Rubber Shoe Co., all of Naugatuck, Connecticut.—United States patent No. 1,368,682.

SHEET RUBBER PLAITING AND BANDING MACHINE

This device is designed primarily to plait the edges of thin rubber articles and to attach a band of rubber at the same time. It effectively accomplishes such work around the limb and waist openings of rubber diaper covers, although it may be used for ornamenting other articles of wearing apparel.



RUBBER PLAITING MACHINE

The machine shown in side elevation has two rollers, *A* and *B*, which coact, the former having corrugations entirely across its face, while the latter is corrugated at the edges with a plain cylindrical portion *D* between. The intermeshing gear teeth produce parallel plaits or folds and include any form which will produce a puckered or wrinkled surface.

The operator passes the articles to be ornamented between the rollers *A* and *B*, which are brought together by pressing the foot-treadle connected to the swing-frame by a rod. A pair of spur gears, which mesh together, prevents the material from being subjected to a driving strain. A narrow strip of rubber is fed between *D* and a smaller roller to insure uniform feeding without excess tension.—James William Brundage, Akron, Ohio, assignor to The Miller Rubber Co., Akron, Ohio. United States patent No. 1,371,853.

A SWISS RUBBER NIPPLE

This invention relates to a rubber nipple which is provided with an inward projecting part in which a valve slit is cut. The nipple is formed in one piece by dipping it in the usual way, with the projecting part extended outwards. It is then partially vulcanized and removed from the mold. The nipple is then turned inside out, or the projecting part is pushed inwards and the vulcanization is completed. This process is stated to prevent the valve slit opening owing to the release of the tension due to cutting.—H. Grimmelmann, Zurich, Switzerland.

OTHER MACHINERY PATENTS

THE UNITED STATES

NO. 1,379,616 Rubber-mixing machine. D. R. Bowen and C. F. Schnuck, assignors to Farrel Foundry & Machine Co.—both of Ansonia, Conn.

1,379,834 Pneumatic-tire core. F. Paulsen, Kansas City, Mo.

1,380,008 Tire-casing repair tool. H. J. Otto, Evansville, Ind.

1,380,085 Tire mold. C. L. Walton, assignor to Kelly-Springfield Tire Co.—both of Akron, O.

1,380,425 Tire vulcanizing apparatus. W. Seward, Baltimore, Md.

1,380,436 Tire spreader. O. Sundhy, assignor to Sundby & Harris, East Ellsworth, Wis.

1,380,448 Tire wrapping machine. W. M. Wheildon, Ashland, and E. H. Angier, Framingham, both in Mass.; said Wheildon assignor to said Angier.

1,380,463 Tire-vulcanizing mold. G. W. Bulley, Chicago, Ill.

1,380,537 Tire core. W. R. Denman, Cleveland, O.

1,380,645 Mold for tires and tubes. H. E. Fisher, Mifflin Township, Franklin County, O.

1,380,667 Tire-building machine. R. McClenathen, Cuyahoga Falls, assignor to Kelly-Springfield Tire Co., Akron—both in Ohio.

1,380,854 Clamp for vulcanizing molds. W. Vanderpool, Springfield, O.

1,380,862 Apparatus for manufacturing seamless rubber articles, such as nipples, etc. A. Boecler, Malmö, Sweden.

1,380,919 Matrix for vulcanizers. F. Maier, Los Angeles, Calif., assignor to Western Vulcanizer Manufacturing Co., Chicago, Ill.

1,380,930 Vulcanizing air bag. G. E. Sapp, Sacramento, Calif.

1,380,966 Tire vulcanizing apparatus. A. L. Jacobson, assignor to L. A. Kearney—both of New York, N. Y.

1,381,242 Knives automatically adjustable, for use with rubber-working calenders. F. A. Schwartz, Brooklyn, N. Y.

1,381,316 Apparatus for manufacturing pneumatic tires. W. G. Lerch, Akron, assignor to The India Tire & Rubber Co., Mogadore—both in Ohio.

REISSUES

15,120 Mold for vulcanizing tires by fluid pressure. F. B. Pfeiffer Akron, O. Original No. 1,327,841, dated January 13, 1920.

THE UNITED KINGDOM

161,438 Special apparatus for making tires. Tyre Machinery Syndicate, 1 Queen Victoria street, London; H. J. Doughty, Edgewood, Providence, Rhode Island, U. S. A.

161,597 Apparatus for molding and vulcanizing tires. Dunlop Rubber Co., Limited, 14 Regent street, Westminster, and C. Macbeth, Para Mills, Acton Cross, Birmingham.

161,701 Oven for vulcanizing rubber, etc. F. O. Bynoe, 15 Chasebridge Villas, Whitton Road, Twickenham, Middlesex.

162,947 Apparatus for molding tennis balls, inflated rubber articles, etc. W. J. Meilersh-Jackson, 28 Southampton Buildings, London. (Mechanical Rubber Co., 73 Reade street, New York, U. S. A.

FRANCE

PATENTS ISSUED, WITH DATES OF ISSUE

504,706 (October 8, 1919) Apparatus for vulcanizing covers of pneumatic tires. E. Hopkinson.

505,147 (March 5, 1919) Hydraulic press for vulcanizing and shaping pneumatic tires for bicycles and motorcycles. E. Lefebvre.

505,619 (October 31, 1919) Automatic machine for manufacturing elastic fabric breadth-wise. A. Froton.

505,627 (October 31, 1919) Vulcanizing apparatus for tire repairing. J. G. Moya.

506,052 (November 14, 1919) Improvements in vulcanizing pincers. F. O. Lake.

507,975 (December 30, 1919) Machine for making plans of the material intended to be vulcanized in hot molds. The Miller Rubber Co.

507,976 (December 30, 1919) Improvements in molds for vulcanizing articles of rubber and for other purposes. The Miller Rubber Co.

508,565 (May 28, 1919.) Apparatus for the manufacture of hollow rubber goods. The Aranar Co.

508,591 (August 18, 1919) Process and apparatus for making articles of rubber. The Aranar Co.

508,674 (January 13, 1920) Improvements in rubber mixers to make them function automatically. J. J. B. A. Garabiol.

509,167 (January 27, 1920) Machine for manufacturing tires. E. Hopkinson and H. V. Lough.

509,184 (January 28, 1920) Improvements in the processes and apparatus employed in mixing or kneading rubber and similar substances. Farrel Foundry & Machine Co.

509,233 (January 29, 1920) Improvements in apparatus for the manufacture of pneumatic tires. T. Sloper.

511,136 (March 5, 1920) Improvements in portable vulcanizers for repairing pneumatic tires. Harvey Frost & Co.

511,224 (March 8, 1920) Improvements in burners for vulcanizers. Harvey Frost & Co.

GERMANY

DESIGN PATENTS ISSUED, WITH DATES OF ISSUE

778,411 (April 19, 1921) Vulcanizing apparatus with built-in alcohol-gas burner. Joh. Herrmann, Kandel, Pfalz.

779,667 (February 10, 1920) Apparatus for inserting rubber pieces in the sides of boots. Wilh. Plischewski, Kirchderne, Post Derne i. W.

PROCESS PATENTS

THE UNITED STATES

NO. 1,380,320 Producing tire-retreading matrix. E. C. Hufford, Los Angeles, Calif.

1,380,426 Vulcanizing pneumatic tires. W. Seward, Baltimore, Md.

1,380,528 Manufacture of tire mandrels. D. A. Clark and C. E. Lowe, assignors by mesne assignments to The Republic Tool & Manufacturing Co.—all of Cleveland, O.

1,380,736 Manufacture of cord tires. J. H. Patten, Kent, assignor to W. T. Behne, King County—both in Washington.

1,381,185 Manufacture of rubber nipples having valve projections. H. Grimelmann, Wallisellen, Switzerland.

1,381,654 Reclaiming rubber. E. Muschewske and W. W. Wood, Los Angeles, Calif.

THE DOMINION OF CANADA

212,201 Manufacture of reinforced inner tubes of standard size. The Liberty Tire & Rubber Co., assignee of J. A. McTaggart—both of Philadelphia, Pa., U. S. A.

THE UNITED KINGDOM

162,263 Vulcanizing tires. The Fisk Rubber Co., Chicopee Falls, assignee of T. Midgley, South Road, Hampden, and R. B. Naylor, 37 Westernview, Springfield—all in Mass., U. S. A. (Not yet accepted.)

162,528 Preserving vulcanized rubber by keeping in artificially moistened atmosphere. H. P. Stevens, 15 High street, Borough, London.

FRANCE

PATENTS ISSUED, WITH DATES OF ISSUE

504,142 (September 22, 1919) Process of making articles of rubber without solders. A. Boecler.

504,586 (October 6, 1919) Improvements in the method of applying repair bands or tread bands to used tires. C. C. Gates.

505,019 (October 17, 1919) Improvements in the manufacture of cord bodies for pneumatic tires with rods. A. O. Remy.

505,254 (October 21, 1919) Improvements in the manufacture of solid rubber tires. C. and A. E. Burnett.

508,143 (January 5, 1920) Recovering pneumatic tires by riveting. C. A. Carteret.

509,667 (April 19, 1919) Improvements in the manufacture of products with a base of rubber. A Helbronner.

GERMANY

DESIGN PATENTS ISSUED, WITH DATES OF ISSUE

779,219 (April 25, 1921) Method for improving pneumatic tires. Otto Lohr, Oberlössnitz-Radebeul.

Society of Automotive Engineers Specifications for Insulated Cables[1]

Electrical Equipment Division Report

The Electrical Equipment Division's recommendation that the present S. A. E. standard for insulated cable be revised to conform to the accompanying specifications for insulated cable, was approved. Although the proposal does not as yet include electrical tests, it is desired by the cable manufacturers that the manufacturing specifications be adopted and published without delay so far as they have been completed.

The electrical tests for high-tension ignition cable will be included in the standard at a later date, as no entirely satisfactory tests have yet been developed. The electrical tests included in the present standard, although used considerably in general power-cable testing, are not considered satisfactory for automotive high-tension ignition cable.

The proposed revision is submitted as a practical and satisfactory specification founded on the best commercial experience. It embodies many points in common with government specifications which have been generally approved and will be used by manufacturers in producing high-grade insulated cable.

INSULATED CABLE

I. GENERAL SPECIFICATIONS

Conductors. Conductors shall be bunched or stranded as specified in each section and shall be annealed copper wire in accordance with Specification No. B3-15 of the American Society for Testing Materials. All wires shall be thoroughly tinned and must withstand the tinning test as specified in Section II, Tests. All tests of copper conductors shall be made before stranding or insulating.

Cotton Separators. Material for separators, where specified, shall be of good grade cotton and shall be closely and tightly applied.

Rubber Insulation. Rubber insulations shall be homogeneous in character, properly vulcanized, and placed concentrically about the conductors. Rubber insulations shall adhere closely to, but shall strip readily from, the conductors, leaving them reasonably clean. Rubber insulations used on cables covered by these specifications shall contain not less than 20 per cent (by weight) of good grade Hevea rubber which has not been previously used.

Varnished Cambric Tape. Varnished cambric tape shall be made from a good grade cotton fiber treated with multiple coats of insulating varnish. The instantaneous puncture voltage shall be not less than 750 volts per mil of thickness tested in accordance with the standards of the American Institute of Electrical Engineers. Varnished cambric tape shall be not less than 0.005-inch, nor more than 0.013-inch thick.

Braids. Braids shall consist of closely woven cotton yarn, and shall not be less than 1/64-inch thick. Braids shall be impregnated with at least two coats of properly dried, heat, oil and water resisting insulating varnish or impregnated with black weather-proof compound which has an even and smooth finish. Adjacent layers of cable, when wound on the reel, shall not stick to one another at any temperature under 105 degrees F. (40 degrees C.).

Armor. Armor shall be of either galvanized or sherardized soft steel, soft brass, aluminum or copper and applied in a close helix. Successive turns shall not overlap. Armor dimensions shall be as given in Table 1.

Table 1. Armor Thickness and Width Dimensions

	Thickness, In.			Width, In.		
Armor	Min.	Nom.	Max.	Min.	Nom.	Max.
Small	0.014	0.017	0.020	0.045	0.050	0.055
Large	0.017	0.020	0.023	0.095	0.100	0.105

[1]The Journal of the Society of Automotive Engineers, July, 1921. Pages 57-59.

Armor shall be solid "D" shaped, unless otherwise specified by the purchaser. The large armor is recommended for use on all cables exceeding ½-inch diameter underneath the armor.

II. TESTS

Tinning Test. For this test, samples of the bare wire before being stranded or insulated shall be properly selected to secure an average grade of tinning. The wires shall be thoroughly cleansed by means of ether, benzine, gasoline, naphtha, caustic alkali solution, alcohol, or hot water and soap, whichever may be found necessary to thoroughly clean the wires.

The wires shall then be rinsed in clear water and wiped dry with a soft cotton cloth. The wires shall then be immersed for one minute in a solution of hydrochloric acid having a specific gravity of 1.088 at 70 degrees F. (21 degrees C.), and then rinsed in clear water and wiped dry as above specified. The wires shall then be immersed for 30 seconds in a solution of sodium polysulphide which contains an excess of sulphur and which has sufficient strength to thoroughly blacken a piece of clean untinned copper wire in 5 seconds.

The complete cycle of operations shall then be repeated, commencing with the immersion in hydrochloric acid and ending with the immersion in the sodium polysulphide solution.

Tests of tinning shall be made on not less than 10 sets of samples of reasonable length. All wires shall withstand one immersion in the hydrochloric acid without blackening in the sodium polysulphide solution, and 75 per cent of the wires shall withstand three immersions in the hydrochloric acid without blackening in the sodium polysulphide solution. All tests shall be conducted with the solutions at a temperature of 70 degrees F.

Physical Tests. A test specimen of rubber insulation which has not previously been handled, not less than 6 inches long shall have marks placed upon it 2 inches apart. The sample shall then be stretched at the rate of 12 inches per minute until these marks are 6 inches apart, and then immediately released. Thirty seconds after being released the distance between the marks shall not exceed 2½ inches. The test specimen shall then be stretched until the marks are 7 inches apart before it is ruptured.

The ultimate tensile strength of rubber insulation shall not be less than 600 pounds per square inch. The tensile strength shall be calculated upon the original cross-section of the test-specimen before stretching.

Physical tests shall be made at a temperature of not less than 50 degrees F. (10 degrees C.), nor more than 90 degrees F. (32 degrees C.).

For the purpose of these tests, care must be used in cutting to obtain samples of uniform cross-section and no manufacturer shall be responsible for results obtained from samples imperfectly cut.

The above physical tests shall not apply to wires or cables having a wall thickness of less than 0.045-inch. For wires and cables having a wall thickness of less than 0.045-inch the initial and ultimate stretch shall be 5 and 6 inches, respectively, and the tensile strength not less than 500 pounds per square inch.

Miscellaneous Tests. The following tests apply to high-tension (secondary) ignition cables only.

Oil Test for Braided Cables. A sample of cable shall be immersed in a mixture of equal parts of machine oil and gasoline for a period of 24 hours without allowing the ends of the sample to become submerged. After this immersion the impregnating varnish should not show signs of softening or absorption, and when the braids have been peeled off, it should be shown that no oil has penetrated to the rubber insulation.

III. SPECIFICATIONS FOR HIGH-TENSION (SECONDARY) IGNITION CABLES

Conductors shall be stranded and covered with rubber insulation.

High-tension (secondary) ignition cables shall be plain rubber covered, single braided, rubber face taped and single braided or double braided. Weatherproof braid shall not be used on this type of cable.

High-tension (secondary) ignition cable sizes shall be as shown in Table 2.

TABLE 2. HIGH-TENSION (SECONDARY) IGNITION CABLE SIZES

Nominal Size Mm.	Nominal Size In.	No. of Wires in Strand	Nominal Size of Wires in Strand A.w.g.	Max. Outside Diam. Inch	Min. Outside Diam. Inch	Min. Thickness of Rubber Wall, In. (Plain Rubber Covered)	Min. Thickness of Rubber Wall, In. (Single Braid)	Min. Thickness of Rubber Wall, In. (Double Braid)
7	0.2756	12	26 (0.0159)	0.285	0.265	0.097	0.081	0.066
		19	27 (0.0142)					
9	0.354	19	27 (0.0142)	0.364	0.344	0.135	0.119	0.104
		19	(0.0147)					

The 7-mm. size is recommended for all high-tension cable.

IV. SPECIFICATIONS FOR LOW-TENSION (PRIMARY) IGNITION CABLES

Conductors shall be bunched or stranded and covered with rubber insulation. Low-tension (primary) ignition cable shall be plain rubber covered, single braided, rubber face taped and single braided, or double braided. Low-tension (primary) ignition cable sizes shall be as shown in Table 3.

TABLE 3. LOW-TENSION IGNITION CABLE SIZES

Nom. Size	No. Wires in Strand	Nom. Size, Wires in Strand A.w.g.	Nom. Size, Wires in Strand In.	Max. Outside Diam. In.	Min. Outside Diam. In.
5 mm.	12	26	0.0159	0.207	0.187
(0.197 in.)	19	27	0.0142	....	....

V. SPECIFICATIONS FOR RUBBER-COVERED LIGHTING AND STARTING CABLES

Conductors of cables Nos. 16 to 10 A.w.g. inclusive shall be either bunched or stranded as desired. Stranded construction is recommended for flexibility. Conductors of cables No. 8 and larger shall be stranded and may be either concentric or rope lay.

Conductors shall be covered with rubber insulation.

Note—Lighting and starting cables shall be single braided, rubber face taped and single braided, or double braided.

Lighting and starting cable sizes shall be as shown in Table 4.

TABLE 4. STRANDING AND DIMENSIONS OF LIGHTING AND STARTING CABLE

Nom. Size A.w.g.	No. Wires in Strand	Nom. Size Wires in Strand A.w.g.	Nom. Size Wires in Strand In.	Circular Mils Nominal	Circular Mils Actual	Contin. Carrying Cap., Amp.	Max. Outside Diam., In.	Min. Thickness of Rubber Wall, In.
	12	27	0.0142		2,418			
16	16	28	0.0126	2,583	2,557	6	0.200	0.022
	19	29	0.0112		2,407			
	19	27	0.0142		3,829			
14	26	28	0.0126	4,107	4,155	15	0.223	0.027
	19	25	0.0179		6,088			
12	26	26	0.0159	6,530	6,607	20	0.250	0.031
	19	23	0.0225		9,681			
10	49	27	0.0142	10,383	9,873	25	0.275	0.031
	19	21	0.0284		15,392			
8	51	25	0.0179	16,510	15,680	35	0.320	0.037
4	61	22	0.0253	41,741	39,193	70	0.420	0.0468
	61	20	0.0319		62,312			
2	127	23	0.0225	66,371	64,707	90	0.490	0.0468
	127	22	0.0253		81,598			
1	133	22	0.0253	83,693	85,453	100	0.600	0.0625
	127	21	0.0284		102,883			
0	133	21	0.0284	105,535	107,743	125	0.635	0.0625
	127	20	0.0319		129,731			
00	133	20	0.0319	133,077	133,817	150	0.700	0.0625
	259	23	0.0225		131,961			

VI. SPECIFICATIONS FOR VARNISHED CAMBRIC INSULATION LIGHTING AND STARTING CABLES

Conductors shall be constructed as described in Section V, and shall be stranded as shown in Table 4. Lighting and starting cables of this class shall have two or more layers of overlapping varnished cambric tape. Alternate layers shall be laid in opposite directions. Lighting and starting cables of this class may be either single or double braided.

TABLE 5. ADDITIONAL SPECIFICATIONS FOR VARNISHED CAMBRIC INSULATION AND ARMORED LIGHTING AND STARTING CABLES

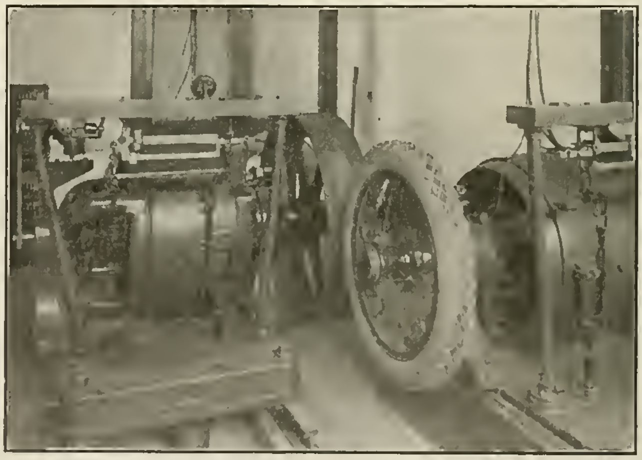
Nom. Size, A.w.g.	Contin. Carrying Cap. Amp.	Max. Outside Diam. Varnished Cambric Cables, In.	Max. Outside Diam. Armored Cables, In.
16	8	0.215	0.255
14	18	0.229	0.269
12	22	0.249	0.289
10	27	0.273	0.313
8	45	0.298	0.338
4	80	0.383	0.423
2	110	0.450	0.496
1	140	0.530	0.576
0	180	0.570	0.616
00	210	0.629	0.675

VII. SPECIFICATIONS FOR ARMORED LIGHTING AND STARTING CABLES

Conductors shall be constructed as described in Section V and shall be stranded as shown in Table 4. Lighting and starting cables of this class shall have two or more layers of overlapping varnished cambric tape. Alternate layers shall be laid in opposite directions. Lighting and starting cables of this class may be either single or double braided.

BUREAU OF STANDARDS ANALYZES PNEUMATIC TIRES

The Bureau of Standards, Washington, D. C., is carrying on an interesting series of investigations in order to develop a standard specification for pneumatic tires. A tire-testing dynamometer has been installed with a view to determine the amount



BUREAU OF STANDARDS TIRE-TESTING DYNAMOMETER

of energy dissipated in heat in tires operated under different conditions of axle load, inflation pressure, speed in miles per hour, and tractive effort. By means of this machine the pressure of the tire against the wheel with which it is in contact may be measured.

In analyzing various brands of automobile tires, the Bureau of Standards makes use of what is scientifically termed an accelerated aging test. During a year, for instance, "the Rubber Section of the Bureau of Standards analyzed for the War Department more than 500 samples of rubber, representing 250,000 tires, and having a valuation of $20,000,000."

As a result of these tests valuable assistance has been rendered to rubber manufacturers, while the quality of rubber compounds has been greatly improved.

New Goods and Specialties

LETTING THE DEALER DO HIS SHARE

Recognizing that a nursing-nipple bored for milk only cannot be used for prepared infant food, the manufacturer of the "Sanitate" nipple has provided means for the dealer or druggist to bore the nipple with a hole of the proper size. The nipple is made in one piece with a long, slender extension at the top which becomes inverted when the nipple is turned the other side out, and prevents collapse of the nipple. This extension is grooved for boring for a hole of any desired size, and the druggist or dealer gets an opportunity to cooperate by boring a hole of the right size to meet the customer's particular requirements.—The Miller Rubber Co., Akron,

Sanitate Nipple

"SPIRALWEAVE" PORTABLE CABLES

A new device in cable manufacture is offered by a well-known Wilkes-Barre company, whose wire products have been on the market since 1848.

The peculiar feature of the "Spiralweave" cables is the method of weaving the outside covering. The threads lie so as to counteract all pull and surface abrasion. Made like fire hose, "Spiralweave" cables are said to outwear other makes that so often have a tendency to stretch and bulge. They are particularly fitted for use as mine-shaft cables; the warp threads running lengthwise of the wire directly support the cable and no steel supporting wires are then necessary.

The heavy insulation, of carefully prepared and combined material and proper rubber vulcanization, gives these cables full protection against moisture or sulphur water. "Spiralweave" can often be used in place of lead-covered cables where there is danger of electrolysis—Hazard Manufacturing Co., Wilkes-Barre, Pa.

ENGLISH TYPE OF CHILDREN'S WATERPROOF WADERS

Waterproof Wader

From England comes a practical wader for children on the beaches, in the form of a waterproof garment which mothers will undoubtedly appreciate. This garment, which is fashioned to protect a child from moisture and dirt, and which is of particular use at the seashore, is made up of a trousers portion combined with a bodice, the whole fastened with straps, and easily put on or removed. A particular feature is the tongue insert at the back of the bodice, preventing the entrance of water. Buttons form the means of fastening this tongue into place, but do not show in the picture.—Pawsons & Gillett, 19 Chapel street, Milton street, London, E.C.2, England.

ATTRACTIVE BATHING CAPS

The "Cleopatra" bathing cap is circular in shape, with pleated top effect and round disks set in at the sides, trimmed with daisy and tassel ornaments. It is to be had in flesh, blue, bright red, yellow, green, and white, trimmed in contrasting colors, and decorated with a design of clusters of dots.

The "Jewel" bathing cap is meant for diving and has only a decorated bow on the front and sides ornamented with "jewels." This cap comes in flesh, green, black, bright red, and blue with trimming and head-band to harmonize.

The "Hawaii" cap has a tam-shaped top overlaid with wide fringe formed by loops of rubber in contrasting color to the body of the cap which may be flesh, green, blue, bright red, or yellow.

"Cleopatra"

"Jewel"

"Hawaii"

The close-fitting head-band is of the same color as the fringe.

These bathing caps are carefully manufactured from tested rubber stock. While the manufacturer cannot assume responsibility for deterioration caused by light, heat, or climatic conditions, these caps are said to be as nearly proof against light, sun and climate as a thin rubber article of light weight and high grade can be.—The Faultless Rubber Co., Ashland, Ohio.

A SPORTS SHOE OF NEW DESIGN

Several new types of sports shoes which would seem to have a particular appeal during summer and for summer sports are offered by the Hood Rubber Products Co., Inc. Among these is the "KlayKort," a tennis shoe made of white duck and having red trimmings. The sole is of red rubber, while the forepart of this sole is of extra quality gray pebbled rubber. The toe cap is also of rubber, while there is a thick felt cushion between the sole and the sock lining. This shoe is suitable not only for tennis but for all outdoor purposes and is made in sizes for men, boys, youths, and women. — Hood Rubber Products Co., Inc., Watertown, Massachusetts.

"KlayKort" Tennis Bal

"AUTCO-KECK" SAFETY BOOT

The special advantages of the "Autco-Keck" safety tire boot are said to be that it can be used to repair a rim cut without causing the casing to bulge, as well as for a blow-out. There are no flaps to project over the edge of the rim, and it is easily applied. It was formerly made by the Keck Manufacturing Co., West Unity, Ohio, and is the invention of Herbert C. Keck.—Akron Universal Tire & Rubber Co., Medina, Ohio.

WATERPROOF HAT-PROTECTOR FOR MEN

A useful invention recently put on the market is a waterproof hat-protector, designed to shield a man's hat from rain or snow. The covering for the crown is of waterproofed cloth or thin sheet rubber, and comes in three styles, suitable for the three ordinary types of men's headgear. The Newman hat-protector follows the contour of the hat and turns under the brim, where an elastic band in the hemmed edge draws the covering for the brim into shape. The device would seem to have much in its favor. To find a protection for women's hats, to suit the many varying shapes and styles, would be, however, a more difficult matter.

Newman Hat-Protector

When not in use the protector can be folded up compactly, but is easily applied when needed and is held securely in place.—Manufacturers Engineering Co., 520 Fifth avenue, New York, N. Y.

RUBBER SANITARY NAPKIN COVER

The "Crescent" sanitary napkin cover is made in tubular form, of white rubber of good quality. The edges of the oval opening cut in one side to permit the insertion of a napkin are reinforced by rolling, as are also the open ends of the cover through which the ends of the napkin are slipped. Gripping fasteners just inside these open ends hold the napkin in place after the cover has been adjusted. These fasteners are riveted in place over pieces of white felt between them and the rubber. This cover may be worn with any belt preferred, and makes it unnecessary to wear a sanitary apron or other similar protection. After washing with any pure soap, it should be patted dry with a towel and dusted with talc powder before being put away.—Crescent Specialty Co., Inc., 265 Wyckoff street, Brooklyn, New York.

"Crescent" Sanitary Napkin Cover

NEW LINE OF RUBBER HOSE

The "Conqueror" line includes air hose, wash rack hose, and flexible hose nozzles. The hose, with a white stripe as its distinguishing characteristic, has, it is claimed, many important features. Among these are unusual durability, the fact that it can withstand several hundred pounds' pressure, and that it is "non-kinkable". The "Conqueror" air hose is put up in fifty-foot coils, or, if desired, in 500-foot continuous lengths.—Voorhees Rubber Manufacturing Co., 20-56 Bostwick avenue, Jersey City, New Jersey.

"Conqueror" Hose

RUBBER-TOP MOUTH FOR TOBACCO BAGS

George W. Williams has improved upon the construction of his prior patent, and now offers a self-closing mouth-piece comprising a conical neck having at its larger end a flange adapted to lie within the discharge opening of bags for tobacco or other granular matter. At the opposite end of the neck are a pair of lips, the meeting faces of which are straight and of such thickness and contour that in normal position they form a closure for the mouth-piece. At the opposite end of the neck are ribs having the double function of retaining the mouth-piece in the opening of the bag and of assisting in effecting the automatic closure of the mouth-piece after it has been opened. The draw-string of the bag is caught beneath the ribs, and, if too long, can be wound around the neck piece and caught under the ribs. When the neck is deformed by pressure at its opposite ends, the lips separate outwardly, bringing the ribs against the bag mouth at a point where it is supported by the flange. Thus the ribs act as resilient struts which assist the normal resiliency of the neck in returning the lips to closed position after deformation.—George W. Williams, 1663 Bay Ridge avenue, Brooklyn, New York.

Tobacco Bag Mouth-Piece

NEW TYPE OF GOLF SOLE AND HEEL

In place of the old-time spiked shoes which are now being banished from golf courses, a new type which, it is claimed, grips as securely but does not injure the golf green, has appeared. The "Steady Man" soles and heels can be attached to ordinary walking boots. The soles are of high-grade red fiber-rubber, to which has been added, before vulcanization, a special ply of white tread compound to form a wear-plate studded with truncated cones which are an integral part of the sole. The shoes equipped with these aids would seem to meet the approval of golfers.—Stedman Products Co., South Braintree, Massachusetts.

"Steady Man" Sole and Heel

STAGGERED BLOCK TIRE

A new type of tread for solid tires, called "Staggered Block," which has, it is said, given very satisfactory results in severe

Staggered Block Tire Tread

trials, and for which a patent has been applied, aims to give a truck greater speed, as well as to effect a marked saving in gasoline. Some of the advantages claimed for this design and construction are that a more uniform cure can be obtained in manufacture, less internal heat is generated while in use as the tire is semi-air cooled, the traction wave is practically eliminated, and greater traction and resiliency obtained through more rapid displacement. The design is such that it is an individual block tire, each block set alternately on a permanent hard base.—H. H. Boucher, 1308 West Pico street, Los Angeles, California.

A RUBBER BOTTLE-CONTAINER

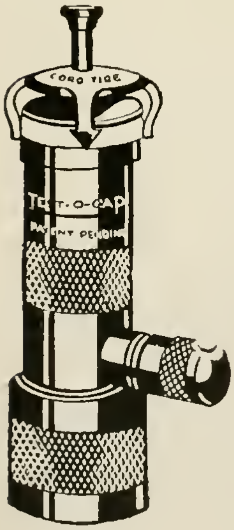
The accompanying illustration shows a new bottle-holder or container, which may be made of rubber, rubberized fabric, or rubber compounds. It may be decorated in any way desired, by using colored rubbers, and it may be in any shape or size to fit bottles of different kinds. The sides are corrugated to prevent rolling if it happens to tip over, but there is an extending flange at the bottom which forms a small air chamber or vacuum when the holder is placed firmly on a flat surface, and this vacuum helps hold the bottle and cover in an upright position. The open end is finished with a heavier band of rubber which grips the bottle firmly. This device is intended to minimize the cracking of bottles from shock as well as to prevent light from getting at their contents, and to preserve heat and cold in contained liquids.—Mrs. Catherine Flannery, 16 Hakes avenue, Hornell, N. Y. United States patent No. 1,381,071.

Nursing-Bottle Holder

DUST CAP AND TIRE GAGE COMBINED

An ingenious invention that combines the features of a dust cap and pressure gage for tire-valve stems is the "Test-O-Cap," which, it is claimed, saves time, tires and gasoline.

The cap screws on over the valve stem and is adjustable to the required pressure. Its functions are to guard against either under or overinflation and in order to test the pressure it is necessary only to press a small plunger at the top. If the cap rises the tire is properly inflated. If it rises so far that a projecting arrow-point travels above the bottom edge of a red band that circles the cap, the tire is overinflated. Failure of the cap to rise at all signifies underinflation. At one side of the cap is a connection for the pump hose.—The Greist Manufacturing Co., New Haven, Connecticut.



The "Test-O-Cap"

"2-PLEX" INSULATING TAPE

Under the name "2-Plex," a combination rubber and friction tape for use in electrical insulation is being marketed. This tape is made with about 50 per cent of live rubber, the rubber side being red and the friction side black. It will withstand a heat of over 200 degrees F., it is claimed, without crystallizing or vulcanizing. This tape is ¾-inch wide, is put up in ½-pound rolls, and comes wrapped in heavy tinfoil.—Diamond Holfast Rubber Co., Atlanta, Georgia.

SCIENTIFIC NURSING-BOTTLE NIPPLE

The "Dominion Nurser" has a special holdfast, anti-colic feature in the shape of the lower part which fits inside the neck of an eight-ounce, round, graduated bottle with semi-wide neck, and allows a passage of air between the nipple and the neck of the bottle while the child is feeding. The nipple also has a projecting flange about half way up from the bottom, which covers the top of the bottle and prevents the food from leaking out. If babies could express their opinions, doubtless they would give this invention their unqualified approval.

"Dominion Nurser"

To remove the nipple from the bottle it is only necessary to insert the finger and thumb below the middle flange, pressing the nipple together slightly and letting in the air. It will then come out easily and can be readily cleaned. The manufacturer of this red rubber nipple also puts out the special bottle on which to use it, and this bottle, on account of its wide neck, can be readily washed and kept entirely antiseptic by proper scalding.

NEW "FLEETFOOT" SANDAL

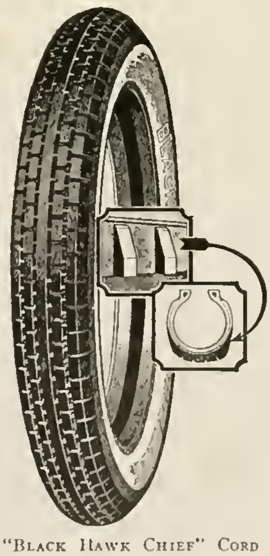
The "Romper" barefoot sandal is a two-strap model of the "Fleetfoot" line, made of white duck, with leather insole and counter, white rubber sole and white foxing, and is made in sizes for misses and children. The same manufacturer produces both nipple and sandal.—Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, Canada.

"Romper," Fleetfoot Line 2-Strap Sandal

CORD TIRE FROM THE MID-WEST

The "Black Hawk Chief" cord tire is said to possess many refinements over the ordinary cord tire. Its outside dimensions are larger than standard cord tires and it is heavily reinforced at the rim to prevent cutting. The side-walls are protected by an unusually heavy coat of tough rubber which prevents the scuffing so common to cords.

The several types of pneumatic automobile tires manufactured by this company are guaranteed to be free from imperfections in material and workmanship. Out of 15,000 manufactured only twenty-two were returned for adjustment. The company claims that its tires are built for hard usage, and have been proved equal to the emergency when used on rough country roads.



"Black Hawk Chief" Cord

The same manufacturer also is featuring "Black Hawk Sturdy Traveler" inner tubes of red rubber with a wide jet-black stripe of specially toughened rubber around the tread. It is claimed that this tube cannot rust to the rim.—Black Hawk Tire & Rubber Co., 2028 East Walnut street, Des Moines, Iowa.

The Reed Rubber Co., 1156 Dorr Street, Toledo, Ohio, is marketing toy balloons in sealed white envelopes on which is printed in colors a group of youngsters "flying" balloons.

THE OBITUARY RECORD

PROMINENT RUBBER JOURNALIST AND PLANTING AUTHORITY

The career of William F. de Bois Maclaren, of Armadale, Scotland, Dumbartonshire, recently terminated at the age of 64, was notable for scope and accomplishment. Although known generally as a financial pioneer of the rubber planting industry, Mr. Maclaren first made his mark in the field of trade journalism. He successfully developed a small printing office into a publishing company of international character, establishing one by one a series of successful trade journals, among them *The India-Rubber Journal*, of London.

He was among the first to see the possibilities of the rubber plantation industry, to the development of which he devoted much skill and direction. To him and others this industry owes a tradition of clean finance and skilled management. He made himself an authority on rubber planting and his views on the subject were highly esteemed. As a business man he is credited as cautious, yet courageous. He was versatile in attainments, full of wit and humor, a ready speaker and a kind-hearted man.

POPULAR IN THE WEST

Charles Measure, formerly connected with The Goodyear Tire & Rubber Co., and more recently with the Federal Rubber Co., Cudahy, Wisconsin, died June 27 at his home in Milwaukee, after a brief illness. Mr. Measure had devoted his entire business career to the rubber industry, and was a salesman of wide acquaintance and experience. He became associated with the Federal Rubber Co. in 1912, and at the time of his death was manager of mechanical rubber goods sales. Mr. Measure is survived by his widow, one son and a daughter.

EDITOR'S BOOK TABLE

"INDUSTRIAL DEMOCRACY AND THE BETTER BOSS." By James Cooper Lawrence, director of branch operations of The B. F. Goodrich Co., Akron, Ohio. Reprinted from "Administration—The Journal of Business Analysis and Control," New York City. Fifteen pages, 4 by 6 inches. Distributed gratis by The B. F. Goodrich Co.

A common-sense view of labor conditions, and an explanation of the underlying motive of the widespread unrest among many workers in large industries. The author recognizes in the worker a natural craving for leadership exemplified in labor organizations, but ignored in their various "industrial democracy" schemes, despite the fact that leadership has proved itself indispensable in all human activities. It is not merely a voice in the management that the worker really needs so much as capable leadership, which will insure him good working conditions, good wages, and a good home.

The author sees in the present era of slackened production the chance of a generation to purge from industrial organizations leaders who have proved their inability not merely to get results for a plant but to handle fairly the operatives over whom they are placed. He notes with satisfaction the tendency of many corporations to encourage the sale of common stock. The employes thus share in the ownership of the business.

"TRADE TESTS, THE SCIENTIFIC MEASUREMENT OF TRADE Proficiency." By J. Crosby Chapman, B.A., D.Sc., Ph.D., with the assistance of Daisy Rogers Chapman, M. A. Henry Holt & Co., New York, 1921. Cloth, 435 pages, 5½ by 8¼ inches.

This book treats of trade test methods developed by the Committee on Classification of Personnel, Army Trade Test Division. The trade test is the instrument devised and constructed to make it possible for a trained examiner, unskilled in any particular trade, to measure in objective terms the trade standing of any recruit claiming skill in any of the several hundred trades necessary to the work of the Army.

The construction and application of the oral, picture, performance and written tests are detailed. The place of the trade test in industry is discussed at length, followed by a bibliography and index.

"AMERICAN CHEMISTRY: A RECORD OF ACHIEVEMENT THE Basis for Future Progress." By Harrison Hale, Ph.D., head of Department of Chemistry, University of Arkansas. D. Van Nostrand Co., 8 Warren street, New York, N. Y. Cloth, 215 pages, 6 by 8½ inches.

In the preface to this volume attention is called to the steadily increasing importance of a knowledge of chemistry, because of the connection this subject has with matters of every-day life. The record of the American chemist, the author believes, is one of achievement, with encouraging prospects for still further progress. In the volume under consideration a chapter is devoted to briefly describing rubber from source to finished product, while several illustrations serve to give the subject an added interest. A brief bibliography appears at the end of the chapter.

NEW TRADE PUBLICATIONS

In the introduction to the recent catalog issued by Francis Shaw & Co., Limited, Bradford, Manchester, England, the following sentence is significant: "As the leading makers in Great Britain of rubber machinery our designs can be relied on to include all up-to-date improvements and labor-saving devices."

The catalog at hand is divided into several sections, each dealing with some division of the rubber industry. More exhaustive treatment, however, of the subjects mentioned can be found in other circulars published by the same company under the titles of: "Rubber Plantation Machinery"; "Machinery for the Manufacture of Solid and Pneumatic Tires"; "Fine Cut Sheet Machinery"; and "Vacuum Drying and Impregnating Machinery."

The most important sections of the present catalog deal with types of rubber plantation machinery and machines for making tires, belting, hose, and many kinds of mechanical goods. Descriptions of machinery used in vulcanizing are also given an important place. Many illustrations serve to give added interest to this catalog.

The Fisher Governor Co., Marshalltown, Iowa, in its recently issued Bulletin No. 210 sets forth the advantages of the series No. 90 pressure regulator, manufactured by this firm. The single-seated self-contained pressure regulator in question is particularly adapted to vulcanizing, and can be used where lack of space prevents use of lever and weight type of valve. The mechanism is of especial value, it is claimed, in controlling the vulcanizing steam pressure and is being used in many plants devoted to the manufacture of rubber products.

The Adams-Barre Co., 1242-1244 North High Street, Columbus, Ohio, in its Catalog No. 21, recently issued, calls attention to the advantages of its tire repair equipments. A comprehensive list of vulcanizing tools and supplies is one of the important features of this catalog.

The firm of Toch Brothers, 320 Fifth avenue, New York, N. Y., publishes numerous catalogs descriptive of the company's various "RIW" protective products. The rubber colors which this company manufactures include blacks, reds, yellows, blues, greens, etc., of use for coloring tiles, hot-water bottles, automobile tubes, toy balloons, and rubber goods of all kinds.

In an effort to increase the use of the motor truck as an indispensable factor in modern transportation, the Firestone Ship-by-Truck Bureau, Firestone Park, Akron, Ohio, has issued a series of bulletins devoted to this subject. The most recent of these, Bulletin No. 8, is entitled "Marketing Live Stock by Motor Truck." By means of photographs, charts, and statistical tables an investigation covering movements into Omaha, St. Joseph, Kansas City, Denver, Fort Worth, Cincinnati, Indianapolis, East St. Louis and other cities, has been reported. The bulletin aims to show the part that the truck has been and is playing in the marketing of live stock, and to point out some of the benefits resulting to the farmer from its use.

"The Black Art of Rubber Compounding." Chat No. 6. The sixth in the series which is being sent out to the trade by the Binney & Smith Co., 81 Fulton street, New York, N. Y. It deals with Micronex as an ingredient in tire and shoe stocks and in pressure-cure formulas.

Among the new publications which are of interest to the rubber industry is an illustrated pamphlet issued by Harrisons & Crosfield, Limited, 1-4 Great Tower street, London, E. C. 3, England. This pamphlet, entitled "Rubber, Tea and Other Tropical Produce," furnishes much valuable information regarding the commodities mentioned. Several statistical tables add much to the importance of the pamphlet.

An unusual and interesting catalog is that of the Spreckels "Savage" Tire Co., San Diego, California. The author and illustrator of this circular is a full-blooded Indian, brought up among his own people, the Apaches, but later trained in the white man's universities. The catalog sets forth not only some of the curious Indian customs but describes also the important features of the new "Savage" cord tires, the latest product of the Spreckels company.

RUBBER TRADE INQUIRIES

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

(893) A manufacturer requests the address of a New York concern handling talc under the brand "600."

(894) Request is made for the address of the manufacturer of brown and gray good-quality rubber bathing caps having the edge machine-stitched to resemble button-holing, and fastening under the chin with adjustable strap.

(895) The address of manufacturers of uncoated fabric for dirigibles is desired by a reader.

(896) A manufacturer desires the address of concerns manufacturing machinery for plaiting and crimping sheet rubber.

(897) A manufacturer abroad requests the address of makers of rubber drives suitable for motorcyclists.

(898) A reader asks for the address of the manufacturer of a green felt top rubber-base dice mat, 18 by 24 inches.

(899) A reader in Japan requests the addresses of manufacturers of rubber footwear repair equipment and supplies.

(900) An inquiry has been received for the addresses of manufacturers of knit jacket fire hose.

(901) A reader desires to know what rubber specialty house uses OO as the trade mark on its products.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS

Addresses may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or from the following district or cooperative offices. Requests for each address should be on a separate sheet, and state number.

District Offices.	Cooperative Offices.
New York: 734 Customhouse.	Cleveland: Chamber of Commerce.
Boston: 1801 Customhouse.	Cincinnati: Chamber of Commerce; General Freight Agent, Southern Railway, 96 Ingalls Building.
Chicago: 504 Federal Building.	Dayton, Ohio: Dayton Chamber of Commerce.
St. Louis: 402 Third National Bank Building.	Los Angeles: Chamber of Commerce.
New Orleans: 1020 Hibernia Bank Building.	Philadelphia: Chamber of Commerce.
San Francisco: 307 Customhouse.	Portland, Oregon: Chamber of Commerce.
Seattle: 848 Henry Building.	

(34,911) A merchant in Porto Rico desires to secure an agency for the sale in Spain of tires and accessories.

(35,085) A commercial agent in France desires to secure the representation of firms for the sale of tires and accessories.

(35,105) A mercantile firm in Catania desires to purchase first-grade automobile tires and pneumatic tires. Correspondence in Italian.

(35,133) An importer in Spain desires to be placed in communication with manufacturers not already represented in that country, for the sale of rubber heels, automobile and motorcycle accessories, etc.

(35,153) A company of commission agents in the Maltese Islands desires to secure an agency for the sale of raincoats. Quote c.i.f. Malta for shipment direct from New York to Malta.

(35,199) A merchant in Spain, now in the United States, desires to purchase and secure an agency for the sale of novelties and rubber goods.

JUDICIAL DECISIONS

SUIT BY I. T. S. RUBBER CO. VS. ESSEX RUBBER CO. DISMISSED

I. T. S. Rubber Co. vs. Essex Rubber Co. District Court, District of Massachusetts, November 27, 1920. In Equity, No. 1008.

The case in question had reference to an alleged infringement of the Tufford patent on resilient heels, No. 14,049, reissued January 11, 1916. On the defendant's motion to dismiss this suit, brought by an Ohio corporation against a New Jersey corporation, on the ground that it appears on the records that there was no infringement in the district mentioned, the motion was granted and for want of jurisdiction the bill was dismissed.—*Federal Reporter*, volume 270, pages 593-656.

COMPLAINT AGAINST SUPER TREAD TIRE CO. DISMISSED

Following the recent report of the Union Trust Co., receiver for the Super Tread Tire Co., South Bend, Indiana, the case of the Federal Trade Commission against the latter concern has been dismissed.

No evidence was found to substantiate the claim that the Super Tread Tire Co. ever "sold rebuilt tires with the intent, purpose and effect of deceiving and misleading the general public, or that said company circulated or caused to be circulated advertisements which stated that the Super Tread Tire Co.'s automobile tires were new, when, as a matter of fact, they were reconstructed and rebuilt."

It was also found that this company in its advertising matter, when offering its tires for sale, never concealed the fact that such tires were rebuilt. The case against the company was therefore set aside.

CUSTOMS APPRAISERS' DECISIONS

The United States General Appraisers, New York, N. Y., affirmed the decision of the collector in the matter of the protest of Austin Baldwin & Co., Boston, Mass., against the assessment of duties on printers' blankets by the Boston collector of customs.

Printers' blankets composed of three layers of rubber and three layers of cotton, were assessed for duty as a manufacture in chief value of cotton, at 30 per cent ad valorem under Paragraph 266, Tariff Act of 1913. It was claimed by the importers to be a manufacture in chief value of rubber, with duty at the rate of but 10 per cent ad valorem under Paragraph 368.

THE EDGE LAW AMENDED

The bill amending the Edge Act, which has become law by presidential signature, provides that after the required initial payment on subscriptions to the capital stock of Edge Law corporations, subsequent payments, with the consent of the Federal Reserve Board, may be made upon call of the board of directors of such corporations. It is believed that this amendment, doing away with the 10 per cent installments at sixty-day periods formerly required, will greatly facilitate obtaining subscriptions by giving assurance that funds will be acquired only as urgently needed for safe and profitable employment in financing American foreign trade.

Brushes in Tire Making and Rubber Manufacture

Rubber manufacturing includes many operations in which the use of brushes, both ordinary and special, is quite indispensable, as in cleaning, cementing, buffing, polishing and painting, as well as for general purposes.

The illustration shows some typical brushes of different forms and material, each intended for some special use in the rubber factory. Their purposes are briefly as follows:

No. 1. Floor Sweep. China bristle floor brush for sweeping smooth cement or wood floors. Adapted for sweeping whiting from mill-room floors and cleaning up around mills and calenders. It is sometimes used in the compound pan in the operation of mixing on account of its convenience for reaching under the mill rolls by reason of its long handle.

No. 2. Bristle Mill Duster and Bench Brush. This is commonly used by the rubber mixer for gathering compound ingredients that fall in the pan during mixing, and at the calender when a rubber surface is to be dusted with flour, starch, etc. It is convenient for brushing out mold cavities and removing mold trim and other scrap from work benches in the press room and other departments.

Nos. 3 and 4. Naphtha and Acid-Cure Brushes. These are round and flat tools with bristles set in vulcanized rubber to keep them from coming out when used in naphtha. They are adapted for spreading rubber cement and applying chloride of sulphur in the acid cure of inner tubes.

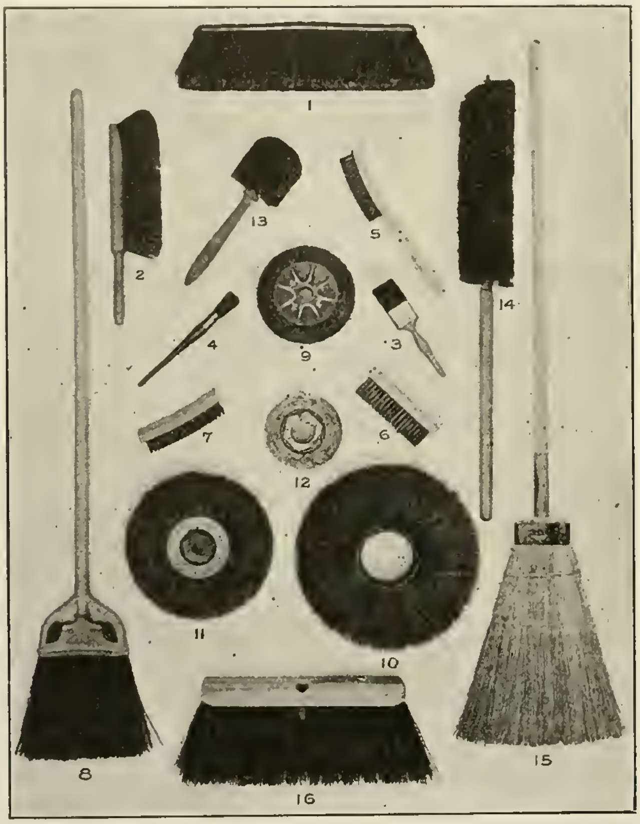
Nos. 5, 6 and 7. Fine Wire Hand Scratch Brushes. These are used for cleaning soapstone and sulphur incrustations from molds, cores, tube or hose poles. When made of stout flat wire this style of brush is useful for cleaning pole stains from inner tubes. If the work is done with brush and rubber wet, the inner tube may be cleaned without injury by scratching.

No. 8. Cure-Room Broom. A detachable-head broom of specially-dressed bass fiber, for sweeping wet floors.

Nos. 9, 10 and 11. Power Wire Wheels. These wheels are made in any diameter and any width of face desired. Wire of various gages and temper is used, according to the work for which the brushes are intended. They are used in power-cleaning tire molds, cores and tube poles, also for buffing cured beads, carcasses and tread bands of pneumatic tires. They are generally used in all tire-repair work, roughing inner tubes for splicing, and cleaning steel bands for receiving the hard rubber base of solid tires.

No. 12. Wheel Hub. A type of hub for securing power brushes to the spindle.

No. 13. Bristle Brush of Swab Form. The shape of this brush makes it convenient for cleaning hollow spaces such as the inside of tire cases, tire and bead molds, and for applying liquid dressing for whitening the inside of tire casings.



The Osborn Manufacturing Co.

Typical Brushes Used in the Rubber Industry

No. 14. Balloon Brush for cleaning dust from balloon and glove forms.

No. 15. Warehouse Broom made of mixed corn and Japanese fiber for general sweeping where upright brooms are used.

No. 16. Push Broom for heavy sweeping around yards and shipping platforms.

STANDARDIZATION OF BRAKE-LININGS

The Journal of the Society of Automotive Engineers in a recent issue, makes the following statements: "The lack of definite information and uniform practice with regard to the testing and operation of brake-linings clearly indicates that the establishment of standard tests which can be followed by manufacturers and users and form the basis for purchase specifications will be an important accomplishment in this branch of the industry. Such standards when carefully planned and executed should make possible greater uniformity of materials and establish a better understanding of the essentials involved."

With similar purposes in view the Bureau of Standards, after a joint meeting of the Truck Division of the Standards Committee and the Truck Committee of the National Automobile Chamber of Commerce, held April 21, 1919, agreed to conduct certain tests for the determination of brake-lining specifications and coefficients of friction. The work was to proceed under the general supervision of a subdivision of the Truck Division in cooperation with the Bureau of Standards and the Motor Transport Corps, the latter body to furnish also the necessary apparatus.

Two years later it was found advisable to add representatives of four brake-lining manufacturers, who should construct testing equipment similar to that installed by the Bureau of Standards, and conduct an independent series of tests.

At a conference called at the Bureau of Standards on May 17 of the present year, and when practically all of the brake-lining manufacturers of the country were represented, many problems were discussed, while data of much importance appeared to have been obtained. It was felt, however, that still further tests would be necessary, and more investigations should be made before a final decision could be reached. The comparative information gained by the methods mentioned will undoubtedly prove of much value to the industry.

"Acidotex," a new coagulant resembling "Coagulatex," is prepared and sold in Penang. Its analysis, as reported by *Le Caoutchouc et la Gutta Percha*, is as follows:

Density at 85°	1.445
Sulphuric acid	59.3%
Hydrochloric acid	4.2%
Mineral residue	8.4%

The latter item is equivalent to 122 grams per liter.

News of the American Rubber Industry

NEW INCORPORATIONS

At-Your-Service Tire Co., February 21 (Kentucky), $75,000. A. L. Smith; A. E. Lang; B. B. Mahan; S. M. Don; C. M. Cummins—all of Louisville, Kentucky. Principal office, Louisville, Kentucky. To deal in automobile tires, tubes and accessories.

Broderick-Lally Tire & Rubber Co. of New York, July 5 (New York), $50,000. T. A. Broderick; M. J. Lally, both of 201 West 38th street; T. L. Hurley, 42 East 11th street—both in New York City. To manufacture tires.

Bronx Solid Tire Co., Inc., July 16 (New York), $15,000. L. A. Allers; L. Biel, both of 27 Cedar street; J. V. Kilroe, 230 West 116th street—both in New York City. To deal in tires.

Clark Rubber Syndicate, Inc., June 29 (New York), $50,000. I. D. Allen, 150 North Union street; F. P. Dunham, 5 Chapin street; S. A. Millington, 57 Huntington Park—all of Rochester, New York. Principal office, Rochester, New York. To manufacture tires and re-treads.

Consumers Tire & Rubber Co., The, June 24 (Delaware), $500,000. M. M. Lucey; V. P. Lacey; L. S. Dorsey—all of Wilmington, Delaware. Delaware agent, Colonial Charter Co., 927 Market street, Wilmington, Delaware. To deal in tires, tubes, etc.

Crosby & Collins Pharmacy, Inc., June 23 (Massachusetts), $30,000. M. F. Ford, 20 Williams avenue, Hyde Park; T. J. G. Armstrong, 37 Partridge avenue, Somerville; G. M. Faulkner, 1870 Commonwealth avenue, Brighton—all in Massachusetts. Principle office, Boston, Massachusetts. To manufacture and deal in drugs and druggists' sundries.

Duplex Tire & Rubber Co., May 19 (Missouri), $1,000,000. R. W. Crissey, president; C. A. Carlton, secretary and factory manager; R. Coonts, treasurer; L. A. Tooker, vice-president. Principal office, 322 Frisco Building, Joplin, Missouri. To manufacture rubber goods.

Edgar Storms Corp., April 25 (New York), $100,000. J. F. Forrester; L. Dertz, both of 95 Madison avenue; E. Storms, 10 Central Park West—both in New York City. To manufacture tires, etc.

Enterprise Tire & Supply Co., Inc., June 23 (New York), $6,000. M. A. Ryan, 16 East 48th street; F. D. Braisted, 149 West 84th street; M. J. Sberlock, 261 West 69th street—all in New York City. To manufacture auto tires.

Essandell Tire Co., June 25 (Massachusetts), $250,000. F. G. Saylor, corner Sea & Bayview avenue; W. MacLean, 30 Chestnut street, both of Quincy; G. A. Lufkin, 173 Shirley avenue, Revere—both in Massachusetts. Principal office, Boston, Massachusetts. To deal in all kinds of rubber goods.

Fresno Tire & Rubber Co., February 28 (Nevada), $2,000,000. D. B. Eastman, president, Elks Club, Fresno; C. A. Bunnell, secretary and treasurer, 21 South Morengo avenue, Pasadena—both in California. Principal office, Reno, Nevada. To deal in rubber tires.

Hartford Auto Products, Inc., May 24 (New Jersey), $50,000. L. G. Chandler, president; G. W. Burbery, treasurer, both of 332 Broad street; H. Isherwood, secretary, 738 Broad street—both in Newark, New Jersey. Principal office, Room 906, 738 Broad street, Newark, New Jersey. Agent in charge, H. Isherwood. To distribute automobile supplies and accessories of every kind.

Hurley Tire Co., The, July 6 (Massachusetts), $15,000. D. J. Hurley, 27 Asticou Road; M. G. Downey, 430 Centre street, both of Jamaica Plain; A. Perreault, 352 Washington street, Dorchester; E. Ebler, 189 West Newton street, Boston—all in Massachusetts. Principal office, Boston, Massachusetts. To manufacture and deal in tires, tubes, etc.

J. F. & S. M. Tire Corporation, The, July 1 (Washington), $300,000. J. F. Mora, president, Pittsburg, Calif.; J. F. Stranahan, vice-president; N. Canevara, secretary; G. Todaro, treasurer. Principal office, Seattle, Washington. To manufacture tires.

Lawrence Tire Service Co., Inc., July 19 (New York), $10,000. S. and B. Zerman, both of Far Rockaway; J. Zerman, Long Island—both in New York. To deal in automobile tires, etc.

Louis Rubber Co., May 18 (Ohio), $5,000. L. M. Latta; W. J. Bennett—both of Akron, Ohio. Principal office, Akron, Ohio. To manufacture rubber articles.

Marathon Rubber Products Co., April 9 (Wisconsin), $300,000. F. H. Schneider, H. E. Damon, J. H. Elliott, R. E. Cjartier, all of Wausau; J. H. Hieb, Merrill—both in Wisconsin. Principal office, Wausau, Wisconsin. To deal in rubber, etc.

Miller-Steiner Rubber Co., June 9 (New Jersey), $100,000. J. M. Miller, president; G. W. Page, treasurer; J. D. Steiner, vice-president and secretary. Principal office, 678 North Olden avenue, Trenton, New Jersey. To manufacture mechanical rubber goods.

National Consolidated Rubber Co., June 24 (Delaware), $750,000. J. M. and J. A. Frere, M. A. Alexander—all of Wilmington, Delaware. Delaware agent, American Guaranty & Trust Co., 206 West 9th street, Wilmington, Delaware.

Non-Breakable Button Corporation, April 14 (Wisconsin), $100,000. S. F. Dietrich, president, 541 Plankinton avenue, Cudahy; C. W. Moebius, vice-president, 530 Linnwood avenue, Milwaukee—both in Wisconsin; L. Ehlert, secretary; W. Pfleger, treasurer. Principal office, 200-210 Pleasant street, Milwaukee, Wisconsin. To manufacture a non-breakable button from high-grade rubber and other ingredients.

Robinson Anti-Splash Tire Co., The, June 28 (Massachusetts), $200,000. C. A. Robinson, 3960 Washington street, Roslindale; J. P. Sylvia, Jr., 1460 Blue Hill avenue, Boston; J. A. Coveney, 103 Walnut avenue, Roxbury—all in Massachusetts. Principal office, Boston, Massachusetts. To manufacture Robinson anti-splash tire.

Sales Corporation of America, June 13 (Delaware), $12,000. Delaware Agent, Colonial Charter Co., Wilmington, Delaware. To manufacture rubber articles.

Self-Sealing Auto Tube Co., The, June 11 (Delaware), $850,000. H. C. Adam, H. A. Sperry, M. A. Behrend. To manufacture inner tubes and other rubber products.

Sinar Rim Corp., June 24 (Delaware), $500,000. F. R. Hansell; J. V. Pimm, both of Philadelphia, Pennsylvania; E. M. MacFarland, Camden, New Jersey. Delaware Agent, Corporation Guarantee & Trust Co., 927 Market street, Wilmington, Delaware. To manufacture patented automobile rims.

Solimine Rubber Heel Co., Inc., June 27 (New York), $50,000. C. and A. A. Pellegrino, both of 509 Dean street; C. Solimine, 539 Bergen street—both in Brooklyn, New York. Principal office, Brooklyn, New York. To manufacture rubber heels.

Standard Rubber Cement Co., May 4 (Massachusetts), $10,000. M. S. Azulay, president; E. M. Azulay, treasurer and clerk—both of Stoughton, Massachusetts; J. C. Eccles, Trenton, New Jersey. Principal office, Stoughton, Massachusetts. Factory, Canton, Massachusetts. To buy, sell, manufacture and deal in rubber, rubber cement, etc.

Taylor, L. R., Co., May 16 (New York), $25,000. L. and H. Taylor, H. H. Pickering—all of Freeport, Long Island, New York. To manufacture compressors and ankle reducers.

Tire Jobbers, Inc., The, July 16 (New York), $2,500. E. B. Jensen, 270½ Alexander street; E. B. McGinley, 564 North Goodman street; W. B. Slattery, 266 Garson avenue—all of Rochester, New York. Principal office, Rochester, New York. To deal in tires, etc.

Virginia Sales & Advertising Corporation, The, July 19 (New York), $10,000. C. P. Joslyn; W. Silliman, E. Hayden—all of Buffalo, New York. Principal office, Buffalo, New York. To deal in tires.

West Coast Rubber Corporation, Inc., April 7 (California), $2,000,000. C. L. Williamson, F. C. Jordan, W. F. Petersen, W. W. Felt, Jr., R. Sanford, J. W. MacClatchie. Principal office, 33 Dolores street, San Francisco, California. To manufacture "Bonner" inner tubes.

FINANCIAL NOTES

The board of directors of the United States Rubber Co., at their meeting, July 7, declared the usual 2 per cent quarterly dividend on the preferred stock, but deferred action on the common stock dividend. The sales for the first six months of the year have been satisfactory under the business conditions that have prevailed. The directors have made a careful review of the situation for the balance of the year, and the outlook is encouraging, especially as to tire and footwear sales. While the financial position of the company is strong, the directors deem it conservative to defer action on the common stock dividend for the present.

The directors of The B. F. Goodrich Co. have declared the regular quarterly dividend of 1¾ per cent on the preferred stock, payable October 1 on stock of record September 21, 1921. Sales for the first four months were unsatisfactory but since May 1 there has been a substantial increase and the liquidation of the inventory has been sufficient to reduce bank loans since the first of the year from $29,000,000 to $14,900,000. If present conditions continue, the company will be able to pay off practically all bank indebtedness by the end of the year.

The Fisk Rubber Co., Chicopee Falls, Massachusetts, has passed the quarterly dividend of 1¾ per cent on its first preferred stock, due on August 1.

Current earnings of the Lee Rubber & Tire Corporation, Conshohocken, Pennsylvania, are running well ahead of the dividend requirements. Sales for the first three months of the year show a decrease compared with the corresponding period of last year, but since April 1 there has been a marked improvement, making necessary day and night operations, and production is now running at record figures. The present schedule calls for 2,000 tires a day, which is the largest in the history of the company and the demand is greater than the production. The company is free of all incumbrances and the total bank debt is only $500,000. There is cash on deposit in excess of this amount.

The Federal Rubber Co., Cudahy, Wisconsin, has passed the quarterly dividend of 1¾ per cent due on the preferred stock at this time.

NEW YORK STOCK EXCHANGE QUOTATIONS

July 25, 1921

	High	Low	Last
Ajax Rubber Co., Inc.	24¾	23	24
Fisk Rubber Co., The	13⅜	12½	13¼
B. F. Goodrich Co., The	33¾	32	32¼
Kelly-Springfield Tire Co.	43¼	39¾	43¼
Kelly-Springfield Tire Co., 8% pfd.	77½	77¼	77¼
Keystone T. & R. Co., Inc., The	13⅞	12½	13⅞
Lee R. & T. Corporation	29	28	29
United States Rubber Co.	55⅝	53	54¼
United States Rubber Co., 1st pfd.	95¼	95	95¼

AKRON RUBBER STOCK QUOTATIONS

The following are closing quotations of July 19, supplied by The App-Hillman Co., Second National Building, Akron, Ohio:

	Bid	Asked
American R. & T. Co., com	30	40
Amazon Rubber Co., The	..	15
Firestone T. & R. Co., com	58	60
Firestone T. & R. Co., 6% pfd	80	87
Firestone T. & R. Co., 7% pfd	64	70
General T. & R. Co., The, com	..	200
General T. & R. Co., The, 7% pfd	70	80
Goodrich, B. F., Co., The, com	30¼	31
Goodrich, B. F., Co., The, pfd	65	70
Goodrich, B. F., The, pfd	65	70
Goodrich, B. F., Co., The, 5-yr. 7% notes	89	90
Goodyear T. & R. Co., The, com	10¼	11¼
Goodyear T. & R. Co., The, 7% pfd	25	25¼
India T. & R. Co., com	..	70
India T. & R. Co., 7% pfd	60	70
Mason T. & R. Co., The, com	9¼	11
Mason T. & R. Co., The 7% pfd	47	50
Marathon T. & R. Co., com	2½	3½
Miller Rubber Co., The, com	50	55
Miller Rubber Co., The, 8% pfd	60	67
Mohawk Rubber Co., The	..	80
Phoenix Rubber Co., com	..	15
Phoenix Rubber Co., pfd	..	80
Portage Rubber Co., The, com	3	6
Portage Rubber Co., The, 7% pfd	5	10
Republic Rubber Corporation, com	¼	½
Republic Rubber Corporation, 7% pfd	7	9
Republic Rubber Corporation, 8% pfd	2	4
Rubber Products Co., The	..	50
Standard Tire Co., com	..	80
Standard Tire Co., pfd	..	80
Star Rubber Co., com	..	90
Star Rubber Co., 8% pfd	..	100
Swinehart T. & R. Co., com	..	40
Swinehart T. & R. Co., 7% pfd	..	70

DIVIDENDS DECLARED

Company	Stock	Rate		Payable	Stock of Record
Aetna Rubber Co	Pfd.	1¾%	q.	July 1	June 25
Canadian General Electric Co., Limited	Com.	20%	stk.	Aug. 1	July 15
Corn Products Refining Co	Com.	1%	q.	July 25	July 5
Corn Products Refining Co	Com.	½%	ex.	July 25	July 5
Corn Products Refining Co	Pfd.	1¾%	q.	July 15	July 5
Driver-Harris Co	Pfd.	1¾%	q.	July 1	June 21
Firestone Tire & Rubber Co......6%	Pfd.	1½%	q.	July 15	July 1
General Tire & Rubber Co	Pfd.	1¾%	q.	July 1	June 20
B. F. Goodrich Co., The	Pfd.	1¾%	q.	Oct. 1	Sept. 21
Grace, W. R., & Co	Com.	4%	s.a.	Aug. 1	July 28
Hodgman Rubber Co	Pfd.	2%	q.	Aug. 1	July 15
Hood Rubber Co	Pfd.	1¾%	q.	Aug. 1	July 20
Kelly-Springfield Tire Co	Com.	3%	stk.	Aug. 15	Aug. 1
Kelly-Springfield Tire Co........8%	Pfd.	2%	q.	Aug. 15	Aug. 1
Mason Tire & Rubber Co., The	Pfd.	1¾%	q.	Aug. 20	June 30
New Jersey Zinc Co	Com.	2%	q.	Aug. 10	July 30
Philadelphia Insulated Wire Co	Com.	$2.00	s.a.	Aug. 5	July 30
United States Rubber Co..........1st	Pfd.	2%	q,	July 30	July 15

EASTERN AND SOUTHERN NOTES

By Our Regular Correspondent

The New York Rubber Co., 84 Reade street, New York, N. Y., with factories at Beacon, New York, has appointed the following officers: John Acken, president; Henry F. Hering, vice-president and general manager; Milton Loeb, treasurer, and Walter E. Palmer, secretary.

The Ajax Rubber Co., Inc., New York, N. Y., has appointed F. M. Hoblitt general sales manager, succeeding F. E. Dayton, who resigned to become an associated broker with the real estate firm of Cross & Brown Co., and will specialize in the leasing of the new building of The Fisk Rubber Co. at 57th street between Broadway and Eighth avenue.

President Harding accepted the invitation of Harvey S. Firestone to join a camping party which was held last month in the Cumberland mountains. Thomas A. Edison and Henry Ford were present. The three last-mentioned men, with the late John Burroughs, the famous naturalist, held similar excursions annually.

W. G. Loney has been appointed Buffalo sales agent of the Gutta Percha & Rubber Manufacturing Co., whose main offices are at 126-128 Duane street, New York, N. Y. Mr. Loney succeeds C. P. Joslyn, who recently retired from the managership of the Buffalo office.

In a recent issue of *Greater New York*, a weekly bulletin issued by The Merchants' Association of New York, the following item was noted in the list of names of those lately added to the membership of the Association's committee on industrial relations: "C. S. Ching, United States Rubber Co., has been appointed supervisor of industrial relations."

The Beacon Tire Co., Inc., Beacon, New York, is adding about 10,000 square feet of floor space to its factory, to be used for tire building and vulcanizing. It is expected that this addition will be completed by September 1 and will bring the factory capacity up to about 800 cord tires daily.

The Pines Rubber Co., Brooklyn, New York, incorporated December 16, 1914, with a capital of $75,000, to manufacture rubberized fabrics, has increased its capital to $200,000. Actively interested in the company as its incorporators were the following: Joseph Pines, No. 260 Ocean Parkway; David Pines, No. 828 Eastern Parkway; and Morris Pines, 1524 St. Mark's avenue—all in Brooklyn, New York.

Ernest F. Kling has been appointed factory manager of the Batavia Rubber Co., Batavia, N. Y. Mr. Kling was formerly chief analytical chemist with Morgan & Wright, Detroit, Michigan, and assistant factory manager of a branch factory of the Fiat Automobile Works, having been overseas from 1915 to 1919. Early in 1920 he became connected with the Batavia Rubber Co., first in the capacity of chemist, later being placed in charge of construction and compounds.

The Goodyear Cotton Mills, Inc., Goodyear, Connecticut, resumed operations July 5, on a one-shift basis. The present production is approximately 40,000 pounds weekly, while 175 people are employed. Last year the output was 160,000 pounds weekly on a three-shift basis. The company expects production to remain on the present basis for the remainder of the year.

PENNSYLVANIA NOTES

The East End Tire Co., Inc., incorporated in Pennsylvania four years ago, is capitalized at $45,700. Its only office is at 5901 Penn avenue, Pittsburgh, Pennsylvania, and its present officers are: F. W. Fischlein, president; W. E. Ireland, vice-president; H. C. Grubbs, secretary and treasurer; and M. A. Hillard, assistant treasurer.

The McCreary Tire & Rubber Co., Indiana, Pennsylvania, has appointed Homer C. Steffen sales manager. The company manufactures McCreary tires and tubes.

J. H. McGachan, formerly with The Portage Rubber Co., Barberton, Ohio, and later chief chemist of the Mason Tire & Rubber Co., Kent, Ohio, is now a member of the organization of the Rex-Hide Rubber Manufacturing Co., East Brady, Pennsylvania. Mr. McGachan has had a wide experience along tire-manufacturing lines.

The Southern Carbon Co., Williamsport, Pennsylvania, incorporated under the laws of Delaware February 5, 1917, with a capital of $1,000,000 fully paid in, is a subsidiary of the Columbian Carbon Co., of the same city. The company was organized to produce natural gas and manufacture gas carbon black and gasoline. The officers are: G. L. Bubb, president; F. F. Curtze, vice-president; N. B. Bubb, treasurer; and R. L. Carr, secretary.

SOUTHERN NOTES

The Eastern Rubber Products Co., 361 North Calvert street, Baltimore, Maryland, was incorporated under the laws of that state on November 26, 1920, to purchase and deal in all forms of rubber. The capital stock consisted of 800 shares of preferred stock, par value $50; 600 shares common, without par value. The company is now planning to install rubber-working machinery in its new plant. Charles B. Kegarice is secretary and treasurer and the other incorporators included Charles M. Wyatt and Charles F. Black, both of Baltimore.

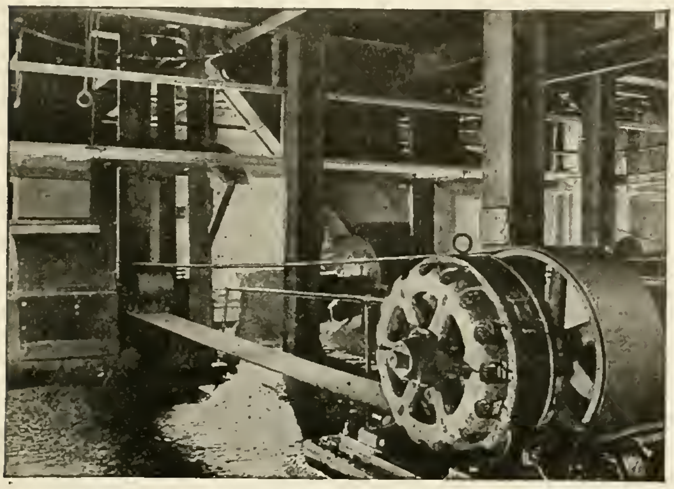
The Diamond Holfast Rubber Co., Atlanta, Georgia, has elected the following officers: H. I. Diamond, president and treasurer; Herman Ditt, secretary; H. I. Diamond, Herman Ditt, Gadsden E. Russell, George W. White, S. B. Turman, C. A. Tappan and W. W. Griffin, directors. The company has recently purchased a new factory site of 11 acres on which to build a

modern fireproof concrete building, having outgrown its present factory which is operating day and night. One of the new specialties of this company is "2-Plex" combination electrical tape which replaces the rubber tape and friction tape generally used for insulation.

"TEST SPECIAL" RUBBER BELTING

A remarkable example of the durability of rubber belting is being furnished at the plant of the Champion Fibre Co., Canton, North Carolina.

The belt in question is one which has traveled most of the time through 24 hours a day, at the speed of 6,273 feet per minute. It has been in use for six years, and is still running. The installation was made by The New York Belting & Packing Co., 91-93 Chambers street, New York, N. Y. The claims of this company regarding the great strength and endurance of its "Test Special" rubber belting would seem, in this instance, to be fully substantiated.



A Demonstration of Rubber Belt Efficiency

THE RUBBER TRADE IN NEW JERSEY

By Our Regular Correspondent

The tire situation in Trenton is holding its own at the present time and the plants are busy. One manufacturer said: "This is the time of the year when there is a large demand for tires. But the volume of business is not as great as it should be." Another rubber manufacturer said he did not believe the industry would show any great strides before fall. "The fact that the rubber mills are not as busy as they should be was proof that the demand for tires would not increase any this summer."

The Globe Rubber Tire Manufacturing Co. still has a night force at work and expects to continue the double shift all summer. An official of the Empire Tire & Rubber Corporation said that his plant was fairly busy and that he expected to see the tire business improve shortly. The mechanical end of the business, he declared, was much brighter. The Bergougnan Rubber Co. is running 75 per cent of capacity. The Zee Zee Rubber Co. reports business good. The Ajax Rubber Co. reports that the outlook for the concern is very bright and that there has been much improvement of late.

The scrap rubber business is not very encouraging. The Nearpara Rubber Co. is running full time, but the business is not very good. Prices of scrap rubber are at the lowest levels and there is no telling when they will advance.

Tire prices continue to be very low and in some instances tires are selling at less than pre-war figures. It is said that the average mileage of high-class tires has increased, in some instances, 100 per cent.

TRENTON NOTES

Affiliation is announced between the Thermoid Rubber Co. and the Detroit Pressed Steel Co., in the manufacture of the Thermoid universal joint. The consolidation of these two well-known companies in this particular line of manufacture is a significant event in the automotive industry.

The Acme Rubber Manufacturing Co. and the Essex Rubber Co., Trenton, will display their goods at the trade exposition to be held in Caracas, Venezuela, this fall.

The Grizzly Rubber Co., Trenton, has been appointed the Trenton representative of The Mason Tire & Rubber Co., Akron, Ohio, and will handle Mason tires in the surrounding territory. Richard R. Rogers, head of the Grizzly Rubber Co. for a number of years, was identified with the Empire Rubber & Tire Corporation, both in manufacturing and selling.

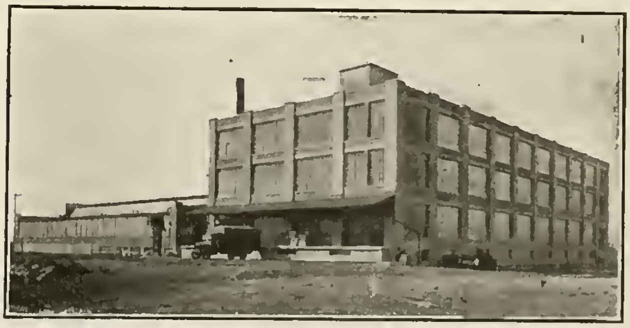
Edward T. Comly, secretary of the Acme Rubber Manufacturing Co., Trenton, recently gave a talk before the Rotary Club on the making of garden and other hose.

The plant of the Trent Rubber Co. was sold at public sale on June 22 for $100,000 to Edgar W. Hunt, representing some of the creditors. In August the plant will be turned over to the purchasers, while in the meantime operations are being continued under the managership of J. O. Bigelow, the receiver. The company was incorporated more than two years ago under the name of the Atlas Tire & Rubber Co. and later the name was changed to the Trent Rubber Co. The plant was erected at a cost of more than $300,000.

The automobile service station of Charles H. West was destroyed by fire on June 23, causing a loss of about $15,000. More than 400 Bergougnan tires and tubes were burned, together with two automobiles. The loss is covered by insurance.

THE STOKES ASBESTOS CO.

The new plant of the Stokes Asbestos Co., Trenton, New Jersey, is now operating at about one-third capacity, but will be at maximum capacity as soon as additional machines, already installed, have been adjusted and put into service. This plant is an adjunct of the Thermoid Rubber Co., which uses asbestos metallic cloth in the manufacture of brake lining.



Plant of The Stokes Asbestos Co., Trenton, N. J.

The principal raw material used in the preparation of this product is crude asbestos, which is mined in Canada. The process includes spinning this material into yarn around small strands of brass wire. This metallic yarn is then woven into an asbestos metallic cloth, which finally appears in rolls approximately 100 yards long. The finished cloth, then delivered to the Thermoid Rubber Co., undergoes several processes, the last of these being vulcanizing. This final treatment gives the product a uniform density throughout, and does not destroy its fabric nature.

The machinery in the new buildings is of the newest design,

and has many interesting features, including a complete dust-exhausting and collecting system, connected with each machine and planned to safeguard the health of the employes.

The officers of the Stokes Asbestos Co. are: J. Oliver Stokes, president; William J. B. Stokes, treasurer; Robert J. Stokes, secretary and assistant treasurer. William C. Aichele is superintendent and Edmund W. Craft is the purchasing agent.

MISCELLANEOUS NEW JERSEY NOTES

Counsel for Elgin G. McBurney, receiver for the Indian Tire & Rubber Co., New Brunswick, has filed a report showing total receipts of $48,037.92 and disbursements aggregating $23,376.14, leaving a balance of $24,661.78 available for the payment of allowances, costs, etc., and claims aggregating $129,083.10.

The Smith Rubber & Tire Co., Inc., Garfield, New Jersey, plans to put a night shift at work to meet the increasing demand for tires. At a special meeting, July 8, the concern was placed on a monthly dividend-paying basis: the first dividend of one per cent being payable August 1. Winfield Clearwater is president of the company.

A statement which appeared in our last issue is herewith corrected. The New Jersey Rubber Co., Lambertville, is not owned by the E. H. Clapp Rubber Co., of Boston, the latter having no interest in the former company

The Eckrode Rubber Co., Viehmann Building, New Brunswick, will conduct selling operations for the Eckrode Rubber Co., Inc., Newark. E. A. Sattler, recently elected vice-president of the corporation, will have charge of sales, assisted by Theodore Weigele. Both men were formerly with the Howe Rubber Corporation, New Brunswick, New Jersey, as director of sales and assistant sales manager, respectively. The Eckrode products at the present time include red inner tubes and repair accessories, and national distribution is planned before the end of the year. Sales have previously been confined largely to the Eastern States.

NEWARK FACTORY OF L. E. WATERMAN CO.

The L. E. Waterman Co., New York, N. Y., fountain pen manufacturer, late in the winter purchased the factory of the General Phonograph Co., 140 to 150 Thomas street, Newark, New Jersey, and took possession in the spring. It also took title to a large area of land surrounding the factory, on which to lay out a baseball park, tennis courts, playgrounds, and other equipment for outdoor recreation and pleasure to benefit employes.

The new building, of concrete and steel, contains 250,000 square feet of floor space and is the largest of the company's five plants

Largest Factory Where Waterman Pens Are Made

in this country and Canada. It is equipped with the most up-to-date machinery and will produce approximately 10,000,000 fountain pens yearly. A private siding gives direct connection with the Pennsylvania railroad. There is a separate power plant, of 600 h.p., and a 100,000-gallon water reservoir.

The factory proper provides space and facilities for the manufacture of the company's pens and ink; for the ornamentation of the metal work; for packing, casing and shipping; for an emergency printing plant; for making, combining, and shipping dealer and window display material; an employes' locker room, and a completely equipped clinic in charge of a nurse. Other special features for the benefit of employes include a cafeteria, rest rooms, and an auditorium for meetings and entertainments.

THE RUBBER TRADE IN RHODE ISLAND

By Our Regular Correspondent

The manufacturing rubber industry in Rhode Island during the past month has been in a somewhat chaotic condition, in fact so much so that any statement as to a general situation is difficult and unsatisfactory. The safest, most consistent statement in this connection is that business is unsettled and the future uncertain.

At the same time the numerous textile factories throughout Rhode Island that produce textile fabrics for tire purposes and that have been idle for a considerable period, are showing evidences of awakening. The resumption, however, is on a restricted schedule.

The Millville plant, a footwear division of the United States Rubber Co.'s system, was closed December 10, 1920, and has remained so ever since. The calender department started operations on the morning of July 11 and the employes of the cutting room came in the following day. The first day's making, however, was not until July 14, when the bootmakers returned, the resumption thus taking place in one department after another as usual, the packers being the last to strike in on July 15. About 50 per cent of the employes, numbering approximately 4,000, have been called in.

The "Keds" division of the National India Rubber Co. closed July 15 for an indefinite period. Three days later, on July 18, the wire division of the plant resumed operations after having been closed for a number of weeks. New orders for tennis goods have been rather scarce so far this year and until a more promising outlook for the sale of these products presents itself, the length of the present shut-down can not be determined.

In order that the employes at the National factory may seek employment in other localities, during the present slack period, and still remain in a position to return to work for the company, if they so desire, the announcement was made previous to the shut-down as follows: "Leave of absence for a definite period of any length up to one year, will be granted to anyone at present in the employ of the company. Reemployment is guaranteed provided the person on leave returns at the time which he has specified. In most cases he or she will be returned to the same type of work as that upon which they were working at the time the leave was granted. When that is impossible, employment will be given at some other job with an equal class wage."

The American Wringer Co.'s plant at Social street, Woonsocket, Rhode Island, which some months ago was put in the hands of the Industrial Trust Co. of this city, as receivers, closed down July 15 for a two weeks' vacation. This shut-down affected the entire plant, with the exception of the mechanical roll department, employing about 60 hands. The factory in normal times employs about 800 hands, but only about 350 have been at work recently. Since the company went into the hands of the receivers there has been a general curtailment of operating expenses through consolidation of official duties and concentration of efforts.

Arthur Campbell resigned as assistant superintendent, after being with the American Wringer Co. for ten years, first as head of the stock department, later as production manager, and for the last two years as assistant superintendent. William J. Meakin, for

forty years an employe of the company, and for 25 years foreman of the tool room, in charge of the erection of the large mangles and the large tobacco wringers, has resigned his position. Percy A. Greenwood, foreman of the finishing department, has also resigned. He has been with the company for the past fifteen years.

Members of the Davol Rubber Company Mutual Benefit Association recently gave a minstrel show to mark the opening of the new recreation rooms provided by the company. No admission was charged, but the attendance was limited to members of the Association. The circle was made up entirely of young women, the "end men" and chorus numbering nearly forty of the women employes. Next winter it is intended to hold a series of socials, entertainments, dances and other social features.

Harold De Blois Rice, who for the past two years has been chief chemist of the National India Rubber Co. at Bristol, Rhode Island, and Miss Madeline Ives Goddard were married July 7. After a wedding trip to New York and Maine they will live in Bristol.

The Providence Rubber Co., Providence, has reduced its capital stock from $500,000 to $100,000, according to the filing of an amendment to its charter at the office of Secretary of State Parker under the laws of Rhode Island, the papers being signed by Samuel P. Colt as president and Clarence H. Guild as secretary. The original charter was granted by the General Assembly of Rhode Island at the May session, 1892, and a few years later was changed to the Marine Rubber Co. which at the January session, 1921, was changed to the Providence Rubber Co., and the capital stock increased to $500,000.

The fourth annual outing of the Tubular Woven Fabric Co., Pawtucket, Rhode Island, took place July 16, at the Warwick Club on the west shore of Narragansett Bay, where the employes were conveyed by special electric cars. After luncheon a long list of sports and field games afforded amusement for both participants and onlookers. The first event was the baseball game between the Weavers and Duras, in which the former, having the most runs to their credit, were awarded the prize. Next in order on the program was the clambake, which was served at 3.30 o'clock. Paper hats and toy balloons were distributed among the diners and throughout the dinner merriment and good cheer were not lacking. Music was furnished by the orchestra during the dinner hour, as well as for dancing. Late in the evening the return journey was made.

The Ellingwood Tire Co., 112 Fountain street, Providence, has been succeeded by the Schieber Rubber Co.

The Narragansett Vulcanizing Works, 271 Richmond street, Providence, is owned and conducted by Charles S. McCullum and Harry A. Davis, according to their statements filed at the city clerk's office.

The Kelly-Springfield Tire Co. has given up its Providence branch at 143 Broad street, and the Belcher & Loomis Hardware Co., 83 Weybosset street, has taken over the local agency.

PROVIDENCE RUBBER CO. TO MAKE U. S. TIRES

J. N. Gunn, vice-president of the United States Rubber Co. and president of the United States Tire Co., announces that the Providence Rubber Co. has been organized to take over tire manufacturing operations at Providence heretofore conducted under the name of the Revere Rubber Co., Colt Plant, Providence, Rhode Island. The local officers of the company are John J. Shea, vice-president and factory manager, A. P. Delahunt, assistant secretary and assistant treasurer. This plant will continue to be known as the Colt plant. The Revere Rubber Co. will continue to operate its large mechanical plant, located near the Colt plant, as heretofore.

THE RUBBER TRADE IN MASSACHUSETTS

By Our Regular Correspondent

Tire demand and consequent production continue to improve, with most plants operating at 75 per cent capacity or better. Increasing general business, the vacation season and the influence of lower tire and gasoline prices on those who motor chiefly for pleasure have helped to stimulate tire buying. The mechanical rubber goods situation remains unchanged and waits upon increasing industrial activity. Manufacturers of druggists' and stationers' sundries report about 75 per cent of normal business with little prospect of betterment before autumn. A little improvement is being felt in the proofing branch of the trade, increasing automobile sales calling for more top material. Orders for raincoat materials are fairly good and business in rubber heels and soles continues satisfactory. The reclaim market remains featureless with output greatly curtailed, and despite the slightly higher crude rubber prices which have ruled of late, little rubber is being sold; due not solely to lack of demand but partly to the fact that holders of rubber are selling only in case of absolute necessity.

Rubber footwear orders have been but partial and late in arrival, with the result that most manufacturers now have on hand sufficient orders for all they can produce during the remainder of the season, and after their customary summer shut-downs will be operating very near capacity. As the mills have found it expedient to make up rubber footwear on order only, a shortage this coming winter is not improbable.

Many reorders are reported on canvas footwear, for which the demand promises to be good for the remainder of the summer. This year, in deference to the suggestion of retail merchants, the announcement of the new tennis prices will be postponed until after September 1, it having been found that the earlier announcements of the past have interfered with retail business in the middle of the selling season.

BOSTON NOTES

The National Shoe and Leather Exposition and Style Show, held in Mechanics' Building, Boston, from July 12 to 14 inclusive, was pronounced the greatest ever held, and buying was regarded as fair considering existing conditions. Rubber and canvas footwear formed a notable feature of the show. Bathing and outing girls exhibited the many kinds of rubber and fiber soled canvas shoes for sports wear, while men in hunting costume and lumberjacks displayed heavy rubber footwear for hard service. The "Rubber Girl" of the United States Rubber Co., in a rubber bathing costume of brilliant hue, and white bathing shoes, was one of the belles in a galaxy of models. The Hood Rubber Products Co., Inc., was a notable participant in the big street parade on July 12.

Herbert Hoover, Secretary of Commerce, was the guest of honor, and his message, briefly stated, was to the effect that America has already turned the corner in business, but that unless the buying power of many thousands is to remain curtailed, foreign markets must be thrown open to some of our great industries.

Several new types of soles with rubber plugs for golfing were exhibited at the Style Show, the idea being to produce golf shoes which will not cut up the golf course or scratch the club-room floors. For example, a sport shoe with two rubber plugs on the sole and two on the heel, the latter two being reinforced by a crescent set into the leather, has been brought out by the English firm of Church, Northampton. The rubber plugs give a firm tread on the golf grounds or tennis court and eliminate the damaging metal spikes. The plug attachments can be bought separately from the shoe.

Everett Morss, president of the Simplex Wire & Cable Co., Simplex Electric Heating Co., and the Morss & Whyte Co., wire manufacturers, was recently elected president of the Boston Chamber of Commerce. Mr. Morss is chairman of the executive

committee and a member of the corporation of the Massachusetts Institute of Technology, a Fellow of the American Institute of Electrical Engineers, a director of the Boston Belting Co., Chemical Products Co., The First National Bank of Boston, and has numerous other interests. During the war he served the Government in various capacities, notably as New England representative on the Priority Committee of the Council of National Defense, and later as chief of the brass and copper tube section of the War Industries Board. He has always taken an active interest in the Boston Chamber of Commerce, having served as a member of its committee on industrial relations and as chairman of its special committees on Federal trade matters and social insurance, and his election to the presidency at this critical time is regarded as a fortunate choice.

E. D. Winans, district manager in New England for the Ajax Rubber Co., Inc., reports a remarkable response to the first advertised announcement of the new black tread Ajax cord tire and its new features.

The Hazen-Brown Co., manufacturing cements, has removed its offices from the former Beach street address to 727 Atlantic avenue, Boston. This is also the headquarters of the Gleasonite Co., manufacturing heels and soles, of which F. J. Gleason is president; Louis Brown, vice-president; G. F. Kerr, secretary, and Max Brown, treasurer.

George E. Hall, president and general manager of the Boston Woven Hose & Rubber Co., accompanied by his wife and two older daughters, sailed for Europe on the "Aquitania" July 5, where they will visit the company's London office, Paris, the battlefields of France, and other points of interest on the Continent, returning about September 1.

Barney Oldfield, of racing fame and head of the Oldfield Tire Co., Cleveland, Ohio, was a recent visitor in Boston, conferring with R. W. Harris, New England distributer for Oldfield tires, and also renewing old acquaintances.

H. T. West Co., dealing in oils and naval stores, carbon blacks, etc., has removed from 148 State street to 132 Library street, Chelsea 50, Boston, Massachusetts.

MISCELLANEOUS MASSACHUSETTS NOTES

George B. Hendrick, publicity director for The Fisk Rubber Co., Chicopee Falls, Massachusetts, was recently elected president of the Publicity Club of Springfield, in the same state.

The Appleton Rubber Co.'s plant at Franklin, Massachusetts, closed the past month, operations being suspended indefinitely on July 2. This shut-down was due to the present conditions of the insulating business but it is expected that operations will be resumed when conditions become better.

The Converse Rubber Shoe Co., Malden, Massachusetts, closed its plant on July 22 until August 8, for the customary summer vacation shutdown. In the interim necessary repairs will be made and considerable renovating done.

Directors of the Converse Rubber Shoe Co., Malden, Massachusetts, at a recent meeting voted to separate the tire business from the footwear business and organized the Converse Tire Co., a distinct corporation, with a capital of 10,000 shares of preferred stock, with a par value of $100, and 10,000 shares of common, without any par value. The new concern plans to deal directly with the dealer, and will have quick assets of about $1,000,000.

The Fisk Rubber Co., Chicopee Falls, Massachusetts, has continued to gain ground since the latter part of May, when a big improvement in business was felt. July production schedules called for an output of 175,000 tires, as compared with about 120,000 for the month of June. On July 20, however, the plant was operating at about 90 per cent capacity, turning out 8,500 casings and 10,000 inner tubes a day, as against 2,500 casings at the low-level of the depression last winter. To conserve cash resources, however, the directors have voted to omit the quarterly dividend of 1¾ per cent on the first preferred stock, usually payable August 1.

The Davidson Rubber Co., manufacturer of druggists' and stationers' sundries, dental gum and hard rubber, Charlestown, Massachusetts, is operating at 75 to 80 per cent capacity and anticipates a continuance of business in about that volume for the near future.

The Mystic Rubber Co., clothing, druggists' sundries and dress shields, West Medford, Massachusetts, reports a great increase in orders during the past month, and officers of the company regard the future with optimism.

The Crompton & Knowles Loom Works, manufacturer of tire fabric looms, Worcester, held closing exercises in its Americanization classes early in July, when ninety-four students, thirty of them forty years of age or over, received certificates. The exercises were held at Knowles Park, a forty-acre tract where employes may enjoy such recreation facilities as a club house, picnic grove, baseball diamond, running track, playground swings and garden plots. Barbecues by groups of employes are held during the summer months, clam bakes and sheep roasts being the feature of such occasions.

RUBBER SECTION OF NATIONAL SAFETY COUNCIL CONVENTION ARRANGES PROGRAM

As a part of the program of the National Safety Council Convention to be held in Boston, September 28-30, a luncheon will be given, on September 28, by the Rubber Section.

Among the speakers at this special session will be the following: H. S. Firestone, of the Firestone Tire & Rubber Co., Dr. Lothar E. Weber, and Frederic C. Hood, president of the Hood Rubber Co. The latter will speak on the subject: "Safety from the Factory Manager's Viewpoint."

F. J. Hoxie, engineer and special inspector of the Associated Factory Mutual Fire Insurance Companies, will give an address on "Fire Hazards and Static Electricity in the Rubber Industry." Mr. Hoxie is recognized as one of the foremost experts on this subject.

AKRON RUBBER INDUSTRY APPROACHING NORMAL CONDITIONS

Special Correspondence

Akron, the rubber center of the world because more than 65 per cent of the world's tires and 40 per cent of all rubber goods are manufactured there, is emerging from the eight months' universal business depression more rapidly than any other city in the United States. The rubber industry is now within 70 per cent of normal production and practically every resident rubber worker in the city is employed.

Goodyear leads all companies in rapidity of recuperation and is now producing 25,000 tires and 30,000 tubes a day. Firestone is making 23,000, which is close to normal production. Goodrich is now making close to 15,000 tires a day, which is much better than 70 per cent production. Miller is adding men and production is now better than 4,000 tires daily.

While the larger companies have increased production the smaller concerns have advanced with leaps and bounds. The American Tire & Rubber Co. is operating three eight-hour shifts at peak production. The General Tire & Rubber Co. is working one day-shift at 100 per cent normal production. The India Tire & Rubber Co. is doing better than 90 per cent of normal. Swinehart's production is running close to 70 per cent. Kelly-Springfield is a month behind orders. The Rubber Products Co.'s plant is doing better than 80 per cent normal while its tire department is 5 per cent above the remainder of the factory. The Mohawk is operating at above 60 per cent of normal.

Conservative estimates on the part of employment managers indicate that in May, June and July 8,000 men were placed in the factories. Much of the increased production, however, has been the result of longer hours, as well as increased efficiency of the plants as a whole.

Railroads already show the effects of the increased production. Outbound tonnage has increased more than 20 per cent and is close to 70 per cent of last year. The increased business has come from dealers in every part of the United States except the South and automobile manufacturers who have returned to more normal production. Many dealers' and manufacturers' orders have been held up because stocks were exhausted and the tires have had to be built.

It must be borne in mind that while other industries were shut down because of the depression, 9,000,000 automobiles and 1,000,000 trucks continued to wear out tires. This replacement on old cars explains the disappearance of the huge stocks in the warehouses when the depression came. From time to time THE INDIA RUBBER WORLD has stated that the stocks were gradually disappearing but the sales and shipments were made so quietly that when the dealers finally came to actually buy they were confronted with the fact that before the tires could be shipped they had to be manufactured. Since Akron factories are today making tires only for actual orders there is reason to believe that warehouse stocks will be small this summer.

Regarding factory efficiency, the plants have increased per capita production more than 30 per cent. Thousands of so-called non-producers and thousands not actually connected with production have left and the chances are they will not return. Paper work has been decreased 75 per cent; tire building has increased in efficiency; every employe is doing necessary work; departments which do not relate directly to the production, selling and shipping of manufactured goods have been wiped out and only the essential departments remain. This has been the case in practically every factory; other overhead has been similarly decreased; welfare work has been cut to the bone; departments duplicated in factory and general offices have been combined; and every effort is being bent towards the efficient production of manufactured products.

Another factor is that every man in the factory knows his job. This has cut the immense turnover and cost of breaking in new men. Today when a man is hired, the office records tell exactly what he can do by the records of his past performance. Another result of increased efficiency is the decrease in losses due to oversights on the part of workmen. In the old days inspection became lax and seconds were turned out in large numbers. Today when a tire leaves the mold it is a tire in every sense of the word and few are returned for adjustment.

During the worst days Akron rubber men never lost hope and perhaps no city in the United States remained as consistently optimistic. Plans for better housing, better streets, more paved roads and better facilities were never dropped. The men of Akron looked to the future, not blindly, but upon the basis of hard facts. They knew the tire business and what stocks were on hand and how rapidly they were being depleted; knowing that, they could prepare for the better day which was never far distant in their minds. The depression was a bitter pill, perhaps, but it was the only manner in which Akron could be brought back to a safe and normal basis. The inflated structure of the war and post-war period had to be torn down so that rebuilding could be started upon the solid foundation of conservative business methods.

With the entrance into the second half of the year it is believed in banking and business circles that a period of operating profit has been entered. That dividend payments will be resumed in the near future is not looked for because the companies will probably desire to pay off as much indebtedness as possible and build up a surplus before beginning again to disburse profits.

THE RUBBER TRADE IN OHIO

By Our Regular Correspondent

AKRON—FOURTEENTH INDUSTRIAL CITY OF AMERICA

If it were possible, the rubber industry would have been given additional importance in the commercial world by a report of the Akron Chamber of Commerce in which it is shown that Akron, making 65 per cent of the world's tires and at least 40 per cent of all the rubber goods of the world, is the fourteenth American industrial city, with a total industrial output in 1920 of more than $640,000,000, of which more than three-fourths was of rubber goods.

Philadelphia, for instance, with a population nine times that of Akron, produced only slightly over three times as much as was produced in Akron in 1920. Detroit, with five times the population of Akron, shows an industrial output of only two and one-third times that of Akron.

In Ohio, Akron ranks third in the list, although Chamber of Commerce officials have expressed the opinion that if the Cincinnati figures were accurately available it would be found that Akron outranked it.

The growth of the automotive industry during the past ten years is also apparent in the Akron industrial figures. In 1915, the first year for which figures were available, the total output amounted to $156,000,000, and the pay-roll of the industries amounted to little more than $25,000,000. The output as shown by the table last year was $640,000,000 and the industrial pay-roll amounted to $145,000,000.

These figures include all industries, but during that period the rubber industry has become so predominant that the increase is really indicative of the rubber industry growth. In 1910 a total of 23,000 were employed in the Akron factories.

RUBBER MEN OPPOSE TARIFF

E. G. Wilmer, president of The Goodyear Tire & Rubber Co., sent a telegram to Ohio senators, stating that the prohibitive tariff on foreign merchandise will work a hardship upon American companies who are making strenuous efforts to obtain a foothold in foreign fields. This telegram was the first expression from any of the leaders of the Akron rubber industry against the proposed tariff. Most of the rubber men in Akron, although regarded as Republican in their sentiment, are said to have privately expressed themselves as of the opinion that prohibitive tariffs would react by closing foreign markets to American goods.

The matter of foreign trade has assumed large proportions in Akron during the past year, as is shown by the number of Akron rubber company representatives who have gone abroad and the manner in which meetings regarding foreign trade are attended.

MAKE RECORD IN HEEL PRODUCTION

The production of rubber heels during the past year was the largest in the history of the Akron rubber industry. More than 100,000,000 pairs of heels were produced in Akron during the twelve months. The Miller Rubber Co. led all other companies with production of 40,000,000 pairs. Goodyear came second with 30,000,000 pairs and Goodrich, it is estimated, produced approximately 22,000,000 pairs. The smaller companies made up the remaining 8,000,000 pairs. One pair of heels was produced for every man, woman, and grown child in the United States.

These heels applied at the average Ohio prices cost the American people approximately $60,000,000 during the year, it is estimated. The June heel production at Goodyear was 3,500,000 pairs.

Although definite figures have not been given out, the sole business increased materially during the year. The Goodyear Tire & Rubber Co. alone received early in June one order amounting to 440,000 from a chain store company in the East.

AMERICAN TIRES STIMULATE EUROPEAN MANUFACTURERS

E. M. McIntosh, of The Goodyear Tire & Rubber Co., after a fourteen-month survey of European tire and automotive conditions, states that the American straight-side pneumatic tire is winning favor with the Europeans and that the tire business on the Continent is being revolutionized.

The sale of the American trucks and automobiles taken over with the American army has publicized the American pneumatic tire in Europe and formed the opening wedge in what has heretofore been largely a solid tire field. The Europeans saw the advantage both in comfort and in the preservation of the highways of using the pneumatic tire and rapidly arrangements are being made to change from solids to pneumatics.

European tire manufacturers, like Dunlop, of England, Michelin, of France, and the large German tire factories, including the Continental, are also preparing to enter the pneumatic field as never before, and it is only better selling methods and leadership in the industry which will make it possible for America to obtain a share of the business. Molds are being made for the new European pneumatics and fabric is being purchased in such quantities as the exchange and economic conditions permit, so that large numbers of the pneumatics can be produced.

With the transition from the solid to the pneumatic tire an entirely new field for the sale of repair machinery, service stations, jacks, gages and the other accessories which go with the pneumatic tire business is opened for the American manufacturer. These tools and accessories are not yet available on the Continent and the Europeans are looking to America to furnish these supplies.

Several well-known bus lines, both in London, England, and Paris, France, which heretofore operated on solids are changing to pneumatics.

AKRON NOTES

The American Rubber & Tire Co., Akron, has been successful in its first effort to branch out from the manufacture of tires and tubes by making a bathing shoe of novel design. The first shoe was produced six months ago and from the first it was a success, with the result that orders are coming in rapidly. The management is exceedingly conservative and refuses to advertise, depending entirely upon salesmen and repeat orders from dealers. At present the factory is operating on a normal production basis. The company recently sold $600,000 worth of preferred stock which made other financing unnecessary.

Officials of The Goodyear Tire & Rubber Co., from both the Los Angeles and Canadian factories, conferred with the new management during the second week in July regarding a general speeding up of the branch factories. The economies which have been put into practice in Akron as well as the new efficiency plans were discussed with the out-of-town officials.

C. T. Crudington, a member of the Goodyear News Service, has been transferred to the sales department as a general line salesman. He will work out of Council Bluffs, Iowa. He was formerly editor of *Goodyear Tire News* for Goodyear dealers. Harold King, of the sales force, will edit the *Triangle*, published for Goodyear salesmen.

The recuperation of The Goodyear Tire & Rubber Co. is the result primarily of "hard work," according to L. C. Rockhill, sales manager.

"If our recuperation is exceptional, as is stated in many quarters, it is because every man working for Goodyear felt that only by 'buckling down' and producing the maximum result from every ounce of effort could pull Goodyear through.

"It was necessary to reduce the sales force together with other departments during the last of 1920 and the early part of this year, and those men who remained knew that upon them depended the future of the company. And they have produced nobly."

Formerly it required one man a day to produce one tire. This was the universal production rule, at least in Akron. But today not only has this ratio been lowered at Goodyear but throughout the industry here. Actual figures regarding men employed in the factories cannot be obtained but it is reported that the 25,000 tires a day being made by Goodyear are produced with almost half of that number of men. In 1920 it was well known that the company was producing 31,000 tires a day with approximately the same number of men.

John Henry Vance, power engineer of The B. F. Goodrich Co., has been elected president of the Akron Engineering Society. H. S. Morse, of the employment department, former city service director, was also a candidate for the office.

Among the rubber officials who have returned from extensive trips to European countries are Dr. W. C. Geer of The B. F. Goodrich Co. and V. L. Brogneaux of the foreign department of The Goodyear Tire & Rubber Co. Dr. Geer visited England and France. Mr. Brogneaux, in a statement given out by Goodyear, said that one of the greatest handicaps in Belgium for the sale of tires and automobiles was the lack of gas filling and repair stations, but that indications are that the future will see Belgium develop as a user of automobiles.

The Goodyear Tire & Rubber Co. early in July received an order for 38 kite balloons and three dirigibles from the Government. It will require the better part of a year to complete the order. The interest shown by the new management in aircraft business is taken as an indication that efforts will be made to keep the company in the forefront of the air transportation industry. Goodyear is one of the few companies which can build completely and test on its own property all varieties of lighter than air craft.

C. P. Raney, formerly assistant manager of the Miller Tire Repair School since June, 1919, has accepted a position as Akron branch manager for the Western Rubber Mold Co., Chicago, Illinois, succeeding L. W. Bourland. The Akron office has been removed from 847 South Main street to 15 North Summit street. Mr. Raney has had nine years' experience in the rubber industry, as tube inspector, department foreman and industrial engineer for a large tire company.

C. E. Wagner, export manager for The Miller Rubber Co., Akron, Ohio, recently returned from a trip to Mexico City. He reports that Frank Gamundi, manager of the Miller company's Latin-American division, is calling on the trade in Porto Rico and Cuba.

Burt A. Waltz, for the last two years chief engineer for The Portage Rubber Co., and formerly with the Osborn Engineering Co. and The B. F. Goodrich Co., all of Akron, has accepted an indefinite leave of absence pending settlement of the Portage company's affairs.

The Goodyear Tire & Rubber Co., Akron, reports an increase of business beyond its expectations. At the Akron factories 25,000 automobile casings and 30,000 tubes are being produced daily, while at the California plant the record is 3,500 for a similar period. Sales to dealers surpass those of last year, while there is an improvement in the number of orders from automobile manufacturers.

L. H. Hopkins, formerly with the W. M. Pattison Supply Co., and F. B. Curran, formerly of the vulcanizing equipment department of the Akron Rubber Mold Co., Akron, have bought The O'Neil Tire & Rubber Co., 350 Bowery street, Akron, and will officiate as president and vice-president, respectively. The company is now building the O'Neil line of tire equipment exclusively.

A group of Ford Motor Co. dealers from Cleveland visited the Firestone Tire & Rubber Co., Akron, early this month. J. M. Bushey, manager of the Firestone branch in Cleveland, and K. D. Sheldon, Cleveland manager for the Ford Motor Co., piloted

the visitors through the plant and later through the Firestone Steel Products Co. plant. H. S. Firestone, president of the company, welcomed and accompanied the group through the factory.

CLEVELAND NOTES

The Cleveland Rubber Clearing House Co., 2006 East 46th street, Cleveland, Ohio, has been appointed distributer for Erie cord tires throughout northern Ohio. The officers are: Fred Dettling, president; J. D. Fackler, secretary, and J. C. McHannan, treasurer.

The National Tire Dealers' Association will hold its second annual convention at Cleveland, Ohio, from October 18-20. A special feature of the meeting will be a Tire and Accessory Show, arranged under the direction of R. F. Valentine, vice-president of the Association.

Newton D. Baker and E. S. Griffiths have been appointed receivers to continue the operation of the property of the Ideal Tire & Rubber Co., Cleveland, Ohio, by order of the United States District Court for the Northern District of Ohio. Eastern Division. No allegation of insolvency has been made and internal dissensions and business obligations are said to be the basis of the receivership action. The output has been increased under the direction of the receivers.

MISCELLANEOUS OHIO NOTES

The Mason Tire & Rubber Co., Kent, Ohio, has appointed E. W. McCreery manager of pneumatic tire sales and H. C. Geer manager of solid tire sales. Mr. McCreery has been eastern district manager for two years and Mr. Geer has been a special representative of the company in the solid tire department.

The Akron Universal Tire & Rubber Co., Medina, Ohio, has acquired the entire equipment of the Superfix Rubber Co., formerly at Elyria in the same state, and is now manufacturing "Superfix" rubber-fix in quantity. This company has also absorbed the Keck Manufacturing Co., West Unity, Ohio, and will manufacture the Keck safety tire boot, described elsewhere in this issue. The officers of the Akron Universal company are: C. R. Baker, president; R. E. Kimmell, vice-president; R. J. Hyde, treasurer, and E. J. Schwartz, secretary.

Production at The Erie Tire & Rubber Co.'s plant, Sandusky, Ohio, which began under order of court in March, 1921, is being maintained. Incidentally about 20 per cent of the indebtedness of the estate has been reduced through the operation of the receivership up to the present time. At the factory some new equipment is being installed, while building operations, which have been suspended since the latter part of 1920, are now being continued. Julian Victor has left The Cord Tire Corporation, Chester, West Virginia, and become associated with the Erie company.

Three rubber companies at Cuyahoga Falls, a suburb of Akron, have responded to the improved conditions and are either running full, or overtime. The Eclat Rubber Co. is working day and night shifts and its officers are considering the advisability of adding to factory space. The Marathon Tire & Rubber Co. is doubling production by increasing working forces and the Falls Rubber Co. has gone to full time.

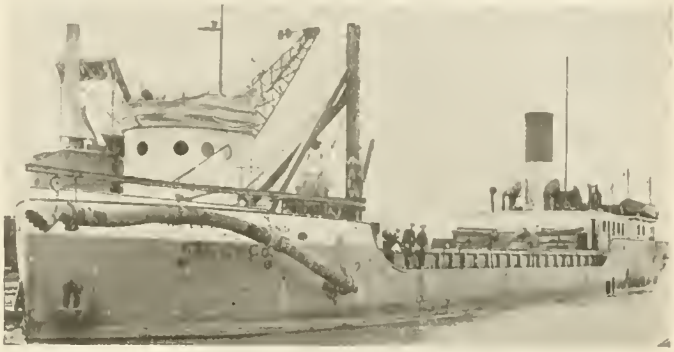
The Eclat Rubber Co. of Cuyahoga Falls, Ohio, early in the month shipped more than 400,000 radiator hose connections to the Ford Motor Co. It was necessary to operate the factory on a three shift basis and on holidays to complete the shipment in time.

REPUBLIC RUBBER CO. RESUMES PRODUCTION

C. H. Booth, who was recently appointed receiver of The Republic Rubber Corporation, Youngstown, Ohio, is also vice-president of The Republic Rubber Co., of Youngstown, and The Knight Tire & Rubber Co., of Canton. Mr. Booth reports that factory operations at the Republic plant in the manufacture of pneumatic tires, tubes and solid tires were resumed July 11, while in the departments for manufacturing mechanical goods work was again undertaken July 18. Operations, it is said, will continue for the present at about 25 per cent capacity.

SAND SUCTION HOSE

Pumping sand and gravel from the bottoms of rivers and lakes has developed into an industry of magnitude. All along our navigable rivers and the Great Lakes are boats which constantly requisition the bottoms of these streams and lakes for their cargoes. The sand and gravel is sucked up by big pumps through



Sand Sucker Fitted with 30 Feet of Goodyear 15-inch Suction Hose

a large suction hose. This hose is usually so large that it has to be made and joined together in sections, usually about ten feet long.

The boat in the illustration is the "Kelley Island," one of the sand fleet of the Kelley Island Lime & Transport Co., Detroit, Michigan. The boat has a carrying capacity of 900 cubic yards and requires about three hours for loading. Last season 216 cargoes were loaded through the big suction hose.

WHEELS MADE OF ALL HARD RUBBER

Wheels made throughout of "Garbonite," a new hard rubber, are claimed to be superior to wheels of wood and metal. They are made with rubber tires as an integral part of the wheel, which therefore cannot crack or come off. "Garbonite" wheels are supplied in any diameter from one inch upwards, and if required for heavy weights are bushed with steel or phosphor bronze. These wheels are being used for railroad platform trucks, electric platform wagons, every description of truck, wheelbarrows, hand carts, motor scooters, auto scooters, wheeled toys and extension ladders. They are being tested on motor cars and lorries with excellent results. Castors for bedsteads, furniture, pianos, cabin trunks, etc., are also being made of "Garbonite."—*The India-Rubber Journal.*

THE RUBBER TRADE IN THE MID-WEST

By Our Regular Correspondent

MID-WEST RUBBER MANUFACTURERS' ASSOCIATION

The regular monthly meeting of the Mid-West Rubber Manufacturers' Association was held July 12 at the Chicago Athletic Association. At this meeting Vice-President W. W. Wuchter presided, while short speeches were made by various members, including E. O. Sessions, of the Sessions Engineering Co.; L. A. Vaughn, of the Vaughn Machinery Co., and Sydney J. Roy, of the Hannibal Rubber Co.

As the Chicago meetings have met with such success it was proposed that regular monthly meetings be held at Omaha, St. Louis, Indianapolis, and other centrally-located cities. Mr. Roy advocated this plan, which was seconded by Mr. Sessions. The matter will undoubtedly come up for continued discussion at the August meeting when a large attendance is expected, as during that week the Pageant of Progress will be held in Chicago.

MISCELLANEOUS MID-WESTERN NOTES

The Link-Belt Co., Chicago, Illinois, has acquired all of the capital stock of the H. W. Caldwell & Son Co., and Frank C. Caldwell has been elected a director of the former company. Two experienced and successful companies in the conveyor world have thus joined forces, with the result that the Link-Belt Co. has added two new lines, helicoid conveyors and power transmission machinery, to its line of manufactures.

While there will be no changes in the product of the Caldwell plant, and no modifications in the policy of the company, it was believed that a consolidation of these two well-known firms would result in advantages to both. The management of the Caldwell plant is practically the same as formerly.

The Burdick Tire & Rubber Co., Chicago, Illinois, has placed with the Fort Dearborn Trust & Savings Bank, trustee, and James S. McClellan, co-trustee, a mortgage of $250,000 on its factory to cover an issue of first mortgage 8 per cent gold bonds to raise additional funds for increasing capacity and for operating expenses. H. G. Steinbrenner is president and F. E. Teachout is vice-president and general manager.

In order to avoid confusion with other companies having a similar name, the Independent Tire Co. has changed its name to The Better Tires Co. and is located at 2023 South Michigan avenue, Chicago, Illinois. The company acts as a jobber to distribute high-grade tires, tubes and accessories to small dealers in towns of less than 5,000 population where it is difficult and unprofitable for the average manufacturer to send a traveling salesman. The concern deals in "firsts" only and has built up a clientele of 4,500 small-town and rural dealers.

The Wildman Rubber Co., Bay City, Michigan, has contracted for the first unit of its new plant and will rush the building to completion at the earliest possible date.

The Altenburg Tire Equipment Co., Davenport, Iowa, has reorganized with V. D. Sears as president and sales manager; R. P. Hayes as vice-president and general manager. The new plant on Rockingham Road at the west end of the city has good railroad facilities and room for expansion. It is one of the most modern in the country, being well-lighted, and of steel frame, brick wall construction. The machine shop has two floors, the lower being used for large production machinery and the second for light assemblies, pattern shop and general office. The foundry is a complete unit with cupola and core ovens. All the buildings have concrete tile roofing and are fireproof. The principal product of the plant will continue to be tire-building and tire-repair equipment.

The Non-Breakable Button Corporation, 200-210 Pleasant street, Milwaukee, Wisconsin, recently incorporated, manufactures high-grade rubber buttons and novelties. The buttons are non-breakable and are not affected, it is claimed, by the laundry wringer, mangle, electric iron, hot water and acids, soaps and soap powders. The thread cannot cut the button-hole, nor will the button-hole cut the thread. The buttons will be made at first in white and khaki in four sizes. The equipment installed will produce 360,000,000 buttons annually. Details concerning incorporation are given elsewhere in this issue.

The George G. Bryant Co., manufacturer of top coats, gabardines and rain coats, has removed to 134 Second street, Milwaukee, Wisconsin. This firm is the western agent for the "Bestyette" products of the New York Mackintosh Co., New York, N. Y.

ACTIVITIES OF THE MOTOR AND ACCESSORY MANUFACTURERS' ASSOCIATION

This year's credit convention of The Motor and Accessory Manufacturers' Association will be held in Detroit, Michigan, at Hotel Statler, September 14-16, inclusive. E. H. Broadwell, president of the Association and vice-president of The Fisk Rubber Co., will preside, while there will also be speakers of national importance from the automotive industry and from industrial, banking and governmental circles. Details regarding the program of the coming convention will appear later.

Following the organization of the Sheet Metal Manufacturers as its first unit, a new group plan of the Association is now under consideration. Under this arrangement the four hundred companies now affiliated with the Association will be divided into a number of groups, each comprising manufacturers of the same products, and each having officers and meetings of its own, but for general purposes affiliated with the parent organization.

It is believed that the establishment and centralization of these groups, based on the classification of the products they manufacture, will make for a greater unity of purpose in the direction of economies of production and distribution, thus eliminating duplication of effort and expense.

THE RUBBER TRADE ON THE PACIFIC COAST

By Our Regular Correspondent

Warmer weather along the Pacific Coast recently has had but little effect on the demand for various kinds of mechanical rubber goods, orders being well sustained. This is due largely to the continued activity of building operations, most of the large cities making a much better per capita showing than the eastern cities. A lull in labor troubles, and the prompt settlement in the Northwest of several incipient strikes over wage reductions having a salutary effect on trade in general, a good inquiry is reported for rubber and balata beltings, sheet packing, asbestos-rubber brake and clutch blocks, steam, air, garden, and oil hose, rubber footwear, soles, heels, surgeons' and druggists' hard and soft rubber goods, acid and cement workers' gloves, automobile top fabrics, and miscellaneous hard rubber articles. Sales of tires and tubes continue to mount in number, and the lively demand and well-sustained prices impel the makers to predict a good trade in both automobile staples until well toward the end of the year.

LOS ANGELES AND VICINITY

A fair index of the trend in the tire trade is afforded by the operations of the largest factory on the Coast, the Goodyear Tire & Rubber Co. of California, at Los Angeles. The factory's July schedule was set for 3,500 tires and 3,700 tubes a day, or an increase of 375 per cent since last March. In March the rubber and textile mills employed only 465 people and the tire output fell to 735 daily, but in the month just ended 1,250 were at work in the mills. Although June, 1920, had been considered one of the peak months for the California company, with a total of 32,654 casings sold to dealers in the western territory, June, 1921, showed sales of 42,266 casings, or an increase of 13,612.

Another comparison may be made with the total sales for the fiscal year ended July 1, 1920, of 291,666 automobile tires as contrasted with total sales for the year ended July 1, 1921, of 348,992 tires. The gross sales for June, 1921, of automobile and truck tires, mechanical goods, accessories, and repair materials, reached over $1,300,000.

The Goodyear Textile Mills, operated in conjunction with the rubber plant, had a production schedule for July of 200,000 pounds of fabric, for August 250,000 pounds, and for September 270,000 pounds. From August 1, 1920, to June 30, 1921, the mills produced 1,252,489 pounds of fabric and used 3,108 bales of long-staple cotton, valued at $966,000, all the cotton coming from the Salt River Valley, Arizona, and the Imperial Valley, California.

Vice-president and general manager A. F. Osterloh, sales manager J. R. Reilly, treasurer W. A. M. Vaughan, and factory superintendent C. Slusser, of the California Goodyear plant, have been attending a conference at Akron, Ohio, called by E. G. Wilmer, president of the parent company, to consider increasing production. Mr. Reilly estimates the value of sales for the three months ending September 30, next, at $4,250,000.

Another cut in Goodyear tires in the west-coast states has been announced. The 30 by 3½ single cure clincher tire is now selling at $13.95.

The Owen Tire Co., Cleveland, Ohio, is reported to be negotiating for a site for a Pacific Coast branch factory, at which not only tires and tubes but also tire fabric will be manufactured. W. C. Owen, president of the concern, has been in touch recently with Los Angeles interests concerning the project, and it is said that if satisfactory arrangements can be made, a plant investment of $1,000,000 is likely to be made and employment probably given to 2,000 people.

The Daly Company, Inc., 1027-1029 Santa Fe avenue, Los Angeles, is about to establish a branch factory in Detroit, Michigan, for the Daly Simplex rim, which is being made a part of standard equipment on many well-known makes of automobiles. The manufacturers claim that tire changing, usually an irksome task, is made very easy with their new rim, a tire being removed and replaced in the rim in fifteen minutes by pulling a lever; and that old rims can be readily fitted with the new device.

Rubber manufacturers on the coast are much interested in a report that a very large concern is about to be established, possibly at Los Angeles, for the weaving of sheetings, Osnaburgs, and other textiles from southwestern long-staple cotton. A survey of coast trade conditions, with a view toward the setting up of such an industry, has been made recently by William R. Berryman, of New York, who is said to represent large textile interests.

The California Wire Co., of which Louis Koth, formerly manager of the Illinois Wire & Cable Co., Sycamore, Illinois, and now a resident of Orange, California, is president, has been formed with $200,000 capital to manufacture rubber-covered electric wire and cable. The plant, which will be at Orange, near Los Angeles, will cover 2½ acres and employ a large force. It is said to be the first insulated wire factory of its kind west of the Mississippi. Fred H. Alden, formerly sales manager for the Sycamore concern, will have charge of the new company's sales. Codirectors with Mr. Koth are F. W. Struck, F. A. Grote, William King, and W. C. Matthias.

SAN FRANCISCO NOTES

The appointment of George L. Hurst as the Pacific Coast representative of the Birmingham Iron Foundry, Derby, Connecticut, has been recently announced. Mr. Hurst has had a wide experience in the matter of designing, constructing, and selling machinery and will handle the well-known products of the Birmingham Iron Foundry at the San Francisco offices, 544 Market street.

The Mason Tire & Rubber Co., Kent, Ohio, is opening a new sales office on Van Ness avenue, San Francisco. R. D. Thomas, a well-known San Francisco man, has been placed in charge of this branch, with Henry Suersted, formerly of the Republic company, as his assistant. A complete stock of tires and tubes will be carried, while the modern equipment now being installed will afford car owners expert service.

SOUTHWESTERN NOTES

William McCallum, of the Continental Rubber Co. of Arizona, recently inspected the guayule rubber plantation at University Farm at Davis, California, and found the young plants in a flourishing condition. Other guayule demonstrations are being made near Escondido in San Diego county and in the Salinas Valley, and good progress is being made in both places, it is stated. The Continental company has two commercial plantings of guayule transplanted from Mexico, one of 200 acres, near San Jacinto, California, and the other of 600 acres, near Continental, Arizona, and both are developing well, it is said. The latter is expected to be yielding rubber within a couple of years.

What is giving the tire men considerable concern is the shortage that looms in the supply of cotton. Last year the cotton acreage in Arizona was 165,000, but this year it is scarcely 50,000, the farmers who produced too much cotton last year having turned to diversified crops as involving less hazard. Local and Los Angeles banking interests have arranged to finance the 1921 crop after getting assurance of greatly reduced acreage.

Recent estimates give the total amount of cotton stored in the Yuma and Salt River Valleys, Arizona, and the Imperial and San Joaquin Valleys, California, as 225,000 bales with an approximate value of $22,500,000.

A colloidal clay, said to be similar to, if not identical with, a mineral substance much used as an accelerator by English rubber manufacturers, has been discovered in the Mojave Desert in the eastern part of California. The California Master Products Co., of Slauson avenue and Alameda street, Los Angeles, has taken title to 500 acres and has set up a plant on the desert to mine the clay, which is also being used in soap making. The president of the concern is L. F. Caswell.

The India Tire & Rubber Co., Akron, Ohio, has opened a direct factory warehouse in Dallas, Texas, where a supply of all rubber products, including a complete line of giant pneumatic truck tires, will be constantly kept in stock. Harry L. Corbett, formerly with the Norwalk Tire & Rubber Co., will be in charge of this new distributing warehouse. C. V. Moore and J. Y. McKinney, also previously associated with the Norwalk company, and L. G. Trench will act as Mr. Corbett's assistants.

NORTHWESTERN NOTES

The Portland Rubber Mills has changed its name to the Huntington Rubber Mills, with address at 1580 Macadam street, Portland, Oregon.

The largest tire repair shop in the Pacific Northwest, the only one featuring a drive-in, and the most completely equipped in the territory, are the claims made for the new home of Coffey & Conway, 27 West Park street, Portland, Oregon, by Ray Conway, head of the concern and president of the Portland Rubber Workers' Club. The two stories of this building are fitted up with the latest improvements, while the equipment is modern in every respect.

BUS LINES SHOW PROFIT

The following figures were compiled from accurate cost records of operating the Goodyear Heights bus line by the Goodyear company and cover a period of 37 months ended December 30, 1920.

During the 37 months under consideration a total of approximately 4,500,000 passengers were carried at five cents each. Net profits are figured at $23,991.10 or $.0052 per passenger. Total revenue is given at $237,846 and total operating expenses at $213,865.

Cost of Operating

	Totals	Per Bus Mile
Gasoline	$28,514.34	$0.0475
Lubrication	6,678.49	.0115
Tires	32,960.07	.056
Drivers' wages	53,733.75	.0914
Maintenance, labor and materials	27,086.00	.046
Miscellaneous expenses, including administration	17,109.57	.029

Insurance, public and liability, cost $6,613.26, garage rent, $2,-114.32, and licenses together with interest on investment at 6 per cent amounted to $6,433.96. The total profit per passenger is given in the report at $.0052 and the total cost at $.0448 per passenger.

The company started with an investment of $6,075 and the total investment for the three years amounted to $90,838. Depreciation charged to operation amounted to $32,620 and depreciation charged to investment amounted to $49,645. During 1918 the bus equipment was in use 91.5 per cent of the available time, in 1919, 65 per cent, and in 1920, 46 per cent of the time.

TIRE FACTORY REPAIR SCHOOL

An advantage that tire-repair concerns in the Southwest appreciate is the training school conducted by the Goodyear company at its works in Los Angeles and now about a year in operation. Such excellent training do the students receive that they find good-paying jobs without trouble. Tuition is entirely free, and the minimum course is three weeks, in which time the students learn how tires are made, why they get damaged, the use of tools and repair material, how to fix sand-boils and tread-cuts, how to do lay-back repairs, mend blow-outs, fix injured beads and sidewalls, do retreading, relining, tube and casing sectional repair, how to handle cord tires, how to manage a vulcanizing apparatus, etc., practical working conditions in a first-class repair shop being fairly duplicated.

Tire Repair School in the Goodyear Factory at Los Angeles.

The aim of the manager of the school, J. R. Wells, is to fit the graduates not only for employment with others but also to set up business for themselves. Classes start every Monday morning, and the enrollment is steadily increasing, many of the pupils coming from several hundred miles distant, and the majority attaining remarkable proficiency in a very short time.

THE GREGORY TIRE & RUBBER CO., LIMITED

The Gregory Tire & Rubber Co., Limited, Vancouver, British Columbia, sends a most optimistic report regarding its new plant, where the demand is ahead of the production.

Plant of The Gregory Tire & Rubber Co., Limited

The city of Vancouver presents an encouraging field for the automobile dealer or manufacturer, as the city ranks second among Canadian towns for the number of cars used, while the climate permits the running of cars the year round.

A note regarding the new Gregory plant, with the names of the officials of the company, appeared in The India Rubber World, May 1, 1921.

NEW TYPE REMOVABLE TRACK UTILIZES RUBBER BELTING

Previous attempts to use caterpillar tracks have been ordinarily confined to low-speed agricultural purposes, where high speeds were difficult to maintain, due to wear upon the track itself. A type recently developed has attained a maximum rate of 37 miles an hour on good roads, the highest speed, so far as is known, yet reached by a track-laying type of vehicle.

The equipment was developed for the Tank, Tractor and Trailer Division of the Ordnance Department, Washington, D. C., by A. M. Chase, who is in charge of its Syracuse engineering office. In this new device, for use with a Ford car, each track consists of two rubberized fabric belts which are connected by steel stampings riveted to the belts, the ends of the stampings being turned over to form a guide into which the tires fit.

In addition to the regular wheels of the car there are provided four extra ones, two on each side, of the same size as the regular wheels and located between the front and rear regular wheels. These extra wheels serve as carriers, the track under the regular wheels being normally off the ground. Standard regular 3½-inch pneumatic tires are used, and after 1,300 miles of operation, under conditions which would have damaged the tires of a regular Ford car, the tires and fabric track appeared in excellent condition. For travel in deep snow, over plowed ground or in deep mud, a commercial auxiliary transmission, which doubles the gear reduction, is introduced in the drive-shaft, directly in front of the rear axle housing. For operation on improved roads the regular Ford ratios are used.—*Automotive Industries.*

U. S. Ordnance Department.

The Chase Caterpillar Track

FULL TIRE INFLATION IMPORTANT IN SUMMER

Tires should be inflated to the same recommended pressure in summer as in winter. The expansion of the air in tires, even in the hottest weather, is so slight that it should be entirely disregarded. Experience shows that most of the heat generated in a tire is due to the internal friction of constant flexing, and increases with the degree of underinflation. By reducing pressures, the increased flexing of the tire creates the very condition which the car owner wishes to guard against.

A test made on a 5-inch cord tire run at 30 miles an hour for two hours at the standard 70 pounds air pressure, with the temperature of the air 62.6 degrees F., increased the temperature of the tire to 86 degrees and the pressure to only 75 pounds. For 23 degrees increase in temperature, pressure increased only 5 pounds. To obtain an increase of 15 pounds pressure, it would be necessary to have a temperature increase of 70 degrees over normal. This, of course, is improbable and clearly proves that the motorist has little to fear from increased temperature. Other tests have shown that it is possible to double this increase in temperature by cutting the normal inflation pressure in half.

The International Rubber Exhibition

The Fifth International Exhibition of Rubber, Other Tropical Products and Allied Industries, was opened in London, June 3, by Sir Owen Phillips, G. C. M. G., M. P., in the presence of a large and distinguished gathering representative of all parts of the British Empire and many foreign countries.

EXHIBITION MARKED GREAT ADVANCES

The exhibition drew a large and interested attendance of spectators each session. In addition to the display of standard crude rubbers, manufactured products and rubber-making machinery, chemicals and ingredients, the notable feature of the exhibition was the marked advancement in processes and products since the last exhibition, notably gas-cured and gas-filled rubber, the rapid preparation of crude rubber from latex, and rubber flooring.

THE PEACHEY PROCESS

Prominent among the new developments was the gas cold cure of the Peachey Process Co., Limited, explained by Messrs. Peachey and Herring-Shaw. Fabrics and other rubber products cured by this process elicited much enthusiasm from the visitors to the exhibit, which was one of the popular attractions of the show.

EXPANDED RUBBER

The display of expanded rubber product made by Onazote, Limited, was also a center of great interest. The material known as "Onazote" is a remarkable new development in rubber foam expanded with nitrogen gas under a process patented by C. L. Marshall. The material is considered to have great possibilities in its applications, due to its structure and internal gas pressure. Among the more obvious of these uses are floats for various purposes, padding and cushions for seats, balls, tire-filling and floor-covering. In the latter use a good thickness of the expanded rubber is provided between two substantial skins, which take the abrasive wear.

"The Rubber Age," London.

General View of the Exhibition

RUBBER FLOOR COVERING FEATURED

Throughout the exhibition and, in fact, throughout the trade today, there is evidence of a great revival of interest in applications of rubber floor-covering. The North British Rubber Co., Limited, are the pioneers of rubber flooring in roll form. Their "Paraflor" rubber flooring is a most attractive article and, wearing quality considered, it compares favorably with linoleum in price. The Peachey Process Co., Limited, showed fine samples of rubber flooring in colors produced by their curing process.

Rubber tiling, with slots and keys, on a new interlocking principle, was shown by the United Dutch Rubber Works, Limited.

CRUDE RUBBER PROCESS

The Davidson process of manufacturing crude rubber from latex was demonstrated by working models of the complete plant. Rolls of perfectly dry rubber were produced from the latex in 25 minutes from start to finish of operations.

A special preservative known as "Siroxidine" is employed to preserve the fresh latex in fluid condition for an indefinite length of time. Should a big demand develop for crude latex in Europe or America, there would apparently be no diffculty in shipping it in tank steamers for further treatment by the special coagulant and machinery comprised in the process.

BRAZIL'S EXHIBIT

Prominently displayed on the splendid stand occupied by the Government of Brazil was the following notice: "Rubber production being absolutely unprofitable at present prices, Pará and Amazonas are changing over to other production, as timber, vegetable oils, tanning and coloring materials, besides nuts and cocoa, which always formed an important item in the Amazon exports."

The Brazilian exhibit as a whole was one of the most attractive in the exhibition. Particular admiration was evoked by the collection of native Brazilian timbers.

PROMINENT EXHIBITORS

Among the prominent American exhibits was that of the Hunter process of conditioning rubber, which employs the natural element of humidity in combination with the proper temperature in circulation, shown by Francis Shaw & Co., Limited, Manchester, England. This company specializes in plantation and rubber manufacturing machinery, and is the British representative of the Hunter Dry Kiln Co. As this simple and practical method of improving the compound attracted so much favorable attention, its adoption in a number of British plants will probably follow.

North British Rubber Co., Limited, Castle Mills, Edinburgh, made a most attractive show of its general line, including mechanical goods, footwear, clothing, sporting, air and surgical products. Distinctive and popular features of this exhibit were the "Paraflor" rubber carpeting and the "Clincher" golf balls, both of which attracted a great deal of attention. It was, beyond any question, one of the most comprehensive and effective exploitations of the show.

Pirelli & Co., Limited, the prominent Italian manufacturer of electric cable, india rubber, gutta percha products and pneumatic and solid tires for motor cars, cycles, etc., made a most effective show, which, by the way, also included mechanical and surgical goods as well as clothing and sporting effects.

The "Pirelli" solid twin tire on one band was the subject of much interest. It is built up with an open V to prevent stones, etc., from being caught up and embedded in the rubber. The two tire sections are designed to take the camber of the road.

An interesting exhibit was that of Alfred Smith, Limited, Clayton, Manchester, who exhibited its lines of substitutes and accelerators. "Velosan," one of the company's prominent specialties, is in active request among rubber manufacturers every where. Alfred Smith, Limited, was established in 1856.

Typke & King, Limited, had a very attractive stand in which were exhibited the company's various lines of antimony sulphides, substitutes, mineral rubber and a general line of compounding ingredients used in rubber manufacture. The "T & K" trademark is accepted as a quality standard among rubber manufac-

turers all over the world, and has been so regarded for nearly half a century.

Among the prominent producers of reclaimed rubber exhibiting was the North Western Rubber Co., whose product is of international repute and in active request where rubber manufacture is an important industry.

Shortly before the close of the exhibition the trophies, medals, and other prizes were presented to the winners by Professor Wyndham R. Dunstan, president of the exhibition. A complete report of the awards will be published in a forthcoming issue.

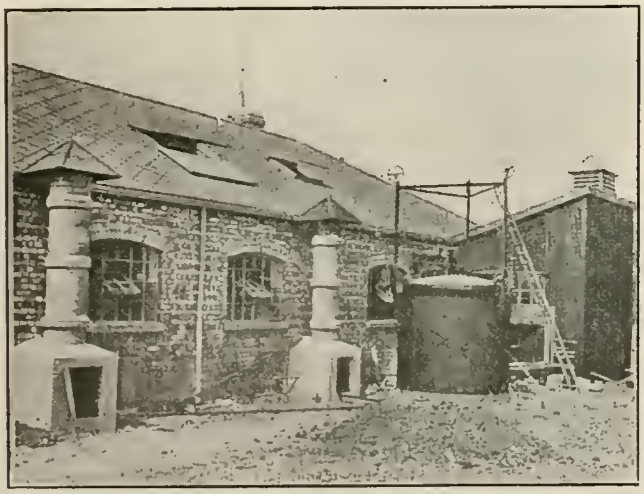
PEACHEY PROCESS DEMONSTRATION PLANT

An experimental plant and laboratory has been installed by The Peachey Process Co. at 380 Highroad, Willesden, London, N. W., and it is now in successful operation for the demonstration of the process in all its adaptations. The process was made one of the features of the recent Fifth International Rubber Exhibition in London.

The Willesden plant is equipped with mixing and calendering machinery, stationary curing pans and a series of vertical chambers for continuous curing of material in long lengths. As is well known, the process effects vulcanization without heat or pressure by exposing the rubber, first to sulphur dioxide gas, and then to hydrogen sulphide. The former is purchasable in liquid form in steel cylinders. The latter is made in a gas-producing plant on the premises from iron sulphide and hydrochloric acid and stored in an oil-sealed gas holder.

OPERATION OF PROCESS

The process as applied in the stationary pan consists in placing the articles on wooden racks in the pan, which is then tightly closed. Separate inlets are provided for the admission of each gas to the pan, and an outlet connected with an absorber outside the plant. To effect the cure sulphur dioxide under the required pressure is admitted to the pan for ten minutes to saturate the rubber. The excess gas is then expelled by compressed air,

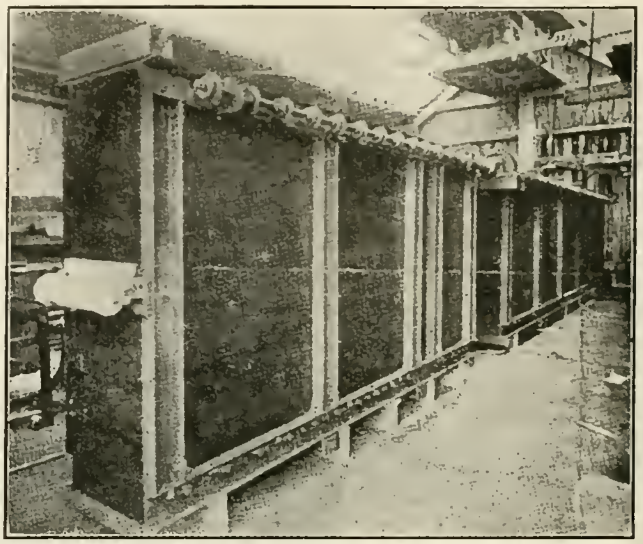


View of Gas Absorbers

and hydrogen sulphide is admitted and held for 30 minutes to finish the process of curing, no heat or extra pressure being required.

CONTINUOUS VULCANIZATION

The chambers for continuous vulcanization are so arranged that the rubber-coated materials enter at one end of the apparatus, passing first through a chamber, festooned over rollers geared to run at the same speed to avoid strain on the fabric. The rate of passage through the apparatus is such that during its passage from entrance to exit the rubber is fully cured. The material having been saturated with sulphur dioxide in the first chamber enters the second, or air chamber, to prevent any sulphuring, and then passes through the third chamber similar to the first. Its passage through this chamber is three times as long as through



Apparatus for Continuous Vulcanization

the first, as the chamber is fitted with more festooning rollers. By this means the exposure to each of the gases is properly timed. From the last chamber the fabric is received on a suitable windup roller in a finished condition.

ANNUAL REPORT OF THE STRATHMORE RUBBER CO., LIMITED

The Strathmore Rubber Co., Limited, 46 Charlotte Square, Edinburgh, was incorporated March 27, 1920, taking over the business of the former company of the same name. From the report of this firm for the year 1920 the following items are taken:

The total acreage of the rubber estates in the Federated Malay States is 2,334 acres. The yield of rubber has been satisfactory, and the factories are reported in excellent condition. A substantial part of the year's crop was sold for delivery at Singapore. The acreage planted with Hevea rubber is as follows:

When Planted	Strathmore Estate Acres	Ulu Buloh Estate Acres	Sungei Rawang Estate Acres	Totals Acres
In bearing:				
1906 to 1914........	580	732	....	1,312
Not in bearing:				
1915	....	90	....	90
1916	....	115	207	322
1918-19	....	....	295	295
1919 (Decrease)	....	....	253	253
Total planted..........	580	937	755	2,272
Unplanted area (including building sites, etc.)	4½	50	7½	62
Total acreage	584½	987	762½	2,334

For purposes of comparison with the results obtained by the old company during the previous five years, the following statement of figures is given:

Year	Crop. Lbs. Dry Rubber	Gross Average Price Realized per lb.	Cost of Production, f. o. b. per lb.	Selling Charges, Including Freight and Insurance, per lb.	Administration Expenses, Including Directors' Fees, per lb.	Cost of Production "All in," per lb.	Profit for Year, Before Paying Income Tax.
		s. d.	s. d.	s. d.	s. d.	s. d.	£
1915	367,656	2/7.45	7.60	1.73	.08	10.01	34,063
1916	427,034	2/6.12	6.91	1.49	.78	9.18	38,838
1917	437,403	2/3.19	9.20	1.71	.73	11.64	29.829
1918	349,773	1/9.08	11.20	1.52	.98	1/1.70	12,032
1919	458,908	1/10.16	9.23	1.12	.73	11.08	21,591
1920	473,890	1/6.15	10.15	1.70	.85	1/0.70	11,311

The Rubber Trade in Great Britain

By Our Regular Correspondent

From the Government's reply to the representations of rubber-growing interests in the Far East, it is clear that no imperial assistance or support is to be expected with regard to rubber production control. Like the coal and other home industries, it is obvious that the rubber-growing industry will have to work out its own salvation. Meanwhile, the passing of dividends is a somewhat serious matter to numerous shareholders who bought the shares as investments and it is natural that uneasiness as to the future is widely prevalent. Shares generally are about at their worst and it is difficult to justify any material recovery.

In some of the papers too much is being made of the failure of the United Malaysian Rubber Co., Limited, with liabilities of about £2,000,000. It will be remembered, however, that this is not a rubber-growing company but one of the rubber boom flotations for deresinating jelutong, and was chiefly remarkable for the presence on its board of a Vanderbilt and a Goelet.

COAL STRIKE AT AN END

The coal strike has at last come to an end, though it will be a few weeks before supplies are normal. The lifting of the dockers' ban against handling foreign coal on June 1 led to the immediate discharge of some American coal vessels, chiefly gas coal, at our northern ports, and the arrival of several more cargoes has eased the position appreciably.

It would be foolish, however, to imagine that the end of the coal strike, coupled with the fall in the bank rate, will cause any real revival in the rubber trade. This no doubt will come, but there are no signs of its imminence. With regard to the waterproof trade, the general absence of rain during the first half of the year has added another adverse factor to those already existing.

EFFECT OF THE UNITED STATES TARIFF BILL

The United States Emergency Tariff Bill, as far as its anti-dumping section is concerned, has been somewhat severely criticized on this side by anti-protectional interests. It is all very well to talk about cost of production, sale price and so on, but these are only relative and cannot be closely defined. The opinion has been expressed that the act will either become a dead letter after having served its electioneering purpose or it will put an end to a large volume of trade with the United States.

The fact is that the only reason a country imports any article is that it is cheaper or better than the home-made article and the whole of international trade and exchange rests on this basis. A straight tariff is workable, but one depending on relative and fluctuating prices seems on the face of it to be an absurdity in international trade. Of course, England proposes to do much the same thing and the proposals are meeting with a good deal more opposition in Parliament than appears to have been the case in America.

POSITION OF BRITISH TIRE MANUFACTURERS

With regard to the British tire manufacturers' position a memorandum has been circulated by the Association, drawing attention to the parlous position of the industry, this being largely attributed to the import of foreign, mainly American, tires duty free. It is stated that the capital involved in the industry is about £25,000,000 and direct employment is given to 30,000 work people, many others also being dependent on it in subsidiary industries. It is urged that unless immediate protective steps are taken the future of the industry will be most precarious. It seems to be the fact that the continental business done this year has not been a financial success, owing to the adverse exchanges, while with regard to America where the exchange favors England, the inability of British tire manufacturers to supply cord tires has been against an increase of business.

ONAZOTE

This seems to have attracted a good deal of attention at the Rubber Exhibition on account of its being a complete novelty. With regard to the origin of the name, this may be derived from "ezote," the old name for nitrogen. The substance is an expanded or cellular rubber made under high pressure, and the gas appears to be kept in by a vulcanized external skin of ordinary rubber. It is patented by C. L. Marshall, British patent No. 162,176. Unlike the manufacturers of unburstable balls, Mr. Marshall has patented his invention and the ball manufacturers are in a position to see how near his formula and procedure resemble their own. A company has been formed with the not excessive capital of £25,000 to work the process under license, the new works being situated at 38 Harlesden Road, Willesden Green, N. W. 10.

HARD RUBBER CARBOYS

Among the new goods and specialties referred to in the June issue of The India Rubber World, there is an illustration of a 29-gallon carboy of hard rubber made by a prominent American hard rubber company. It is stated that such carboys have been used successfully for the conveyance of corrosive acids and alkalies, and it would seem that their wider adoption would add to the public safety. There have been at least two cases quite recently in England where a collision has caused carboys of vitriol to be broken and to cause serious damage to people in the vicinity. Although glass has gone up in price and rubber down, it is presumed that the hard rubber carboy would still cost a great deal more than its present competitor, but this is a matter that might right itself where compensating advantages are duly recognized. However, the matter is of sufficient importance to English carboy users to warrant the hope that the publicity given to the new carboy in England is not limited to the circulation of The India Rubber World.

THE RUBBER CLUB OF GREAT BRITAIN

After a good deal more delay than the original promoters anticipated the Rubber Club has been formed, the deciding meeting having been held at the Rubber Exhibition. By the poor response from the trade it was clear that the subscriptions for the different classes of members were considered too high, and it is generally admitted to have been a wise move to reduce them to the following scale: full members (manufacturers) £5/5*s.* 0*d.*; merchant members, £2/12*s.* 6*d.*; associate members, £1/1*s.* 0*d.*; and student members under 21 years of age, 10*s.* 6*d.* These subscriptions will no doubt be considered quite high enough for those who live at a distance from the two proposed centers of activity, London and Manchester.

An eminent rubber chemist whose business premises are located a mile or so away from the Rubber Exhibition mentioned with a tone of regret that H. C. Pearson, and various others who live at a greater or lesser distance, failed to put in an appearance. Londoners do not always appreciate to the full the great advantage they enjoy in having international exhibitions and the headquarters of all societies of importance so easy of access. Compared with their country cousins, they are in a highly favored position and the thought occurs that, to a great extent, the Rubber Club of Great Britain will be the Rubber Club of London as far as attendance at meetings is concerned.

Passing to another topic, it now seems to be openly acknowledged that the leading rubber manufacturers, for reasons I am

unacquainted with, have not sent in applications for membership and it remains to be seen how the project will succeed without their support. Times certainly are bad but this abstention cannot be attributed solely to a desire to save the amount of the subscription and it may be permissible to hazard the conjecture that the altruistic ideals of the promoters have not met with universal acceptance in the minds of business men.

THE PROFITEERING ACT

Although this act is now deceased, interesting sidelights in the conduct of various business are now appearing as the result of the labors of various sub-committees. In contradistinction to what was found in the case of soap, woolen clothing, etc., it is recorded that the rise in prices of the products of the Cable Makers' Association was not unwarrantable under the existing circumstances. As an offset to the fall of 50 per cent in rubber, metals, paper, etc., showed a large rise in price and then, of course, there is labor now about 200 per cent above what it was in 1914. In addition to the Cable Makers' Association, there are the Telephone Cable Makers' Association and the High Conductivity Copper Association, all of whom are in league to a certain extent. The report testifies that they have not abused their monopolistic position though this may be due to some extent to the fact that some old-established firms still remain outside the Cable Makers' Association and can charge their own prices which would appear to be, as a rule, somewhere about 10 per cent below those of members of the Association, the goods, of course, not bearing the special guaranty of the Association.

FIRESTONE'S EUROPEAN MANAGER

Few more romantic situations can be conceived of than that of Colonel Speaks who, a short time ago was traversing the war-torn fields of France in the Quartermaster's Department of the United States Army, but at present is covering the same district as European manager for the Firestone Tire & Rubber Co., with headquarters in London, England.

Charles E. Speaks

In 1915 Mr. Speaks was appointed manager of the Firestone motorcycle tire department, and two years later was made manager of truck tire sales. From this post he went into his country's service and was advanced from captain to colonel in the short span of two years. Attached from the first to the transportation divisions, he was in charge of the operations connected with getting supplies to the troops. Later, as repair problems and depots of supply forced themselves upon the general staff, Colonel Speaks assumed even more important duties, assisting in the rehabilitation of the devastated country.

Following his return to his former position in the Firestone organization, the value of his experience in France was recognized and he has been given important duties in the furtherance of peace-time commerce and will make a study of selling goods in the more important European nations.

RUBBER GROWERS PLAN FIFTY PER CENT REDUCTION

At a recent meeting of the Rubber Growers' Association, 38 Eastcheap, London, E.C.3, England, the following resolutions were carried:

(1) That the revised draft scheme for a "Rubber Producers Corporation" submitted to this meeting be adopted as the proposal of this Council and that the Output Control Committee be empowered to take steps with all speed to secure the support necessary to make the scheme effective, with discretion to make such amendments in the scheme as may be found necessary.

(2) That in view of the imperative necessity for an immediate reduction of output by at least 50 per cent and having regard to the delay which will necessarily ensue before the scheme for a "Rubber Producers Corporation" can become operative the Council recommend all producers of plantation rubber, who have not already done so, to take the necessary steps to bring such reduction of output into effect immediately.

THE RUBBER TRADE IN EUROPE

By a Special Correspondent

FRANCE

The Société Commerciale du Caoutchouc, Paris, reports that net profits for 1920 were 670,864 francs against 853,036 francs the year before. A dividend of 8 per cent was proposed as compared with the dividend of 15 per cent for 1919.

Etablissements Isol, 78 rue de Wattignies, Paris, is a new firm which will manufacture and sell all kinds of insulating materials, including those with a base of rubber, particularly molded goods in soft or hard rubber. The capital has been fixed at 700,000 francs. The first directors are Henri Lejeune, Romano Scheu, Maurice Abenheimer and Edouard Moreau, all of Paris, and Jacques Mirault, of Chatillon-sur-Indre (Indre).

Under the name of Herteaux et Cie., a new company has been formed with headquarters at 17 rue Lannois, Levallois-Perret, to manufacture and represent all kinds of rubber goods for automobiles. The capital is 200,000 francs.

P. Lacollonge, Lyon, is a new firm which will operate a factory at Villeurbanne where all kinds of rubber goods will be produced.

It is reported that at an extraordinary general meeting of the Manufacture Parisienne de Caoutchouc, recently held, the liquidation of the company was decided upon. M. Jehan Pottier has been designated liquidator and all necessary powers have been given him, especially for the purpose of bringing over a part of the assets to a new company.

An international investment trust dealing in rubber enterprises is the Société Financière des Caoutchoucs (capital 40,000,000 francs), in which are involved the Banque de l'Union Parisienne, the Union Financière de Génève, Bungé and Co. of Antwerp, and other Dutch and British firms. This company has itself organized twelve subsidiary companies, and holds stock in some thirty others.

Another investment trust of colonial interests and international scope, organized under Belgian law and directed by Belgian initiative, is the Société Internationale de Plantations et de Finance (Sipef), with which the Bungé and Grisar groups at Antwerp are closely connected. Its capital of 25,000,000 francs is held largely in Belgium, though Swiss and Dutch banks were also subscribers. The company controls, among others, such important enterprises as the Federated Malay States Rubber Co. and the Kuala Lumpur Rubber Co.

LYON SAMPLE FAIR TO BE HELD IN OCTOBER

An excellent opportunity for American rubber manufacturers to reach foreign customers, and to keep in touch with new developments will be afforded by the Lyon Sample Fair, which will be held October 1-15, inclusive. At the spring fair held in March, 1921, fourteen countries were represented, while the daily attendance was very large. Information as to details can be obtained from Emile Garden, official delegate for the United States, 150 Nassau street, New York, N. Y.

GERMANY

Tariff reform seems to be the order of the day all over the world, and Germany, too, apparently intends to revise her tariff, and that upward. So far as the countries of the Entente are concerned, Germany is bound by the provisions of the treaty of Versailles. But with regard to other countries she is in a more favorable position. Tariff obligations with Austria have already ceased and recently the German Government notified the Swiss Government that the tariff convention with Switzerland would terminate July 1, 1921.

Apropos of tariffs, German exporters have been more or less perplexed by contradictory statements made in the Reichstag with reference to the refunding by the German Government of the Rhein duty leviable by the Entente. On May 20, it was announced that the Government would refund to exporters the amount of duty leviable by the Entente and that payment would be made in paper marks. On May 31, a semi-official statement was published stating just the contrary and giving German business men the impression that the Government considered that trade interests should look after themselves. However, the latest report is that the Chancellor confirmed before the Reichstag the first declaration, adding that payments in paper marks would begin after certain necessary preliminaries had been gone through.

From an item in the *Gummi-Zeitung* of June 3, it seems that certain exporters are trying to shift the burden of the Entente duty onto the importers and are quite frank about it. At any rate, offers have been received in Sweden, with prices subject to change, as the amount payable to the Entente had not yet been fixed. Naturally, Swedish importers are highly indignant at this procedure and declare that as soon as they can get the required goods from England, France and the United States, they will no longer look to Germany for them. As they say with truth, they owe the Entente nothing, and do not see why they should be required to pay Germany's debts. The writer of the article warns German business men of this attitude and seems to be as disgusted with their methods as are the Swedish importers.

A NEW HOLE IN THE WEST

The new "hole in the West" through which large quantities of goods are entering Germany, is causing anxiety in certain German circles. Rubber goods also find their way into the country and in the first ten months of this year the quantity of these articles, chiefly tires, amounted to 18,900 quintals—one quintal equals 220.46 pounds.

The impression got abroad that Germany, long starved for rubber goods, was a good field for export. And now, in spite of the prohibition of the importation of rubber manufactures, tires to a value of millions of marks are finding their way on the German market, much to the alarm of those interested.

Dealers are bitterly reproached for their lack of patriotism which not only permits them to sell the foreign tires, but also to advertise them. Among the foreign tires that are found in many parts of Germany are the "Engelbert" tires, made in Belgium. Dealers are urged to be more patriotic and to refuse to sell any but German-made goods.

NOVELTIES IN RUBBER GOODS

The local fad for colored tire casings seems to be threatened by the luxury tax. It is an odd thing that while white, gray and black tires do not come under the class of goods subject to the luxury tax, the colored tires, which come in yellow, red, green and violet shades, and which are really no better in quality than their soberer compeers, should be considered luxuries. The coloring of tires is simply a mode of advertising as is the fashion of making marbleized or striped covers.

Are hard rubber high heels to take the place of those usually made of wood or leather? The *Gummi-Zeitung* thinks that this would be practicable: heels of this kind would have a more even, durable and handsome polish than the ordinary heels. They could be made with a soft rubber layer at the bottom. Hard rubber soles with inserts of soft rubber are also suggested.

NEW FIRMS

West-Deutsche Holsatia-Gummi-Gesellschaft m. b. H., Düsseldorf. This firm will have exclusive selling rights for the "Holsatia" rubber soles and heels manufactured by the Gummifabrik Friedrich Wilop, Hamburg.

A. Nitsche & Co., Leipzig; representation; sale of rubber goods.

Rheinische Gummimanufaktur, G. m. b. H., Mainz; manufacture and sale of rubber heels and soles of the trade-mark "Maxos." Capital, 200,000 marks.

Süddeutsche Gummiindustrie, Weissach-Württemberg, Karl Seutter, Weissach (Württemberg); wholesale dealers in tires and accessories for bicycles and automobiles, also rubber shoes and other rubber goods. The firm will also manufacture material for packing and leather floor cloth.

"Edigo" Gummiwaren-Vertrieb, Edgard Goldstein, Berlin; sale of rubber goods.

Gummigesellschaft Colonia, Bruno Aschenbach & Co., Köln-Kalk.

The Gummiwarenfabrik Hagufa, e. G. m. b. H., Harburg, has been changed to Gummiwarenfabrik Levante, G. m. b. H.

Gummiwarenfabrik "Imperator," Jander & Lemcke, Berlin-Tempelhof, has been dissolved and a new firm has been founded by Gustaf Lemcke, known as Gummiwarenfabrik Birkenwerder, Gustav Lemcke, located in Birkenwerder (Bez. Potsdam).

The Kölnische Gummifäden-Fabrik, formerly Ferd. Kohlstadt & Co., Köln-Deutz, reports net profits of 531,527.44 marks for the past year. A dividend of 14 per cent was declared. It was proposed to double the capital by issuing 1,500,000 marks' worth of original shares and 1,500,000 marks' worth of preferential shares.

RUSSIA

Owing to the chaotic condition of exchange it has been impossible to supply Russia's need for rubber. If credit and exchange could be arranged, Russia would probably take 10,000 to 15,000 tons of rubber immediately. The difficulties of the position are illustrated by the recent proposal that London firms should export to Russia 20,000,000 pounds of tea, for which payment of 25 per cent should be made in cash and for the remainder by twelve months' bills accepted by the Russian cooperative societies and endorsed by the Russian Foreign Trade Department.

FOREIGN TARIFFS

SWITZERLAND

The new provisional customs tariff of Switzerland, effective July 1, 1921, includes the following items of interest to the rubber industry.

Tariff No.	Articles	Rate of Duty: Former, Fr. cts. per 100	Rate of Duty: Revised, Fr. cts Kilogs.
	G. India Rubber and Gutta Percha.		
	India rubber and gutta percha, pure or mixed:		
	Without internal layers of metals or tissues:		
516	In blocks, bulbs, and negrobeads (raw rubber): "Patentplatten," not vulcanized; india rubber and gutta percha waste	1.00	2.00
517	In strips, sheets, plates, plugs, moulded articles, threads, balls, rods, etc	1.00	5.00
518	Hose, tubes, pipes	5.00	10.00
519	Threads for making elastic tissues	5.00	5.00
520	Carpets for rooms and passages, mats, etc.	20.00	30.00
	With internal layers of metals or tissues:		
521	Plates, rings, balls, strips, bands, etc	5.00	10.00
522	Tubes and pipes	8.00	20.00
523	Transmission belts	20.00	40.00
524	Carpets for rooms and passages, mats, etc.	20.00	40.00
525	Gummed tissues for industrial use, stuffs for cards, covers for printing cylinders, insulating materials	3.00	5.00
526	Rubbered stuffs (double stuffs) for cart tilts, etc.	30.00	80.00
527	Elastic tissues of all kinds, of rubber combined with cotton, wool, silk, etc	40.00	80.00
528	Rubber and gutta percha, applied on tissues or other materials; waterproof fabrics for sanitary purposes, rubbered on one or both sides	30.00	80.00
529	Articles of rubber and gutta percha not elsewhere specified	25.00	60.00

MISCELLANEOUS FOREIGN NEWS

INCREASE OF MOTOR TIRES IN NEW ZEALAND

According to *Commerce Reports* there has been a marked increase in New Zealand's imports of motor vehicles during the year 1920. A growing demand for trucks was noted while the large number of cars used will necessitate an increased supply of tires and spare parts. The gain in the items referred to is indicated below:

	1919	1920
Cars	£976,135	£2,435,303
Trucks	148,953	485,870
Tires	860,048	1,803,959
Spares	118,724	240,997
Total	2,103,860	4,966,129

THE TIRE INDUSTRY IN THE ORIENT

It is interesting to note that statistics show a steady and remarkable increase in the value of United States exports to the Orient during the years 1918-1920. These same statistics show also a decline during the first months of 1921, indicative of business conditions everywhere for that period. In the table following, one division only, the Dutch East Indies, shows an increase in the volume of exports for the first three months of 1921:

				1921		
Rubber Tires	1918	1919	1920	January	February	March
China	$71,558	$254,784	$421,364	$27,005	$13,939	......
Japan	118,685	422,432	491,246	20,218	5,496	......
India	294,619	557,396	1,096,377	60,554	51,713	$36,387
Philippines	982,224	1,372,544	2,431,252	130,551	99,313	35,282
Dutch East Indies	519,535	686,873	1,712,524	37,966	80,136	54,037

THE CHINESE RUBBER GOODS MARKET

There are no factories within the Shanghai consular district engaged in the manufacture of rubber goods of any kind. Less than 40 tons of india rubber and gutta-percha were imported into all China during the year 1919, which exceeds the imports for all previous years. This indicates little if any manufacturing of rubber goods throughout China. No scrap, waste or reclaimed rubber is imported into China, though small amounts of waste and old rubber are exported through the port of Shanghai.

Imports of india rubber and gutta percha and manufactured articles, including boots and shoes, for all China for the years 1913, 1918 and 1919 were:

Imported from—	1913	1918	1919
Canada	....	$2,725	$48,572
France	$22,129	11,365	23,375
Germany	19,868	....	....
Great Britain	43,160	25,821	46,038
Hongkong	18,152	27,031	43,328
Japan (including Formosa)	26,739	728,377	1,426,421
Philippine Islands	....	1,455	46,126
Russia and Siberia	165,328	12,978	25,901
Singapore, Straits Settlements, etc.	188	4,395	14,331
United States	12,143	128,746	468,227
All others	2,223	573	5,454
Gross imports	$309,930	$943,466	$2,147,773
Reexported to foreign countries	42,599	65,598	162,005
Net import	$267,331	$877,868	$1,985,768

There are approximately 3,500 passenger automobiles in Shanghai, from seventy to eighty per cent of which are four to five-passenger cars. About 75 per cent of the 150 motor trucks used in the Shanghai consular district are equipped with solid tires, though there is a decided tendency to replace these with the pneumatic truck tire.

Estimating conservatively there are 25,000 rickshaws in Shanghai alone, all of which use pneumatic tires, principally the double (outer and inner tube) tire, size 36 by 2 inches, or 900 by 50 centimeters (centimeter=0.393-inch). A very large proportion of these are Dunlop tires, manufactured in Japan, and sold at a price much less than American-made tires are being sold for in Shanghai. There are also in use in Shanghai about 2,000 carriages known as Victorias, all of which are supplied with rubber tires.

It is said that cord tires are more in demand than are the fabric types. All cords are straight-side, whereas the fabric type embraces both straight-side and clincher type. The standard metric and standard inch sizes are used here as in the United States. The greater proportion of tires used on automobiles in Shanghai are of American manufacture, the foreign firms competing being but two in number, one English and one French. Owing to unfavorable climatic conditions for the preservation of rubber goods, the system of consigned stocks of tires is impracticable.

The total value of the net imports of automobile tires for 1919 was over ten times as great as in 1913 and nearly fifty times as great as in 1918 in the Shanghai consular district. The reexports from Shanghai to other Chinese ports in 1918 decreased materially the net imports. This indicated the development of the tire market in this district. There are numerous service stations and garages in Shanghai where tire changes, adjustments, etc., are performed as skilfully as in the United States.

The market for rubber boots and shoes is limited, though in 1919 there were approximately 14 times as many imported as in 1918. Because foreign-made shoes find a very small market with the Chinese natives, their shoes being made by local shoemakers, foreign-made rubbers will not fit, and galoshes and rubber boots are not popular. An American importing firm in Foochow imported 4,000 pairs of rubber soles from a Chinese rubber firm in Singapore. These were sold immediately, as was a second large order, and the local native dealers impatiently awaited the arrival of a third shipment.

Factories are steadily increasing in China, which will in turn increase the market for belting, packing, hose, etc., which today have a fairly ready market.

Rubber clothing, while popular with the foreign population, is not used by the natives to any great extent. There would appear to be a much better market for rubberized fabric from which garments of Chinese patterns could be made.

The market for druggists' rubber sundries, such as rubber gloves, hot-water bottles, hard-rubber goods, etc., is excellent. Goods are distributed through agents and through the aid of catalogs, printed in English and Chinese, with illustrations. One firm stated that their business in such goods had doubled since May, 1920, and that it was difficult to get sufficient goods to supply the demand from the native population.

In general the basis of financial credits in the importation of rubber goods is the same as other imported commodities. Terms of payment are purely matters between the parties to the transaction and dependent upon circumstances. The import duty upon india rubber and india rubber goods is 5 per cent ad valorem, to which duty is added a fee of 5 per cent of the duty charges for wharfage and warehouse dues.

TIRE NOTES FROM INDIA

The roads of India may be put into three classes; first, the good metalled roads in and near towns; second, the main country roads made of white hard clay watered and rolled and topped with fine sand; and third, the cross-country roads which are merely cart tracks used by bullock carts, and with frequent ditches crossing them. The first and second classes are very good for tires, causing but little wear and tear, while the third class is used only in cases of dire necessity and at considerable risk. A new system of oiling roads has lately come in and this has led to the production of the oil-proof tire.

During the war, the American tires made great headway in India as in England, wide and judicious advertising having helped the business. American cars were also largely imported and this led to the Firestone, Fisk, Goodyear, Goodrich, and some other American tires getting well established. Since the cessation of hostilities, however, the British tire, especially the Dunlop, has been going ahead. Dunlop is selling millions of cycle tires, a new phase of Indian native life being the using of cycles on an extensive scale; and only the best soft rubber tires are in demand.

Another innovation is the use up-country for agricultural purposes of the light truck of 1 to 1½ tons capacity with solid tires. In Bombay the 5-ton truck is now competing successfully with

bullock carts in the transit of bales of cotton. A form of tire which is highly spoken of is the Pennsylvania, which is fitted with vacuum cups, the only drawback being its high price.

IMPORTS AND EXPORTS OF INDO-CHINA

A recent official report of the trade of Indo-China during 1919 shows that the imports of rubber goods in that year were valued at 10,545,000 francs, as compared with 3,076,000 francs the previous year. France supplied tires, tubes, etc., amounting to 1,512 quintals, valued at 5,744,800 francs, which shows an increase in value of 4,439,800 over the total for 1918, when the figures were 687 quintals, value 1,305,000 francs. At the same time Indo-China imported from France electric wires and cables to a total of 316 quintals, value 284,400 francs, as compared with 603 quintals, value 271,000 francs.

Among the rubber articles imported from other countries were: footwear—210 quintals, value 333,300 francs, in 1919, and 391 quintals, value 313,100 francs, in 1918; elastic fabrics—616 quintals, value 307,800 francs, in 1919, against 55 quintals, value 136,800 francs, in 1918; belting, hose and packing—332 quintals, value 596,900 francs, and 421 quintals, value 378,800 francs, in 1919 and 1918, respectively; tires and tubes—701 quintals, value 2,663,500 francs, in 1919, and 403 quintals, value 766,000 francs, in 1918. As will be noted, the greatest increase took place in tires, where the excess in value over that of the previous year was 1,897,500 francs.

The foreign countries participating in this trade in 1919 were: Singapore—which supplied rubber goods totaling 294 quintals, value 891,000 francs; England—116 quintals, value 266,000 francs; Japan—1,302 quintals, value 612,000 francs; United States—185 quintals, value 493,000 francs; Philippines—149 quintals, value 556,000 francs.

The exports during 1919 amounted to 29,505 quintals, value 23,604,000 francs, as compared with 5,377 quintals, value 3,226,000 francs, the year before. The entire rubber exports went to France in 1918. In 1919 the greater part, 27,844 quintals, value 22,275,000 francs, was taken by France, the remaining 1,661 quintals, value 1,329,000, going to other countries.

THE SOUTH AFRICAN RUBBER MANUFACTURING CO., LTD.

An interesting example of a plant representing some of the most modern practice in the rubber industry is that furnished by the South African Rubber Manufacturing Co., Limited, at Howick, near Johannesburg.

The business of today is the outgrowth of two smaller industries established several years ago, while in 1918 plans were being considered regarding a decided expansion. As a result the South African Rubber Manufacturing Co., Limited, became associated with George Spencer, Moulton & Co., Limited, and Wood-Milne, Limited. The capital was subscribed in South Africa and England, while practically all the machinery at the Howick plant came from the latter country.

The main building at Induna Mills, Howick, is divided into three sections, each 50 feet wide and 180 feet long, and each devoted to a particular branch of the rubber industry. In the first section, for instance, pneumatic tires and tubes are manufactured, while the other two divisions supply woven and braided hose, conveyor and transmission belting, brake and coach gear, footwear and general mechanical goods. The Induna Mills were built after a thorough inspection of English and American factories.

A small volume entitled "Rubber Planting, a Book for the Prospective Estate Assistant in British Malaya," endeavors to give an idea of the exact conditions of plantation life in Malaya. An entire chapter, for instance, is devoted to "Tropical Health Hints." Another entitled "Rubber Estate Work," appears to be very comprehensive, while the subject of rubber planting, in all its details, is thoroughly covered. This book was reviewed in The India Rubber World, December 1, 1920.

THE RUBBER TRADE IN THE FAR EAST

By Our Regular Correspondent

MALAYA

Now that the plan for compulsory restriction of the output of rubber has been squelched by the Colonial Secretary, new suggestions are cropping up and another few months will probably go by before anything definite has been decided upon. At an important meeting held at Kuala Lumpur on May 18, seven different schemes for getting the rubber industry out of its difficulties were received. One of these was being considered by the Rubber Growers' Association in London but so far no details are available for publication.

At the above-mentioned meeting, the opinion seemed to be that although all of the schemes had defects the Kellie-Smith plan and the Carey plan were the best. The first restricted the output 50 per cent by imposing a heavy export duty, not to exceed 10 per cent ad valorem or 5 cents a pound, on all excess over 50 per cent of the normal output.

The second plans a 25 per cent restriction, with the following objects: Reduction of rubber stocks, aid to weak producers, and proof to the Government of the industry's desire to assist itself. To this end it is proposed to place a tax of 1 to 2 cents a pound on all rubber exported, the money thus obtained to be utilized to capitalize a land bank through which weak producers offering good securities would be assisted.

Those who favor this plan point out that the Government might be more ready to favor a scheme of compulsory restriction if the industry itself were prepared to assist weak producers. It is believed that one of the chief obstacles to legislation is the inability of the Government to finance deserving claims, which legislation implies.

There are those who oppose this scheme on the ground that governmental assistance would again be required and that so far attempts to get governmental assistance in the matter has resulted in nothing but a waste of time.

Certainly, the Malayan rubber industry, which is hardest hit by prevailing conditions, has spent many months in profitless discussion. It was in September of 1920 that the stock position began to cause anxiety, and although almost a year has passed, nothing definite has been accomplished in remedying the situation.

If much more time is spent in futile talk, producers will some day awaken to the fact that the only plan that has been properly supported is the "shake out" which the schemes under consideration were intended to prevent!

And what will be the result of a shake-out? The Malayan rubber industry will pass from under British control, says *The Malayan Tin & Rubber Journal*:

> Men with long purses who have no sympathy for the Malayan industry and think only of what they can get out of it will buy up cheaply the more valuable of the weakly financed estates. They will be cunning enough to acquire control of the rubber planting industry to the detriment of everyone but themselves. It recalls how foreigners acquired large areas of British oil territory and that this combination was strong enough to gain the ear of the Colonial Office and a large influence in Parliament.
>
> In the case of Malaya it is probable that as the greater part of our rubber goes to a foreign country the control will be exercised in that country.
>
> Although owners may be ruined and estates abandoned, the trees will still continue to yield latex. They will of course be overtapped and the product will be bought largely by the huge combines, who being intimately concerned with the manufacturers, or maybe the manufacturers themselves, will see that the general user of rubber articles pays the full price for them. That will not benefit the producer—but the manufacturers. There can then be no revival of the rubber industry so far as Malayan planters are concerned.

SPREAD OF PINK DISEASE

Another worry that has been added to the burden of the Malayan rubber plant is a serious spread of pink disease north of Selangor and in lower Perak. Abandoned native holdings and poorly kept, overtapped areas are the chief centers of the disease.

This is particularly alarming at present because the disease is caused by a fungus by which neighboring estates could easily be infected, and further, although the Pests Enactment makes it punishable for estate owners or managers to fail to combat the disease, the enactment would be of little use now. Owners who had to abandon their estates and had no money to treat pink disease, would not be able to pay the fine for not doing this work. The Department of Agriculture is trying to locate all abandoned areas with a view of supervising them and dealing with any outbreak of pink disease.

SMALL HOLDINGS

For various reasons small holdings are attracting a good deal of attention and statistics regarding the acreage of holdings having an area of less than 100 acres should be interesting.

The following figures for 1919 were published in *The Agricultural Bulletin of the Federated Malay States:*

HOLDINGS LESS THAN 100 ACRES IN EXTENT

	Acreage planted	Acreage in bearing	Number of trees tapped
Perak	182,117	101,773	15,266,015
Selangor	128,721	78,580	12,185,350
Negri Sembilan	73,901	30,331	4,549,650
Pahang	24,287	8,688	1,303,200
Totals	409,026	219,372	33,304,215

The number of trees, as a rule, has been calculated at the rate of 150 trees per acre.

CEYLON

At a recent meeting of the Ceylon Chamber of Commerce the following resolution was almost unanimously adopted:

That on sale of spot rubber, that is, rubber sold for delivery within one month, brokerage be 1 per cent.

On sale of rubber on forward contract, ½ per cent.

This item had been:

On sale of rubber on invoices up to and including 1,000 pounds, 1 per cent.

Invoices over 1,000 pounds, ½ per cent.

THE NETHERLANDS EAST INDIES

In February of this year a meeting was held, under leadership of the Director of Agriculture, with representatives of various banks and of tea and rubber interests, when a committee was formed to study the question of aiding estates. Through the efforts of this committee an Agricultural Loan Bank will be established which will aid worthy estates by loans, and if necessary, temporarily acquire and exploit estates.

Creditors of these estates will be required to postpone their claims until the bank loans have been paid. Furthermore, attempts of creditors to acquire plantations at prices below their actual value will be prevented by the bank through its right to acquire temporarily such property.

The Agricultural Loan Bank will be capitalized at 1,000,000 gilders (normally, $400,000); private parties have already largely promised cooperation, but the bank will rely chiefly on moral and material support of the Government which has guaranteed financial assistance to a certain maximum yet to be fixed and which also takes upon itself responsibility for any losses the bank may sustain.

JAVA RUBBER TRADE IN 1920

Reports concerning Java's trade in rubber and rubber goods show that the imports of bicycle tires in 1920 amounted to 643,505 pieces against 196,067 in 1919 and 265,960 in 1918. Automobile tires showed a smaller but steadier increase, the figures being: 104,616 in 1918, 200,906 in 1919 and 247,663 in 1920.

Exports of rubber during the year under review totaled 30,000 metric tons (2,204.6 pounds = 1 metric ton) as compared with 35,000 metric tons in 1919. Shipments to the United States, which went direct, showed a decrease, being 12,000 metric tons against 18,700 metric tons in 1919.

The lowest prices for standard crêpe and standard sheet obtained during December, 1920, when the rates per half-kilo fell below 50 and 40 cents. However, even at these low prices, most of the Java estates were able to sell their product without loss as the cost of production in Java is generally around 35 cents a pound.

SUMATRA ESTATES CLOSING DOWN

The situation in Sumatra and particularly on the East Coast is gradually getting worse. The Japanese estates appear to be the hardest hit, although the American concerns are also in difficulties. The number of plantations closing down is increasing. Many estates are stopping the separate administration of their various plantations and are uniting them as far as possible.

Of course, the rate of unemployment, both European and coolie, is growing as well as the number of estates that are cutting salaries. Thus far only one Dutch concern has lowered salaries, all the other firms being foreign.

RUBBER EXPORTS FROM SUMATRA

According to data furnished by the Commercial Association of Medan, exports of rubber from the East Coast of Sumatra during 1920, amounted to 32,695 tons, against 38,368 tons in 1919. The value of exports in 1919 was 88,692,620 gilders and in 1920, 57,522,425 gilders, which is a decrease of 35 per cent. Exports for the first quarter of 1921 totaled 6,428,149 kilos. On this basis, the entire exports for 1921 would amount to 25,712,592 kilos which, it is estimated, would be 10,000 tons less than the production for the year.

DISTRIBUTION OF RUBBER PLANTATIONS IN DELI

The Commercial Association of Medan gives the following interesting figures regarding the crops for 1920 and the areas planted and producing by December, 1920.

	Area Planted Hectares	Area Producing Hectares	Crop Kilos
Dutch	45,685	27,261	9,625,942
British	42,335	32,105	12,540,254
Dutch East Indian	10,556	6,080	2,029,363
American	25,356	17,731	6,321,880
Belgian-French	17,084	13,319	4,630,948
Japanese	3,410	1,110	381,231
German	1,726	1,658	859,078
Swiss	1,422	816	303,836
Shanghai	2,075	926	291,928
Totals	149,649	101,006	36,984,460

Below follows a comparison of the percentage of area in production and the annual yield per hectare.

	Percentage	Kilos Per Hectare
German	90.20	518
Belgian-French	77.96	348
British	75.84	391
American	69.93	357
Dutch	59.67	353
Dutch East Indian	57.60	333
Swiss	57.45	371
Shanghai	44.59	316
Japanese	32.55	343

A review of the various cultures shows that English capital is mainly invested in tea and rubber; French-Belgian capital, in rubber and palm oil; Dutch capital is prominent in all cultures; Dutch East Indian, in rubber and copra, while American and Japanese capital is invested only in rubber.

THE NETHERLANDS INDIES RUBBER FACTORY

The annual report of this company shows that the year 1920 was more favorable than previous years. A good deal of money was spent on new machinery and extensions in the buildings. In 1920, all of the new machinery ordered had not yet arrived and work had to continue with the old and small installation. In spite of this, output showed a 30 per cent increase over that of 1919.

The capital has been raised by 100,000 gilders to 550,000 gilders because of expansion of the factory buildings and the need for new machinery. In spite of the expenses incurred through experiments with solid tires amounting to 15,048.86 gilders, the accounts showed a favorable balance of 25,138,97½ gilders

JAVA RUBBER SALES ASSOCIATION

The rubber cultivating companies in the Netherlands East Indies, following the example of the Java Sales Association, are planning to pool the interests and stocks of the members, and control the sale of these stocks.

MOULD ON PLANTATION RUBBER

The subject of mouldy rubber has created a great deal of interest recently and there seems to be much mystery surrounding the subject. There can be no doubt that, to a great extent mould is due to the rubber being insufficiently dried in the factories. It was in their interests when prices were high to rush the rubber through in as short a time as possible, and get it on the market. Many Malayan estates, with greatly increasing crops, found their smokehouse accommodation quite insufficient and were forced to empty them too soon to make room for new rubber. Other estates had built their factory in the old part of the estate. As new and distant areas came into bearing the rubber had to be brought long distances and in some cases an anticoagulant was put in the latex to prevent it coagulating before it reached the factory. Rubber so treated takes much longer to dry and through carelessness or necessity it did not receive the extra time necessary in the smokehouse. It is believed that these two causes account for a great percentage of the mouldy rubber in New York and London.

There have been cases, however, where none of these causes would apply and mould still existed. One manager declares he had followed a shipment personally from the estate to Singapore. It left the estate in perfect condition and yet it was mouldy on arrival. He claims he found a remedy by placing an ordinary ebony ruler in the center of the case during packing and that the small air space left after its withdrawal prevented mould.

The chief chemist at Buitenzorg, Java, states that the undercuring of sheet was not responsible for mould; that the moisture content of the virgin was so small that it was quite impossible to determine its extent. After having spent a year investigating this subject they have concluded that mould is a germ that feeds upon the proteins which are on the surface of the rubber before going to the smoke-house, and the process of smoking does not destroy either the germ itself or the food value of the proteins; and up to the present time they have not been able to find any chemical preparation or germ-killing treatment which will destroy the germ, or the food properties on the surface of the rubber. Many estates in Java, after passing the sheet through the rollers, soak it in cold running water from 5 to 12 hours to wash as much as possible of the proteins from the surface of the rubber. Methylated spirit is also used for washing sheets before packing, purely as a mould preventive.

BRAZIL'S RUBBER TRADE DURING 1920

Figures for the general trade of Brazil during 1920 show an increase of 59.9 per cent in imports as compared with those for 1919, while exports declined 17.3 per cent as against those for the year before. While 1919, a record year all over the world, showed a balance of trade in favor of exports amounting to 39.8 per cent, 1920 showed an adverse balance of 13.7 per cent against exports. Exchange conditions have been responsible for this state of affairs and as they still show no improvement, the adverse balance of trade for the first four months of 1921 has increased considerably.

Among the articles to show decreases in exports was rubber. In 1919 shipments abroad totaled 33,252 tons, value 105,537 contos of reis; but in 1920 there were 23,531 tons, value 58,261 contos of reis, or a decrease of 29.2 per cent in quantity and 44.8 per cent in value. Rubber, which once ranked second only to coffee, has now fallen to twelfth place on the list of specified staples. It is the opinion that cost of production will have to be considerably reduced and the price will have to go up again to at least 3$000 per kilo before this trade will regain pre-war level.

The United States headed the list of countries dealing with Brazil, both as regards exports and imports of all merchandise in general, and of rubber in particular. It is interesting to note that Germany is rapidly forging ahead here and that she ranks third on the list of suppliers of imports. It is thought that if the mark continues low and Germany can secure the necessary tonnage, she will, before long, outstrip England and the United States. Meanwhile she is exporting quantities of goods regularly at prices that are termed ridiculously low.

Imports of rubber goods, including tires, show an increase of 1,363 tons or almost 100 per cent as compared with 1919, figures being 1,368 tons in 1919 and 2,731 tons in 1920. This great expansion was due to the extraordinary demand for tires for cars which have been imported in large numbers since the armistice and for which there has been an active demand.

Exports of crude rubber were distributed as follows:

From—	1919	1920
Manáos ....tons	14,037	11,728
Itacoatiara	112	114
Pará	17,764	10,931
Maranhão	42	10
Ilha	96	184
Fortaleza	485	145
Pernambuco	.....	70
Bahia	334	237
Rio	87	2
Santos	.....	2
Corumba	247	146
Recife	48	.....
Natal	.....	19
Totals ....tons	33,252	23,588

To—	1919	1920
Germany ....tons	.....	639
Argentina	61	6
Belgium	22	138
United States	23,299	13,812
France	2.556	1,475
United Kingdom....	6,769	7,302
Italy	.....	2
Holland	328	163
Portugal	32	11
Sweden	15	40
Uruguay	161	.....
Denmark	7	.....
Totals ....tons	33,252	23,588

Figures for the years 1913 and 1917-1920 are as follows:

	1913	1917	1918	1919	1920
Total in tons........	36,232	33,998	22,662	33,252	23,588
Value in contos......	155,631	144,080	73,728	105,537	58,349
Value in £1,000....	10,375	7,484	3,998	6,240	3,716

NEW RUBBER FACTORY IN SAO PAULO

In addition to the Companhia Brasileira de Artefactos de Borracha (successors to the Industria Brasileira de Borracha Berrogain, Limitada), which has been manufacturing rubber products for some time and which soon will have a daily production of 250 tires, 250 inner tubes, and 50 solid tires, São Paulo is also to have another factory to help take advantage of Brazilian rubber and avoid the necessity of importing so much rubber goods. The new establishment is to be a stock company known as the Sociedade Anonyma Fabrica Nacional de Artefactos de Borracha and capitalized at 300,000 milreis. The first-named company is capitalized at 6,000,000 milreis.—*Commerce Reports.*

TOY BALLOONS POPULAR IN ARGENTINA

Although toy balloons are extremely popular with the children of Argentina, they are sold only by peddlers, no stores selling them. Two large department stores have made a practice of giving away toy balloons and together average 23,520 balloons monthly, while on holidays when larger balloons are offered, bearing the name of the store and the Spanish and Argentinean flags, together with other wording, more than a thousand balloons are disposed of. An exporting factory in France sends over the deflated balloons which are inflated locally. The two sizes commonly employed are 10 and 12 inches in diameter when the balloons are fully inflated.—*Commerce Reports.*

AMERICAN TIRE-REPAIR MATERIALS POPULAR IN HAVANA

The repair shops and vulcanizers of Havana, Cuba, obtain their tire-repair materials almost exclusively from the United States. Only minor repairs of tire casings are customarily made, while retreading is practiced very rarely. Tire tubes, however, are repaired whenever possible.

Recent Patents Relating to Rubber

THE UNITED STATES

ISSUED MAY 31, 1921

No. 1,379,602 Stylographic pen. J. Abegg, West Hoboken, assignor to Gordon Pen Co., West New York—both in New Jersey.
1,379,603 Stylographic pen. J. Abegg, West Hoboken, assignor to Gordon Pen Co., West New Work—both in New Jersey.
1,379,660 Surgical rubber wound-dam. W. H. Taylor, Guelph, Ont., Can.
1,379,787 Garter. W. H. Smith, New Haven, Conn.
1,379,809 Transplit demountable tire rim. E. M. Foster, assignor to The Hydraulic Pressed Steel Co.—both of Cleveland, O.
1,379,856 Wheel-rim fastening device for use with pneumatic tires. F. E. Enter, Cuyahoga Falls, assignor of ½ to W. Martin, Cleveland—both in Ohio.
1,379,887 Pneumatic tire. H. S. Williams, assignor of ½ to O. Keller—both of San Antonio, Tex.
1,379,890 Fountain pen. P. E. Wirt, Bloomsburg, Pa.
1,379,915 Pneumatic tire. J. Guagliardo, Hammond, La.
1,379,929 Inner tube in sections with plurality of cores, and mold for making. T. B. McLeroth, London, England.
1,379,944 Toy with elastic operating strip. E. M. Story, Braintree, Mass.
1,379,958 Chair mat with track for chair. M. Blumenthal, Brooklyn, N. Y.
1,380,109 Fountain pen. C. A. Luck, assignor to The Conklin Pen Manufacturing Co.—both of Toledo, O. (Original patent No. 1,315,373, dated September 9, 1919. Divided.)
1,380,231 Fountain pen. K. Matsumoto and K. Takagi, Tokio, Japan.

ISSUED JUNE 7, 1921

1,380,496 Sectional resilient tire. M. E. Osborn and J. R. Wollam, Midland, Pa.
1,380,501 Cushion tire. R. Sera, Los Angeles, Calif.
1,380,509 Printing machine for fruit. A. S. Wysong, Los Angeles, Calif.
1,380,625 Tire protector. M. C. Altmayer, New York, N. Y.
1,380,838 Revoluble heel insert. J. G. Robertson, New York, N. Y.
1,380,960 Rubber thimble for crocheting. V. Hmenia, Klein, Mont.
1,381,043 Umbrella cover with triangular-shaped elastic gusset at inner end of placket. I. H. Weinberg and C. F. Bisbing, New York, N. Y.
1,381,067 Water pillow. I. Eguchi, Tokio, Japan.
1,381,071 Rubber cover, preferably ribbed, for bottles and other containers. C. Flannery, Hornell, N. Y. (See description elsewhere in this issue.)

REISSUES

15,121 Tire design. B. H. Pratt, Milwaukee, assignor to The Federal Rubber Co., Cudahy—both in Wis. Original No. 52,116, dated June 18, 1918, for 3½ years.

ISSUED JUNE 14, 1921

1,381,108 Truck tire. L. R. Davis, assignor to Revere Rubber Co., both of Providence, R. I. (Substitute for application Serial No. 381,633, filed May 15, 1920.)
1,381,123 Truss. E. G. Hutterer, Sanborn, Ia.
1,381,168 Demountable rim for vehicle wheels. E. O. Coats, Postoak, Mo., assignor of ½ to G. L. Hall, Leeton, Mo.
1,381,173 Inlaid tread tire. J. H. Dwork, Newark, N. J.
1,381,175 Anti-explosive and non-inflammable fibrous rubber gasoline tank. H. C. Ericsson, U. S. Army.
1,381,332 Self-filling fountain pen. P. H. Qualmann, Milwaukee, Wis.
1,381,336 Sponge rubber truss. L. Rehtbaler, assignor to Battle Creek Appliance Co., Limited—both of Battle Creek, Mich.
1,381,345 Protector for rubber tires, combining rubber blocks on a metallic rim. H. C. Sankey, St. Louis, Mo.
1,381,373 Ventilated waterproof seam. A. Waterman, assignor of ½ to D. Waterman—both of Chicago, Ill.
1,381,546 Filling-bottle for fountain pens. W. G. H. Dziambor, assignor to the Firm Simplo Fullfeder Gesellschaft Voss, Lausen & Dziambor Fabrik fur Fullfederhalter und Goldfedern—both of Hamburg, Germany.
1,381,571 Fountain pen. F. H. Lennards, Evanston, Ill.
1,381,602 Cushion tire. I. Trautman, New York, N. Y.
1,381,608 Battery jar. O. Wittmann, Lincoln, Neb.
1,381,627 Dust cover for tire valves. G. E. Garrett, Salt Lake City, Utah.
1,381,815 Armored puncture-proof tire. R. H. Fenley, Fort Worth, Tex.
1,381,829 Nostril-cleaning device. R. R. Hartman, Chicago, Ill.

THE DOMINION OF CANADA

GRANTED MAY 31, 1921

211,993 Garter. R. A. Manny and J. A. Rielly, coinventors, both of New York City, U. S. A.
212,140 Rubber sole with integrally formed hobs. J. H. Stedman, Braintree, Mass., U. S. A.

THE UNITED KINGDOM

PUBLISHED JUNE 1, 1921

161,401 Pneumatic tire. W. Hughes, Bro. Dawel, Watling street, Llanrwst, Denbighshire.
161,420 Detachable rim for tires. A. Menegotti and G. Mancini, Fano, Pesaro, Italy.
161,512 Inflatable swimming belt. G. Jordahn, Palm Beach, Fla., U. S. A.
161,622 Reinforced solid tire. P. Chick, Market Square, Highworth, Wiltshire.
161,635 Fountain pen. M. D. Davis, 6 Cardinal Mansions, Carlisle Place, Westminster.
161,662 Balata belt united to layer of rubber-coated, vulcanized fabric. J. Dawson, Boultham Works, Lincoln.
161,664 Cushion wheel. T. H. Rushton, 31 Southbrook Road, Lee, London.
161,818 Mangle roller covered with vulcanized rubber. A. R. Hunter, Potter Street Iron Works, Worksop, Nottinghamshire.
161,860 Cushion wheels. A. L. Runyan, 3619 Farnam street, Omaha, Neb., U. S. A.
161,875 Reinforced pneumatic tire. J. H. Beaumont, 29 Southampton Buildings, London; S. J. Flynn, Court street, Portsmouth, Va., U. S. A.
161,897 Inner tube with thick tread and rim portions and thin sidewalls. W. Drury, 10 Lena Gardens, Shepherds Bush Road, London.
161,908 Driving belt for dynamos, motorcycles, fans, etc., made of strips of leather, canvas, rubber, etc., riveted together. F. H. Baker, Queen's Hotel, Alderley Edge, Cheshire.
161,984 Breathing apparatus. R. von der Heide, 43 Wielandstrasse, Charlottenburg, Berlin. (Not yet accepted.)
161,985 Respirator. R. von der Heide, 43 Wielandstrasse, Charlottenburg, Berlin. (Not yet accepted.)
161,986 Respirator. R. von der Heide, 43 Wielandstrasse, Charlottenberg, Berlin. (Not yet accepted.)
161,996 Removable heel, with metal plate for attaching. W. J. Follows, Croft, near Leicester.
162,240 Hydrometer. J. H. Kessler, 415 North East avenue, Vineland, New Jersey, U. S. A.
162,409 Horseshoe for race horses, hunters, etc., having rubber section to contact with ground. J. Wood, 359 Blackburn Road, Bolton, Lancashire.
162,475 Pneumatic tire. W. J. Harper, Glenariff Warrer Drive New Brighton, Cheshire.
162,535 Syringes, douches, etc. E. F., C. L., and S. L. Ristine and C. Lyons, Commercial Bank Building, Lexington, and B. Clark, Bowling Green—both in Missouri, U. S. A.
162,558 Reservoir shaving-brush with flexible rubber diaphragm around brush head and rubber tube extension from reservoir into brush. W. N. Parker, 78 Church Road, Teddington, Middlesex.
162,565 Inflatable rubber toys. H. W. Franklin and J. G. Franklin & Sons, Limited, Birkbeck Works, Birkbeck Road, Dalston, London. (See The India Rubber World, April 1, 1921, page 504.)
162,570 Foot-arch support. W. M. Scholl, 211 West Schiller street, Chicago, Ill., U. S. A.
162,619 Rim for tire valves. A. Schrader's Son, Inc., 470 Vanderbilt avenue, Brooklyn, N. Y., assignee of H. P. Kraft, 219 Godwin avenue, Ridgewood, New Jersey—both in U. S. A. (Not yet accepted.)

PUBLISHED JUNE 29, 1921

162,805 Canvas and rubber ring for attaching pneumatic tires to rim. J. T. Pickering, 19 Fort street, New Brighton, Cheshire.
162,856 Detachable rim for tires. Rapid Rims, Limited, and A. Jordan, 7 Pall Mall, Westminster.
162,857 Nipple. F. R. Graham-Yooll, Dulham Towers, East Trinity Road, Leith, Scotland.
162,932 Tire protector with fastening wires encased in rubber. W. C. McGeorge, 401 Battery street, San Francisco, Calif., U. S. A.
162,942 Compressible bottle for filling fountain pens. W. G. H. Dziambor, 12 Bartlesstrasse, Hamburg, Germany.
162,974 Heel protector with inset rubber cushion. O. W. Peters, 1039 South Hope street, Los Angeles, Calif., U. S. A.

FRANCE

PATENTS ISSUED, WITH DATES OF ISSUE

504,682 (October 8, 1919.) Non-slipping device for pneumatic tires. S. T. Buchanan.
504,837 (October 13, 1919.) Improvements in elastic tires for vehicle wheels. Naamlooze Vennootschap Octrooi Maatschappij Holland tot Exploitatie van Uitvindingen.
504,863 (October 14, 1919.) Cover for pneumatic tires. H. Muller and E. Hofstetter.
504,981 (October 16, 1919.) Braces for pneumatic tires. T. H. Bell and J. G. Schoenlebu.
505,107 (September 5, 1918.) Tread for solid or hollow rubber tires for all kinds of vehicles. A. Voland.
505,195 (September 1, 1919.) Improvements in pneumatic tires. C. C. Marshall.
505,283 (October 22, 1919.) Electric tire. C. Duplouich.
505,307 (October 22, 1919.) Resilient wheel. D. D. Anastasin.
505,471 (October 27, 1919.) New protector for pneumatic tires. E. Albissier.
505,787 (November 6, 1919.) Improvements in elastic tires. D. Maggiora.
505,823 (November 7, 1919.) Improvements in pneumatic tires. W. H. Richards.
506,079 (November 14, 1919.) Demountable rim. The Goodyear Tire & Rubber Co.
506,174 (January 16, 1919.) Elastic tire for all kinds of vehicles. J. A. Allaire and E. F. Guibourgean.
506,193 (November 18, 1919.) Protector for the rubber of elastic tires. D. Maggiora.
506,203 (November 18, 1919.) Improvements in resilient wheels. A. L. Runyan.
506,204 (November 18, 1919.) Improvements in elastic tires. A. L. Runyan.
506,462 (November 21, 1919.) Improvements in vehicle wheels. The Dunlop Rubber Co., Ltd.

Chemical Patents will be found on pages 819-820. Machinery Patents on pages 827-828.

506,512 (November 24, 1919.) Improvements in automobile wheels. J. S. Andrade.
506,528 (November 25, 1919.) Improvements in resilient wheels. C. Spada.
506,533 (November 25, 1919.) Tires for vehicle wheels. J. Bodard, S. Isaacs and M. Rothschild.
506,939 (November 18, 1918.) Unburstable pneumatic tire. J. F. S. Lemele.
507,112 (December 5, 1919.) Resilient wheel. J. Crespo-Conejo.
508,114 (January 3, 1920.) Protector for air tubes of pneumatic tires. H. S. Blydt.
508,395 (January 13, 1920.) Improvements in tires. McEven Tire Ventilator Co., Inc.
508,398 (January 13, 1920.) Rubber tire. E. Pruvost.
508,516 (January 16, 1918.) Improvements in tires of wheels using solid elastic spring rolls. E. Brunswick.
508,527 (May 11, 1918.) Armored rubber cover for pneumatic tires for airplanes, automobiles, etc. J. M. Pousset.
508,592 (August 20, 1919.) Inner tube proof against blow-outs. H. Lambert.
508,772 (January 20, 1920.) Non-skid tread. Racine Auto Tire Co.
509,130 (January 26, 1920.) Cover for pneumatic tires. Société F. E. C. I. T.
509,228 (January 20, 1920.) Improvements in rubber tires and in method of attachment. E. B. Killen.
509,317 (January 31, 1920.) Protective cover for pneumatic tires. L. C. Cummings.
509,766 (February 10, 1920.) Elastic tire. J. Milhau.
509,827 (February 12, 1920.) Reinforced rubber cover for pneumatic tires. I. Ortiz-Escofet.
509,950 (February 13, 1920.) Improvements in pneumatic tires. C. A. Gras.
511,871 (June 7, 1919.) Improved cover for pneumatic tires. J. J. J. Carette.

GERMANY

PATENTS ISSUED, WITH DATES OF ISSUE

338,629 (February 25, 1915.) Inhaler. Friedrich Hanft, Frauentorgraben 67, Nürnberg.
338,685 (January 1, 1916.) Nipple for feeding bottle. Carl Erwin Martin, Oeserstr. 23, Leipzig Schleussig.
338,830 (September 29, 1920.) Injecting syringe. Otto Schmidt, Bahnhofstr. 4, Nordhausen.
338,976 (August 3, 1919.) Irrigator. Hans Josef Goebbel, Charlottenstrasse 9, Düsseldorf.
339,018 (August 5, 1919.) Cover for pneumatic tires. Willy Krus, Stöckerstr. 6, Köln-Mülheim.
339,196 (March 30, 1920.) Lamellated tire. Boris von Loutzkay, Viktoria-Luiseplatz, Berlin.

TRADE MARKS

THE UNITED STATES

TWO KINDS OF TRADE MARKS NOW BEING REGISTERED

Under the rules of the United States Patent Office, trade marks registered under the Act of February 20, 1905, are, in general, fanciful and arbitrary marks, while those registered under the Act of March 19, 1920, Section 1 (b), are non-technical, that is, marks consisting of descriptive or geographical matter or mere surnames. To be registered under the latter act, trade marks must have been used for not less than one year. Marks registered under this act are being published for the first time when registered, any opposition taking the form of an application for cancellation.

GRANTED MAY 31, 1921, ACT OF FEBRUARY 20, 1905

No. 143,368 Buffalo Bill Patch, Violet Ray Self-Vulcanizing—patches for repairing inner tubes, hot-water bags, and rubber footwear. H. R. Hoffeld, Buffalo, N. Y.
143,446 Liberty—elastic webbings, ladies dress beltings, garters, hose supporters, and suspenders. The Russell Manufacturing Co., Middletown, Conn.
143,447 Kangaroo—elastic webbings, garters, hose supporters, and suspenders The Russell Manufacturing Co., Middletown, Conn.
143,448 Sanseer—Elastic webbings, ladies' dress belting, garters, suspenders and hose supporters. The Russell Manufacturing Co., Middletown, Conn.
143,449 American Beauty—ladies' dress belting, elastic webbings, and suspenders. The Russell Manufacturing Co., Middletown, Conn.
143,450 Withdrawn.
143,451 Blue Ribbon—elastic webbings and ladies' dress beltings. The Russell Manufacturing Co., Middletown, Conn.
143,452 Capitol—elastic webbings and ladies' dress beltings. The Russell Manufacturing Co., Middletown, Conn.
143,453 Laurel—elastic webbings. The Russell Manufacturing Co., Middletown, Conn.
143,454 Rusco Products, They Speak for Themselves—beltings, brake-linings, clutch facings, etc. The Russell Manufacturing Co., Middletown, Conn.
143,473 Tirex—insulation materials for covering wire. Simplex Wire & Cable Co., Boston, Mass.

ACT OF MARCH 19, 1920, SECTION 1 (b)

143,526 Road Racer—tires. United States Tire Co., New York, N. Y.

GRANTED JUNE 7, 1921, ACT OF FEBRUARY 20, 1905

143,562 Save a Dollar Everywoman—women's shoes of leather, rubber, fabric, and combinations. Brown Shoe Co., Inc., St. Louis, Mo.
143,563 Buckhecht—shoes, boots and slippers of leather, rubber, canvas, and combinations. Buckingham & Hecht, San Francisco, Calif.
143,587 Pericles Prince of Tyre—tires. The Dunlop Rubber Co., Limited. London, Eng.
143,596 Arch Belt—men's, women's, and children's boots and shoes of leather, rubber, or fabric. The Emerson Shoe Co., Rockland, Mass.
143,623 Goodrich—waterproof coats, jackets, boots, shoes and shoe-pacs. The B. F. Goodrich Co., New York, N. Y.
143,624 The Tire News—monthly periodical. The Goodyear Tire & Rubber Co., Akron, O.

ACT OF MARCH 19, 1920, SECTION 1 (b)

143,817 "Locktite"—tobacco pouches. F. S. Mills Co., Inc., Gloversville, N. Y. (See The India Rubber World, July 1, 1921, page 756.)
143,822 Nonleek Double-Texture Top Fabric—rubberized cotton piece goods. O'Bannon Corporation, Boston, Mass.
143,838 'Never Creep'—fabric and rubber tire patches. United States Tire Co., New York, N. Y.
143,839 Special—druggists' sundries. Whitall Tatum Co., New York, N. Y.

GRANTED JUNE 14, 1921, ACT OF MARCH 19, 1920, SECTION 1 (b)

143,874 Herringbone—tires. G. & J. Tire Co., Indianapolis, Ind.

THE UNITED KINGDOM

PUBLISHED MAY 18, 1921

412,420 Belleroid—ebonite compound for electrical insulation. Barrett & Ellers, Limited, 127 and 129 Wallis Road, Hackney Wick, London, E. 9.
B413,553 Puncture Proofed Tube on representation of a rolled-up inner tube—tires and tubes. Puncture-Proof Tubes, Limited, 8, 22, and 23 Avenue Chambers, Vernon Place, Southampton Row, London, W. C. 1. (See The India Rubber World, February 1, 1921, page 369.)

PUBLISHED MAY 25, 1921

413,185 Sportsman—anti-mudsplash device, made chiefly of rubber, for attachment to vehicle wheels. H. F. Ingram, 70 Basinghall street, London, E. C. 2.
413,186 Gentleman—anti-mudsplash device, made chiefly of rubber, for attachment to vehicle wheels. H. F. Ingram, 70 Basinghall street, London, E. C. 2.
413,168 A within outline of ace of spades—vulcanite combs and buttons. The American Hard Rubber Co. (Britain), Limited, 13A Fore street, London, E. C. 2.

PUBLISHED JUNE 1, 1921

412,416 Economos—velocipede and motor vehicle tires. The British Centrope Co., 75 Aldermanbury, London, E. C. 2.
413,165 A within outline of ace of spades—vulcanite instruments and apparatus for surgical or curative purposes. The American Hard Rubber Co. (Britain), Limited, 13A Fore street, London, E. C. 2.

PUBLISHED JUNE 8, 1921

400,914 The Partridge and representation of a partridge standing within a tire—all goods included in Class No. 40. The F. E. Partridge Rubber Co., Limited. 1 Metcalfe street, Guelph, Ontario, Can. Address for service in the United Kingdom, care of Abel & Imray, 30 Southampton Buildings, London, W. C. 2.
405,659 Tirometer—combined valve and gage for inner tube. Tirometer Valve Corporation of America, 912 Kanawha Banking & Trust Building, Charleston, W. Va., U. S. A. Address for service in United Kingdom, care of Albert L. Mond, 19 Southampton Buildings, Chancery Lane, London, W. C. 2. (See The India Rubber World, April 1, 1920, page 434; March 1, 1921, page 437; April 1, 1921, page 517.)
407,081 Geometric design in black and white, with thistle represented in white silhouette in center—waterproof garments. Campbell, Achnach & Co., Limited. 59 Wallace street, Glasgow.
407,082 Geometric design in black and white, with thistle represented in white silhouette in center—goods manufactured from rubber and gutta percha not included in classes other than No. 40. Campbell, Achnach & Co., Limited. 59 Wallace street, Glasgow.
408,585 Fruits & Flowers—chewing gum. Adams & Beemans, Limited, 89 Great Eastern street, London, E. C. 2.
410,923 Wood's "Everloc" Tire Patch—tire repair patches and repairing material included in Class No. 10. Winfield Copleywood, 74 Western avenue, Minneapolis, Minn., U. S. A. Address for service in the United Kingdom, care of Kilburn & Strode, Chancery Lane Station Chambers, 31 High Holborn, London, W. C. 1.

PUBLISHED JUNE 15, 1921

B405,213 North Pole—tires and tirings in lengths. The Leicester Rubber Co., Limited, Granby Rubber Works, Post Office Place, Leicester.
407,256 Hood and an arrow pointing to the right—footwear. Hood Rubber Co., Watertown, Mass., U. S. A. Address for service in the United Kingdom, care of Albert L. Mond, 19 Southampton Buildings, Chancery Lane, London, W. C. 2.
407,257 Hood and an arrow pointing to the right—tires. Hood Rubber Co., Watertown, Mass., U. S. A. Address for service in the United Kingdom, care of Albert L. Mond, 19 Southampton Buildings, Chancery Lane, London, W. C. 2.
414,221 Climpets—rubber boot and shoe protectors. Thomas Richard Lulham, 112 Becker street, Bellevue East, Johannesburg, South Africa. Address for service in the United Kingdom, care of Abel & Imray, 30 Southampton Buildings, London, W. C. 2.

PUBLISHED JUNE 22, 1921

411,037 S.A within a diamond crude or partly prepared rubber for use in manufactures. Naoyah Akuzawa, trading as The Sango Koshi, 5-5 Beach Road, Singapore, Straits Settlements. Address for service in the United Kingdom, care of Abel & Imray, 30 Southampton Buildings, London, W. C. 2.

PUBLISHED JUNE 29, 1921

411,024 ERROR-NO—copyholders for typewriters, etc. Error-No Incorporated, 522 Ellwanger & Barry Building, 39 State street, Rochester, New York, U. S. A. Address for service in United Kingdom, care of Boult, Wade & Tennant, 112 Hatton Garden, London, E. C. 1.

411,055 ERCO—rubber goods excepting tires and tire accessories, included in Class No. 40. George Allen Stetson, trading as The Elastic Tip Co., 370 Atlantic avenue, Boston, Mass., U. S. A.

NEW ZEALAND

PUBLISHED MAY 19, 1921

16,860 Representation of a label bearing the words BARNET GLASS MILES CHEAPER & AUSTRALIAN TYRES manufactured goods of rubber and gutta percha not included in classes other than No. 40. Wording may be varied by substitution of words indicative of goods other than tires. Barnet Glass Rubber Co., Limited, 289 Swanston street, Melbourne, Victoria, Australia.

17,906 Representation of seal bearing active and inactive volcano and the words NOBEL INDUSTRIES LIMITED, TRADE MARK—manufactured goods of rubber and gutta percha not included in classes other than No. 40. Nobel Industries, Limited, 220 Winchester House, Old Broad street, London, E. C., Eng.

DESIGNS

THE UNITED STATES

NO. 57,209 Tire. Patented March 8, 1921. Term 14 years. W. Carnal, Akron, assignor to The Knox Tire & Rubber Co., Mount Vernon—both in Ohio.

57,400 Tire. Patented March 15, 1921. Term 7 years. E. R. Throsby, assignor to Kelley Tire & Rubber Co.—both of New Haven, Conn. (Shown in THE INDIA RUBBER WORLD, May 1, 1921.)

57,461 Tire casing. Patented April 5, 1921. Term 14 years. F. H. Brewster, assignor to Madison Tire & Rubber Co., Inc.—both of Buffalo, N. Y.

57,571 Tire. Patented April 26, 1921. Term 14 years. A. Balthazar, Chicopee Falls, and M. R. Shaw, Springfield, assignors to The Fisk Rubber Co., Chicopee Falls—both in Mass.

57,631 Non-skid tread. Patented April 26, 1921. Term 14 years. E. O. Fritch, Belmont, assignor to Hood Rubber Co., Watertown—both in Mass.

57,709 Tire. Patented April 26, 1921. Term 3½ years. E. H. Nahm, assignor to The Ideal Tire & Rubber Co.—both of Cleveland, O.

57,758 Tire. Patented April 26, 1921. Term 7 years. E. Yockey, Milwaukee, Wis.

57,759 Tire. Patented May 3, 1921. Term 14 years. W. E. Armacost, assignor to The Columbus Tire & Rubber Co.—both of Columbus, O.

57,764 Tire. Patented May 3, 1921. Term 7 years. E. O. Blekre, Minneapolis, Minn.

57,765 Tire. Patented May 3, 1921. Term 7 years. E. O. Blekre, Minneapolis, Minn.

57,766 Tire. Patented May 3, 1921. Term 7 years. E. O. Blekre, Minneapolis, Minn.

57,767 Tire. Patented May 3, 1921. Term 7 years. E. O. Blekre, Minneapolis, Minn.

57,776 Disk wheel for pneumatic tires. Patented May 3, 1921. Term 14 years. L. B. Harvey, Stockton, Calif., assignor to Harvey Rim & Wheel Co., Inc., Buffalo, N. Y.

57,781 Tire tread. Patented May 3, 1921. Term 14 years. N. H. Losey, Akron, O.

57,790 Tire. Patented May 3, 1921. Term 14 years. F. H. Smith, Bloomfield, N. J.

57,791 Automobile step-plate. Patented May 3, 1921. Term 14 years. F. H. Stanwood, assignor to Stanwood Equipment Co.—both of Chicago, Ill.

57,792 Automobile step-plate. Patented May 3, 1921. Term 14 years. F. H. Stanwood, assignor to Stanwood Equipment Co.—both of Chicago, Ill.

57,813 Tire core. Patented May 10, 1921. Term 14 years. W. A. Black, Perry, Ia.

57,830 Tire tread. Patented May 10, 1921. Term 3½ years. G. E. Foresman, La Fayette, Ind.

57,835 Tire tread. Patented May 10, 1921. Term 14 years. W. J. Greene, assignor to The Dixie Rubber Co.—both of Memphis, Tenn.

57,836 Tire tread. Patented May 10, 1921. Term 14 years. G. Grow, Boston, Mass.

57,842 Tire tread. Patented May 10, 1921. Term 7 years. C. A. Kline, San Francisco, Calif.

57,849 Tire. Patented May 10, 1921. Term 14 years. C. W. McKone, assignor to The Tuscan Tire & Rubber Co.—both of Carrollton, O.

57,856 Tire. Patented May 10, 1921. Term 14 years. J. Olson, Delavan, Ill.

57,861 Disk wheel for pneumatic tires. Patented May 10, 1921. Term 14 years. A. L. Putnam, assignor by mesne assignments to Detroit Pressed Steel Co., a Delaware corporation—both of Detroit, Mich. (See THE INDIA RUBBER WORLD, January 1, 1920, page 225.)

57,870 Tire. Patented May 10, 1921. Term 14 years. R. J. Stokes, assignor to Thermoid Rubber Co.—both of Trenton, N. J.

57,872 Tire. Patented May 10, 1921. Term 14 years. M. Switzer, assignor to Kelly-Springfield Tire Co.—both of New York, N. Y.

57,873 Tire tread. Patented May 10, 1921. Term 14 years. J. D. Tew, Akron, O., assignor to The B. F. Goodrich Co., New York, N. Y.

57,874 Rubber heel. Patented May 10, 1921. Term 7 years. T. Trimboli, Uhrichsville, O.

57,878 Tire. Patented May 10, 1921. Term 14 years. R. H. Waters, Akron, O., assignor to Kelly-Springfield Tire Co., New York, N. Y.

57,879 Tire. Patented May 10, 1921. Term 14 years. O. H. Williams, Columbus, O.

57,880 Tire. Patented May 10, 1921. Term 7 years. J. G. Wolfe, Chicago, Ill.

57,881 Tire. Patented May 17, 1921. Term 7 years. O. Basten, assignor to Sterling Tire Corporation—both of Rutherford, N. J.

57,886 Tire tread. Patented May 17, 1921. Term 14 years. A. L. Breitenstein, Akron, assignor to Hannibal Rubber Co., Hannibal—both in Ohio.

57,887 Tire tread. Patented May 17, 1921. Term 14 years. A. L. Breitenstein, Akron, assignor to Hannibal Rubber Co., Hannibal—both in Ohio.

57,888 Tire. Patented May 17, 1921. Term 3½ years. R. Butler, Barberton, O.

57,889 Tire. Patented May 17, 1921. Term 3½ years. R. Butler, Barberton, O.

57,894 Rubber-tired toy vehicle. Patented May 17, 1921. Term 7 years. G. Eklund, Winona, Minn.

57,898 Non-skid plate for automobile tires. Patented May 17, 1921. Term 7 years. C. B. Gibson, Chicago, Ill.

57,899 Tire tread. Patented May 17, 1921. Term 14 years. J. Graham, Detroit, Mich.

57,921 Disk wheel for use with pneumatic tires. Patented May 17, 1921. Term 14 years. V. Lougheed, Santa Barbara, assignor to Duodisk Steel Wheel Corporation, Los Angeles—both in Calif.

57,926 Tire casing. Patented May 17, 1921. Term 3½ years. G. W. Odell, assignor to International India Rubber Corporation—both of South Bend, Ind.

57,937 Tire. Patented May 17, 1921. Term 14 years. F. H. Smith, Bloomfield, N. J.

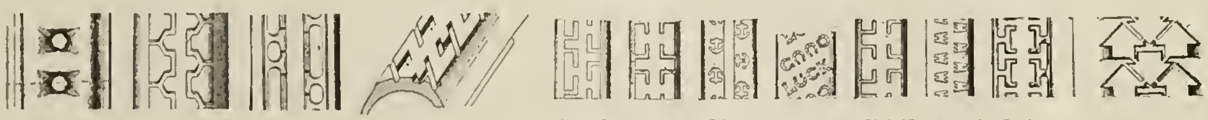
57,948 Tire. Patented May 17, 1921. Term 14 years. M. Switzer, assignor to Kelly-Springfield Tire Co.—both of New York, N. Y.

57,953 Tire. Patented May 17, 1921. Term 14 years. R. S. Trogner, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.

57,966 Wheel for use with pneumatic tires. Patented May 24, 1921. Term 14 years. G. H. Forsyth, Chicago, Ill.

57,967 Disk wheel for use with pneumatic tires. Patented May 24, 1921. Term 14 years. G. H. Forsyth, Chicago, Ill.

57,973 Disk wheel for use with pneumatic tires. Patented May 24, 1921. Term 14 years. L. B. Harvey, Stockton, Calif., assignor to Harvey Rim and Wheel Co., Inc., Buffalo, N. Y.



57,631 57,709 57,461 57,758 58,058 57,764 57,937 57,842 57,765 58,018 57,830 58,080

58,081 57,836 57,879 57,889 58,113 57,759 57,766 57,209 57,571 57,767 57,856 58,022 57,835 57,888 57,926 58,067

57,886 57,880 57,878 57,953 57,870 57,872 57,948 57,887 57,899 57,983 57,881 57,781 58,017 57,849 57,790 57,873

57,983 Tire. Patented May 24, 1921. Term 14 years. W. M. Mackintosh, Springfield Township, Summit County, O.
57,989 Wall tumbler-holder with rubber-covered ring. Patented May 24, 1921. Term 14 years. C. A. Mosgrove, Watertown, Conn., assignor to The Autoyre Co., a Connecticut corporation.
58,017 Tire. Patented May 31, 1921. Term 7 years. W. A. Brubaker, Akron, O., assignor to Nu-Cord Rubber Co., Greensburg, Pa.
58,018 Tire. Patented May 31, 1921. Term 14 years. E. L. Campbell, assignor to The J. R. Watkins Co.—both of Winona, Minn.
58,022 Tire. Patented May 31, 1921. Term 14 years. D. A. Doyle, Jr., Akron, O.
58,058 Tire. Patented June 7, 1921. Term 7 years. E. O. Blekre, Minneapolis, Minn.
58,067 Tire. Patented June 7, 1921. Term 14 years. A. K. Brill, Muskegon, Mich., assignor to The Brunswick-Balke-Collender Co., Chicago, Ill.
58,070 Automobile disk wheel for pneumatic tires. Patented June 7, 1921. Term 14 years. F. S. Carver, East Orange, N. J.
58,080 Non-skid tread. Patented June 7, 1921. Term 14 years. A. A. Glidden, assignor to Hood Rubber Co., both of Watertown, Mass.
58,081 Tire tread. Patented June 7, 1921. Term 14 years. A. A. Glidden and G. G. Buell, Watertown, and E. O. Fritch, Belmont, assignors to Hood Rubber Co., Watertown—both in Mass.
58,109 Toy balloon. Patented June 7, 1921. Term, 14 years. E. T. Richert, Canton, O.
58,113 Tire tread. Patented June 7, 1921. Term 3½ years. J. E. Schneider, assignor to Beach-Wagstaff Rubber Corporation—both of Dallas, Tex.
58,164 Steel wheel for pneumatic tires. Patented June 14, 1921. Term 14 years. A. M. Stanley, Lynn, assignor to Stanley Steel Welded Wheel Corporation, Boston—both in Mass.

GERMANY

DESIGN PATENTS WITH DATES OF ISSUE

774,912 (January 13, 1921.) Hose coupling Pressluft-Industrie, Max L. Froning, Dortmund-Körne.
774,929 (March 5, 1921.) Rubber sole. Hannoversche Gummi-Regenerierwerke Luttermann & Co., G. m. b. H., Wunstorf.
774,930 (March 5, 1921.) Rubber sole, heel lift. Hannoversche Gummi-Regenerierwerke Luttermann & Co., G. m. b. H., Wunstorf.
775,093 (March 19, 1921.) Rubber sole. Balata-Werke Ferdinand Stein, Hannover-Wülfel.
775,094 (March 19, 1921.) Rubber sole. Balata-Werke Ferdinand Stein, Hannover-Wülfel.
775,253 (March 12, 1921.) Rubber tire. Gummi-Klötzer G. m. b. H., Dresden.
775,399 (March 31, 1921.) Rubber heel. Julius Schmitt, Grossenhaum.
775,485 (March 31, 1921.) Welding tube of rubber with inserts of fabric and covering of asbestos fabric. Paul Kölbel & Co., Hannover.
775,548 (March 31, 1921.) Corn plaster. "Vulnoplast" Fabrik Bonner Kautschukpflaster und chemisch-pharmazentischer Präparate, Bonn a. Rh.
775,575 (April 4, 1921.) Exchangeable rubber lift for shoe heels. Johannes Wulff, Grenadurstrasse 21, Schwerin i. M.
775,809 (July 14, 1920). Rupture band. Heinrich Fries and Adolf Traut, Cecilienkloster 5, Cologne on Rhine.
776,079 (March 12, 1921.) Rubber sole. Balata-Werke Ferdinand Stein, Hannover-Wülfel.
776,149 (March 10, 1921.) Rubber plate for the making of rubber soles. Chem. Fabrik Kossack, Düsseldorf.
776,229 (March 7, 1921.) Self-acting irrigator. W. Schleenbecker, Giessen.
776,295 (February 14, 1921.) Rubber sole. Jakob Kraft and Albert Kögl, Werderstrasse 25, Augsburg.
776,301 (March 3, 1921.) Rubber sucker with container and stop motion. August Hobenstein, Ludwigsstrasse 35, Ludwigshafen on Rhine.
776,345 (April 7, 1921.) Revoluble rubber heel. Carl Schürer, Riebeckstrasse 24, Leipzig-Reudnitz.
776,349 (April 8, 1921.) Rubber calks for shoe soles. Carl Fr. Lommel, Bad Hornburg.
776,507 (March 31, 1920.) Tire of rubber substitute. Johannes Barth, Schmannewitz.
776,520 (March 2, 1921.) Rubber heel pad for orthopedic shoes. Westdeutsche Gummi-Compagnie H. Chormann, Düsseldorf.
776,813 (April 13, 1921.) Hæmorrhoidal pessary. Paul Henning, Kaiserin-Augusta Allee 77, Charlottenburg.
777,077 (November 29, 1920). Tire protector of leather with rubber tread. Caspar Schmitz, Neue Winterfeldstrasse 2-3, Berlin.
777,128 (April 12, 1921.) Rubber mat for running-board of automobiles. Lorge & Sabeck G. m. b. H., Berlin.
777,916 (February 26, 1921) Rubber sole for footwear. "Profitens" Gummiwaren-Gesellschaft m. b. H., Dortmund.
777,917 (February 26, 1921) Stretchable rubber sole, with protuberances. "Profitens" Gummiwaren-Gesellschaft m. b. H., Dortmund.
778,104 (April 11, 1921) Hose coupling. Pressluft-Industrie, Max L. Froning, Dortmund Körne.
778,129 (April 25, 1921) Insulation for heat and cold protector. Philipp Gelius, Albanistrasse 2, Munich.
778,575 (April 25, 1921) Connection for belting. Waldemar Wagner, Scheveningen a. N.
778,590 (April 28, 1921) Haemorrhoidal pessary. Hugo Gohmann, Sedanstrasse 27, Dortmund.
778,740 (May 2, 1921) Veil-like covering of rubber to protect ladies' hats from rain. Paul Hesse, Busingstrasse 12, Berlin-Friedenau.
778,818 (March 21, 1921) Connection for all kinds of belting. Anton Dubbelmann, Röckumstrasse 46a, Bonn E.
779,119 (December 17, 1920) Protector for pneumatic pressure tire. Eduard Fromm, Neufreistett i. B.
779,152 (April 22, 1921) Non-skid tread for pneumatic tires. Karl Pistor, Königstrasse 412, Elberfeld.
779,281 (March 29, 1921) Armored non-skid tire for bicycles. Willy Bronski, Wiesenstrasse 33, Hamborn.
779,553 (May 2, 1921) Overlay of rubber or similar material for shoe heels. Wilhelm Kaufmann, Eupen; represented by A. Kuhn, Berlin S. W. 61.
779,714 (May 6, 1921) Rubber sole with central groove. Hessische Gummiwaren-fabrik Fritz Peter, Klein-Auheim-on-the-Main.
779,725 (May 9, 1921) Shock absorber for the revolving rubber plate on heels of boots. Carl Kienle, Hauptstrasse 21, Stuttgart-Gaisburg.
780,149 (January 20, 1921) Rubber heel. H. C. Meyer, Jr., Harburg-Elbe.
780,156 (March 21, 1921) Rubber heel patch. "Profitens" Gummiwaren-Gesellschaft, m. b. H., Dortmund.
780,186 (May 2, 1921) Sole of rubber or similar material. Wilhelm Kaufmann, Eupen; represented by A. Kuhn, Berlin S. W. 61.
780,216 (May 12, 1921) Self-attachable rubber heel. Conrad Kiersch, Wismar i. M.
780,219 (May 13, 1921) Rubber sole. Continentale Isola-Werke A-G., Birkesdorf b. Duren.

CASTING FOR TOY BALLOONS

By Felix J. Koch

Pure gum gas balloons, ordinarily called toy balloons, have as a rule been a sort of kindergarten proposition. To be sure, those who study upper air currents for weather reports use them from time to time in carrying instruments to high altitudes for obtaining meteorological data. Then, too, Europeans went very largely into advertising balloons, making many thousands of types that without doubt served an excellent purpose. Occasionally, also, they were used for decorations at banquets in the pre-Volstead days. Today, however, the balloon the world over is bought chiefly by indulgent parents or nurses to keep the little folks quiet. That the balloon should do something for the elders in the way of sport was not imagined until a sportive crowd in Cincinnati evolved the idea of fishing for them. The procedure is as follows:

The balloons, anchored out in mid-stream or far enough away from the shore to make a cast difficult, are placed at spaced intervals. The fisher, with casting rod and whatever type of hook he selects, stands on the shore and casts. The game, of course, is to get the balloon ashore without bursting it. The country clubs that have ponds, and fishing and game associations throughout the Middle West, have taken to the sport

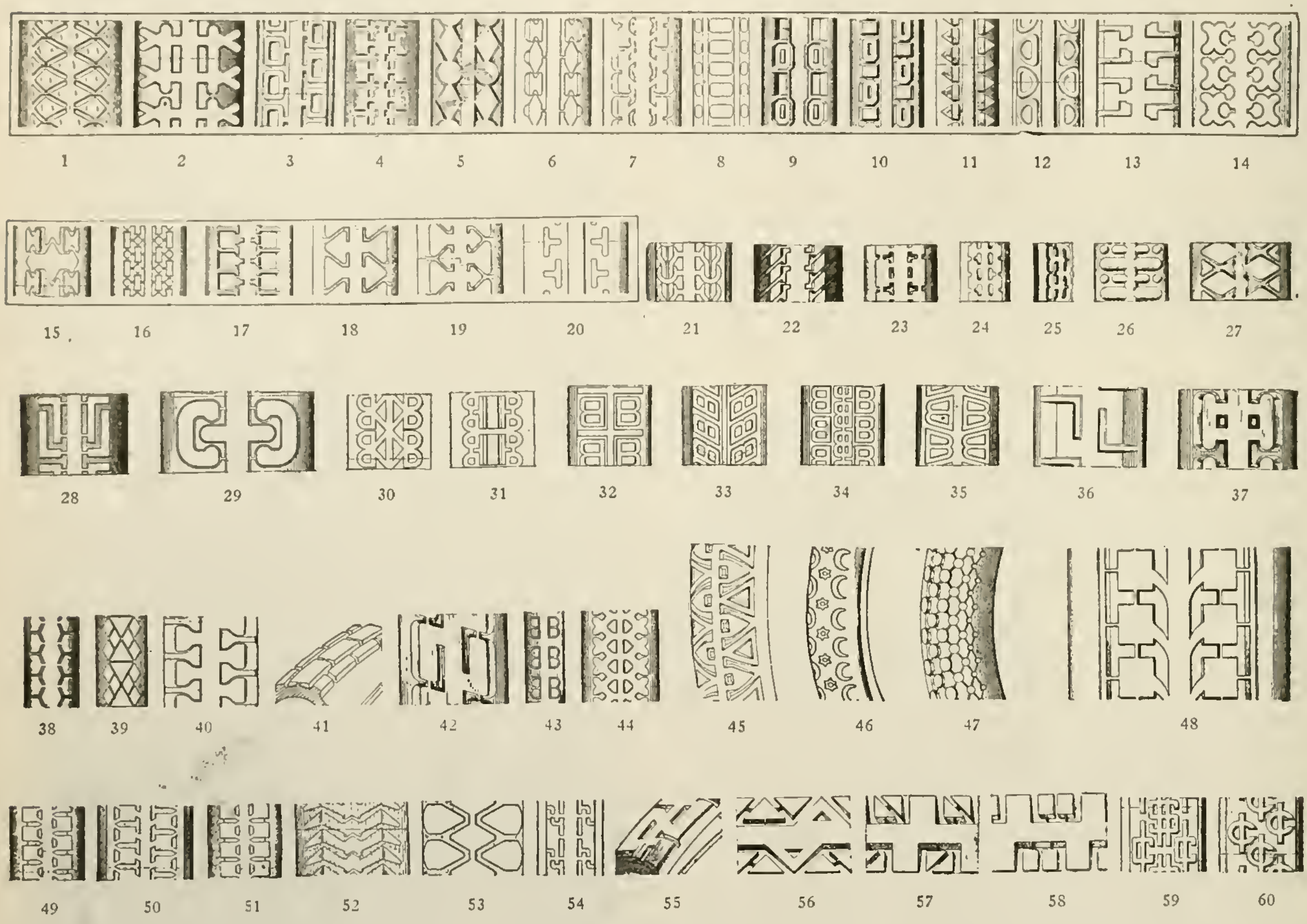
Bait Casters Ready for the Contest

most enthusiastically. Moreover, the practice thus afforded teaches casting, both bait and fly, better than almost any other way.

Of course there are many ways of varying the contests. The balloons may be anchored so that they will remain in designated places, or they may be weighted so that they just rest on the surface of the water and are blown in various directions by the breezes or carried by the current. With one hundred balloons on the shore of a lake, with the contestants drawing lots for position, and with valuable prizes, a game that is bound to be a popular holiday diversion has at last been evolved for the rubber toy balloon.

Pneumatic Tire Tread Designs

September, 1920, to November, 1920, and January, 1921, to March, 1921



CUT	PATENT	PATENTEE OR ASSIGNEE AND ADDRESS
(1)	55,585	G. E. Batcheller, Forest Hills, New York.
(2)	55,586	R. D. Belden, Marion, Ohio.
(3)	55,588	W. O. Bruess, Port Clinton, Ohio.
(4)	55,600	T. Follen, La Fayette, Indiana.
(5)	55,606	The Bowling Green Rubber Co., Toledo, Ohio.
(6)	55,611	Henderson Tire & Rubber Corp., Columbus, Ohio.
(7)	55,612	Henderson Tire & Rubber Corp., Columbus, Ohio.
(8)	55,630	R. P. McElrath, Lakewood, Ohio.
(9)	55,728	W. C. Owen, Cleveland, Ohio.
(10)	55,729	W. C. Owen, Cleveland, Ohio.
(11)	55,808	Armorcord Rubber Co., Morgantown, West Virginia.
(12)	55,813	W. C. Owen, Cleveland, Ohio.
(13)	55,832	Biltwell Tire & Rubber Co., Barberton, Ohio.
(14)	55,842	Wilson Rubber Co., Des Moines, Iowa.
(15)	55,966	The B. F. Goodrich Co., New York City.
(16)	55,987	W. E. Duersten, New Castle, Pennsylvania.
(17)	56,046	The Wildman Rubber Co., Detroit, Michigan.
(18)	56,103	U. S. Compression Inner Tube Co., Tulsa, Oklahoma.
(19)	56,104	U. S. Compression Inner Tube Co., Tulsa, Oklahoma.
(20)	56,105	U. S. Compression Inner Tube Co., Tulsa, Oklahoma.
(21)	56,271	E. O. Blekre, Sioux City, Iowa.
(22)	56,113	W. H. Milliken, Cleveland, Ohio.
(23)	56,158	The Charles William Stores, Inc., Brooklyn, New York.
(24)	56,243	H. H. Swan, Grand Rapids, Michigan.
(25)	56,282	The General Tire & Rubber Co., Akron, Ohio.
(26)	56,307	The B. F. Goodrich Co., New York City.
(27)	56,300	The McLean Tire & Rubber Co., Cleveland, Ohio.
(28)	56,122	The Charles William Stores, Inc., Brooklyn, New York.
(29)	56,217	Chillicothe Tire & Rubber Co., Chillicothe, Ohio.
(30)	56,265	E. O. Blekre, Sioux City, Iowa.
(31)	56,266	E. O. Blekre, Sioux City, Iowa.
(32)	56,267	E. O. Blekre, Sioux City, Iowa.
(33)	56,268	E. O. Blekre, Sioux City, Iowa.
(34)	56,269	E. O. Blekre, Sioux City, Iowa.
(35)	56,270	E. O. Blekre, Sioux City, Iowa.
(36)	56,260	J. M. Alderfer, Akron, Ohio.
(37)	56,299	The McLean Tire & Rubber Co., Cleveland, Ohio.
(38)	56,490	Lincoln Highway Tire Co., Fulton, Illinois.
(39)	56,616	E. C. Hufford and W. S. Bates, Watts, California.
(40)	56,620	The Cascade Tire & Rubber Co., Ravenna, Ohio.
(41)	56,623	The Dunlop Rubber Co., Limited, London, England.
(42)	56,619	The Amazon Rubber Co., Akron, Ohio.
(43)	56,688	W. P. Braender, Passaic, New Jersey.
(44)	56,691	The Ideal Tire & Rubber Co., Cleveland, Ohio.
(45)	56,750	The Gordon Tire & Rubber Co., Canton, Ohio.
(46)	56,723	A. Heskett, Oakland, California.
(47)	56,766	H. S. Rector, Chicago, Illinois.
(48)	56,734	E. O. Blekre, Sioux City, Iowa.
(49)	56,908	E. O. Blekre, Sioux City, Iowa.
(50)	56,909	E. O. Blekre, Sioux City, Iowa.
(51)	56,910	E. O. Blekre, Sioux City, Iowa.
(52)	56,911	D. F. Crow, Omaha, Nebraska.
(53)	56,918	R. B. Gillette and R. W. Hutchins, Eau Claire, Wisconsin.
(54)	56,921	Syracuse Rubber Co., Inc., Syracuse, New York.
(55)	56,934	D. W. Whipple, New York City.
(56)	56,974	H. L. Kenyon, Setauket, New York.
(57)	56,975	H. L. Kenyon, Setauket, New York.
(58)	56,976	H. L. Kenyon, Setauket, New York.
(59)	56,980	E. L. Lawlor, Youngstown, Ohio.
(60)	56,981	E. L. Lawlor, Youngstown, Ohio.

OCEAN RATES FROM NEW YORK ON TIRES, TUBES, MECHANICAL GOODS, CLOTHING, FOOTWEAR AND DRUGGISTS' SUNDRIES[1]

(Same rates apply from other Atlantic ports where service is available.)

AFRICA

Country and Port	Rates Cu. Ft.	Rates 100 lbs.
Africa, East Coast—		
Beira	..	*$26.00
Plus landing charges $0.30 per ton.		
Kilindini	..	*34.40
Delagoa Bay, Lourence Marques	..	*25.40
Mauritius	..	*30.00
North Coast—		
All ports	..	*22.00
Egypt—		
Alexandria	..	*22.00
South Coast—		
Algoa Bay	..	*23.60
Capetown	..	*23.00
East London	..	*24.20
Port Natal	..	*24.80
West Coast—		
Accra-Lagos, Secondi, Buruttu	..	*30.00
Dakar, Freetown	..	*28.00
Boma, Matadi	..	*32.00

ASIA

Country and Port	Rates Cu. Ft.	Rates 100 lbs.
China—		
Hongkong, Shanghai	..	*23.00
India—		
All direct ports	..	*21.00
Madras, Rangoon	..	*23.00
Japan—		
All direct ports	..	*23.00
Java—		
All ports	..	*21.00
Manchuria—		
Dalny	..	*24.00
Philippines—		
Manila	..	*23.00
Straits Settlements—		
Singapore, Penang	..	*21.00
Syria—		
Beyrout	..	*24.00

CENTRAL AMERICA

Country and Port	Rates Cu. Ft.	Rates 100 lbs.
Costa Rica—		
Port Limon	$.64	1.31
Mexico—		
Tampico	.52½	1.05
Plus 2½c. per 100 lbs. bar dues.		
Vera Cruz, Puerto Mexico	.52½	1.05
Panama—		
Colon	.32	.64
Plus $1 per ton transfer charge.		
Panama	.37	.74
Plus $1 per ton transfer charge.		
Salvador—		
La Libertad	.79	1.42

[1]Compiled by Austin Baldwin & Co., Inc., foreign freight contractors, 44 Whitehall st., New York, N. Y.

EUROPE

Country and Port	Rates Cu. Ft.	Rates 100 lbs.
Belgium—		
Antwerp	.40	.75
British Isles—		
All ports	.45	.85
Except rubber belting	.50	1.00
Canary Islands—		
Las Palmas	..	*25.00
Denmark—		
Copenhagen	.55	1.00
Esthonia—		
Reval	.75	1.50
Finland—		
Helsingfors	.75	1.50
France—		
All Atlantic ports	.40	.75
Marseilles	..	*20.00
Germany—		
Hamburg, Bremen	.45	.82½
Danzig	.50	.90
Greece—		
All ports	..	*22.00
Holland—		
Rotterdam	.40	.75
Amsterdam	.40	.75
Italy—		
Direct ports	.50	1.00
Fiume, Trieste, Venice	..	*26.00
Norway—		
All ports	.55	1.00
Portugal—		
Lisbon	..	*20.00
Oporto	..	*25.00
Rumania—		
All ports	..	*25.00
Spain—		
All ports	..	*20.00
Gibraltar	.65	1.20
Sweden—		
Malmo, Stockholm	.65	1.25
Gothenburg	.55	1.00

SOUTH AMERICA

Country and Port	Rates Cu. Ft.	Rates 100 lbs.
Argentina—		
Buenos Aires	..	*20.00
Rosario	..	*27.50
Brazil—		
Rio de Janeiro	..	*22.50
Santos	..	*20.00
Bahia	..	*24.00
Pernambuco	..	*23.50
Chili—		
All ports	.74	1.32
Colombia—		
Cartagena, Puerto Colombia, Santa Marta	.51	1.12
Plus government charges.		
Buenaventura— (via direct steamer)	1.03	1.84
(via transshipment)	.98	1.75
Ecuador—		
Guayaquil— (via direct steamer)	.74	1.32
(via transshipment)	.70	1.25
Peru—		
Callao, Mollendo	.74	1.32
Uruguay—		
Montevideo	..	*20.00
Venezuela—		
La Guayra	.40	.65
Plus 4c per 100 kilos landing charge, plus 40% surcharge.		
New Zealand—		
All ports	..	*30.00

WEST INDIES

Country and Port	Rates Cu. Ft.	Rates 100 lbs.
Bermuda—		
Hamilton	.37	.75
Grenada, St. Croix, St. Thomas, St. Kitts	.50	1.00
Port of Spain	.40	.75
Cuba—		
Havana	.47	.94
Plus 30c per 100 lbs. Cuban wharfage and handling charges.		
Santiago	.59	1.18
Cienfuegos	.61	1.21
Curacao—		
Curacao	.30	.65
Plus 40% surcharge.		
Jamaica—		
Kingston	.42	.84
Porto Rico—		
All ports	.31	.75
San Juan landing charge 1c per ft., or 2½c per 100 lbs. additional.		
Santo Domingo—		
Santo Domingo	.51	.91

*Rate figured on ton of 40 cubic feet or 2,240 lbs.

THE MARKET FOR RUBBER SCRAP

NEW YORK

There is practically no market in rubber scrap. The crude rubber situation is the despair of both the scrap dealer and the reclaimer. Orders have practically ceased in these lines with small prospect of better business in the near future.

QUOTATIONS FOR CARLOAD LOTS DELIVERED

July 25, 1921

Prices subject to change without notice

BOOTS AND SHOES			
Arctic tops	lb.	*$0.075 @	
Boots and shoes	lb.	*.03½ @	.04
Trimmed arctics	lb.	*.02¾ @	.03
Untrimmed arctics	lb.	*.02 @	.02¼
HARD RUBBER			
Battery jars, black compound	lb.	*.07½ @	.01
No. 1, bright fracture	lb.	*.12 @	.15
INNER TUBES			
No. 1	lb.	*.06 @	.06¼
Compounded	lb.	*.04¼ @	.04½
Red	lb.	*.04¼ @	.04¾
MECHANICALS			
Black scrap, mixed, No. 1	lb.	*.02¼ @	.03
No. 2	lb.	*.01½ @	.02
Car springs	lb.	*.02½ @	.03
Heels	lb.	*.02½ @	.03
Horse-shoe pads	lb.	*.02½ @	.03
Hose, air brake	lb.	*.01 @	.01¼
fire, cotton lined	lb.	*.01 @	
garden	lb.	.07 @	.01
Insulated wire stripping, free from fiber	lb.	*.01½ @	.02
Matting	lb.	*.01 @	
Red packing	lb.	*.04½ @	.05
Red scrap, No. 1	lb.	*.07 @	.08
No. 2	lb.	*.05½ @	.06
White scrap, No. 1	lb.	*.07 @	.07½
No. 2	lb.	*.06 @	.06½
TIRES			
PNEUMATIC—			
Auto peelings	lb.	*.02 @	.02¼
Bicycle	lb.	*.01½ @	.02
Standard white auto	lb.	*.02¼ @	.02¾
Mixed auto	lb.	*.01 @	.01½
Stripped, unguaranteed	lb	*.01 @	.01½
White, G. & G., M. & W., and U. S.	lb.	*.02¾ @	
SOLID—			
Carriage	lb.	*.02¼ @	.02¾
Iron	lb	@	
Truck, clean	lb.	*.01½ @	.02

*Nominal.

Review of the Crude Rubber Market

NEW YORK

The firm market tendency shown early in July was due to settlement time in London and local short-covering. Some rubber was sold to factories who were attracted by the low prevailing prices, but when the market advanced slightly they withdrew, indicating a belief in lower prices.

On July 2, spot first latex crêpe sold for 14 cents; with futures ranging from 14¾ cents for September and 16 cents for December, to 17 cents for January, 1922. Spot ribbed smoked sheets sold for 12 cents on July 2, and future quotations were 12¾ for September, 14 cents for December, and 14½ cents for January, 1922.

Following the Rubber Growers Association's announcement of a 50 per cent crop reduction, the market stiffened and large operators refused to sell, resulting in many buying orders being cabled to the Far East. All large holders of rubber believed that the low prevailing prices were ended, and refused to accept factory business only at advanced prices. With greatly reduced rubber arrivals and better banking facilities the importers are apparently able to carry rubber and avoid further losses.

As the month progressed, the market developed strength, thus renewing the interest of both seller and buyer. As the result there was considerable activity in which factories and dealers contributed to give added strength to the market that continued to hold firmly despite several large arrivals.

On July 23, spot first latex crêpe sold for 16 cents with futures ranging from 16½ cents for September and 17½ for December, to 18½ cents for January, 1922. Spot ribbed smoked sheets sold for 14½ cents on July 23, and future quotations were 15 cents for September, 15¾ cents for December and 16¾ cents for January, 1922.

Brazilian Parás have moved upward in sympathy with the market for plantations, spot upriver fine advancing from 16 cents on July 2, to 17 cents on July 23.

Imports of all grades during June were 13,477 tons, compared with 14,881 tons last year. Plantation arrivals for June were 12,361 tons, compared with 12,911 tons a year ago. Total imports of all grades for the first six months of 1921 were 78,712 tons, compared with 151,889 tons for the same period in 1920.

Spot and future quotations on standard plantation and Brazilian grades were as follows:

Plantations. July 2. Spot, first latex crêpe, 14 to 14½ cents; July—September, 14¾ cents; October—December, 16 cents. July 23. Spot, first latex crêpe, 15½ cents; August—September, 15¾ cents; October—December, 16½ cents; January—March, 17½ cents.

July 2. Spot, ribbed smoked sheets, 12 @ 12½ cents; July—September, 12¾ cents; October—December, 14 cents. July 23. Spot, ribbed smoked sheets, 14½ cents; August—September, 14¾ cents; October—December, 15¼ cents; January—March, 16½ cents.

July 2. Spot, No. 1 amber crêpe, 11½ cents; July—September, 12 cents; July—December, 13 cents. July 23. Spot, No. 1 amber crêpe, 13¾ cents; August—September, 14 cents; October—December, 14¾ cents; January—March, 15 cents.

July 2. Spot, No. 1 rolled brown crêpe, .08½ @ .09 cents; July—September, .09½ cents.

July 23. Spot, No. 1 rolled brown crêpe, 11¼ cents; August—September, 11¼ cents; October—December, 11¼ cents; January—March, 11¾ cents.

South American Parás and Caucho. July 2. Spot, upriver fine, 16 cents; islands fine, 16½ cents; upriver coarse, .08 cents; islands coarse, .08½ cents; Cametá, .07½ cents; caucho ball, .09 cents. July 23. Spot, upriver fine, 17 cents; islands fine, 16½ cents; upriver coarse, .08¼ cents; islands coarse, .08 cents; Cametá, .08¼ cents; caucho ball, 10½ cents.

NEW YORK QUOTATIONS

Following are the New York spot quotations, for one year ago, one month ago, and July 23, the current date:

	August 2, 1920	July 1, 1921	July 23, 1921
PLANTATION HEVEA			
First latex crêpe	$0.30 @	$0.14½ @	$0.15½ @
Off latex crêpe	@	.13 @	.15 @
Amber crêpe No. 1	.29 @	.12 @	.13¾ @
Amber crêpe No. 2	.28 @	.11 @	.12¾ @
Amber crêpe No. 3	.28½ @	.10 @	.11¾ @
Brown crêpe, thick and thin	.29 @	.12½ @	.12½ @ .13
Brown crêpe, specky	.28 @	.09 @	.11½ @
Brown crêpe, rolled	.25 @	.09 @	.11¼ @
Smoked sheet, ribbed	.29½ @	.12 @ .13½	.14½ @
Smoked sheet, plain	.30 @	.11 @	.12 @
Unsmoked sheet	.25 @	.10 @	@
Colombo scrap No. 1	.23 @	.08 @	.11 @
Colombo scrap No. 2	.21½ @	.07 @	.10 @
EAST INDIAN			
Assam crêpe	@	@	@
Assam onions	@	@	@
Penang block scrap	@	@	@
PONTIANAK			
Banjermassin	.12 @	.06½ @	.06½ @ .07
Palembang	.13 @	@	.07¾ @
Pressed block	.23 @	.11 @	.09 @ .10
Sarawak	@	.05½ @	.06¼ @
SOUTH AMERICAN			
PARAS			
Upriver, fine	.34½ @ .35	.15 @ .16	.17 @ .17½
Upriver, medium	.30 @	.13 @ .14	.15½ @
Upriver, coarse	.22 @	.07 @ .08	.08½ @
Upriver, weak, fine	.30 @	.12 @	.14 @
Islands, fine	.32 @	.17 @	.16½ @
Islands, medium	.30 @	.13 @	.13½ @
Islands, coarse	.20 @	.09 @	.08 @ .08½
Cametá	.18 @	.08 @	.08¼ @
Acre Bolivian, fine	.36 @	.16 @ .16½	.17 @
Madeira, fine	.37 @	.18 @ .19	.18½ @
Peruvian, fine	.32 @	.15 @	.15½ @
Tapajos, fine	.30 @	.15 @	.15 @
CAUCHO			
Upper caucho ball	.24 @	.09 @ .10	.10 @
Lower caucho ball	.21 @	07 @	.08¼ @
MANICOBAS			
Ceará negro heads	@	*.10 @	.10 @
Ceará scrap	@	*.04 @	.07½ @
Maniçoba, 30% guarantee	@	*.10 @	.09 @
Mangabeira thin sheet	@	*.12 @	.10 @
CENTRALS			
Corinto scrap	.19 @	.06 @ .08	.10 @ .11
Central scrap	.19 @	.06 @ .08	.10 @ .11
Central scrap and strip	.17 @	.06 @ .08	.08 @ .10
Central wet sheet	.13 @	.03 @ .04	.02 @ .04
Esmeralda sausage	.19 @	.06 @ .08	.10 @ .11
Guayule, 20% guarantee	.28 @	@	@
Guayule, washed and dried	.38 @	.26 @	.25 @
AFRICANS			
Benguela, No. 1, 28½%	.14 @	.04 @	.04 @ .05
Benguela, No. 2, 32½%	@	@	.06 @
Conakry niggers	@	@	@
Congo prime, black upper	@	@	@
Congo prime, red upper	@	@	@
Kassai, black	@	@	@
red	@	@	@
Massai sheets and strings	@	@	@
Niger flake, prime	.18¾ @	@	.11 @ .13
Rio Nunez ball	@	@	@
Rio Nunez sheets, strings	@	@	@
GUTTA PERCHA			
Gutta Siak	.24 @ .25	.13½ @ .14	.14 @ .15
Red Macassar	2.80 @	1.50 @ 2.00	2.50 @ 3.00
BALATA			
Block, Ciudad, Bolivar	72 @	.51 @ .54	.53 @ .54
Colombia	.50 @ .51	.35 @ .38	.39 @ .40
Panama	@	.25 @ .35	.39 @ .40
Surinam sheet	.73 @	.65 @ .70	.67 @ .68
amber	.82 @	.67 @ .73	.70 @

RECLAIMED RUBBER

The demand for reclaimed rubber has not increased notably during the past month and the outlook is problematic, dependent for the most part on the revival of crude rubber prices. Reclaimers are anticipating better business by October when the steady increase in rubber manufacturing operations will have reached considerable proportions and result in increased call for reclaims, at least of the better grades. Reclaimers in general are operating at about 25 per cent of capacity.

NEW YORK QUOTATIONS

July 25, 1921.

Prices subject to change without notice.

STANDARD RECLAIMS		
Floating	$0.14	@ $0.16
Friction	.14	@ .16
Mechanical	.09	@ .11
Shoe	.11¼	@ .12¼
Tires, auto	.11¼	@ .13¼
truck	.09	@ .11
White	.14	@ .15

ANTWERP RUBBER MARKET

OSTERRIETH & CO., Antwerp, report under date of July 9, 1921. Soon after our last market report was despatched we have experienced a better market with buyers coming in more freely, the coal strike having come to an end. Unfortunately this regain of activity did not last very long and although stocks in London decreased by a few hundred tons the better level of prices could not be maintained and we close the week at:

	Crêpes, Francs per Kilo	Sheets, Francs per Kilo
July, 1921	3.80	3.40
August	3.90	3.40
September	4.60	3.40
October	4.15	3.50
November	4.20	3.55
December	4.30	3.55
January, 1922	4.50	3.55
February	4.60	3.65
March	4.60	3.75
April	4.60	3.75
May	4.60	3.75
June	4.60	3.75

There is a certain interest for Congo rubber and bids have been made of fr. 1.50 for Kasai Lcanda II and fr. 2.50 for Prime Black Kasai; these prices have been found too low by the owners and no business resulted so far.

Stock to-day: about 1,971 tons.

HAMBURG RUBBER MARKET

Effektin-Rohgummimakler-Verein, Hamburg, report, under date of June 25, 1921.

Although prices were lower owing to the continuation of the coal strike in England, business during this week was quite active. Both new purchases by manufacturers and filling of contracts took place, as well as considerable transactions for later delivery.

Arrivals were normal; sales took place in nearly all plantation grades as well as in fine Parà and caucho ball. The following prices were quoted:

	Marks
First latex crêpe	19.50@ 21
Ribbed smoked sheets	17.50@ 19
Ribbed smoked sheets, lower grade	14.50@ 16.50
Brown crêpe, clean	14.50@ 15.50
Brown crêpe, somewhat barky	12.50@ 14
Dark crêpe	10.50@ 12.50
Hard fine Parà	25 @ 27
Caucho ball	15.50@ 16.50
Panama and Colombia block balata	55 @ 75
No. 1 balata sheet	100 @105
Jelutong	12 @ 14

COMPARATIVE LOW AND HIGH NEW YORK SPOT RUBBER PRICES

	July 1921*		July 1920		July 1919	
PLANTATIONS						
First latex crêpe	$0.14	@ $0.17	$0.30	@ $0.35¼	$0.63	@ $0.63
Smoked sheet ribbed	.11½	@ .15½	.29½	@ .35	.62	@ .62
PARAS						
Upriver, fine	.15½	@ .17½	.34½	@ .35½	.68	@ .68
Upriver, coarse	.07½	@ .09	.22	@ .32	.40	@ .40
Islands, fine	.16	@ .17	.33	@ .37	.59	@ .59
Islands, coarse	.07	@ .09	.21	@ .31	.27	@ .27
Cametá	.07¼	@ .08½	.19	@ .20½	.28	@ .28

*Figured to July 25, 1921.

AMSTERDAM RUBBER MARKET

JOOSTEN & JANSSEN, Amsterdam, report, under date of July 1, 1921: This week we may call the market firmer, with a good turnover in spot parcels, especially standard crêpe and some lower qualities. The turnover on the terminal market did not amount to much, buyers being afraid to follow upward movement. The market closed rather firm, prices being as follows:

Crêpe, Fl. .41	Sheets, Fl. .38 on the spot.
Crêpe, Fl. .42½	Sheets, Fl. .39½ July—September.
Crêpe, Fl. .46½	Sheets, Fl. .43½ October—December.
Crêpe, Fl. .50	Sheets, Fl. .46 January—March.

SINGAPORE RUBBER MARKET

GUTHRIE & CO., Limited, Singapore, report under date of June 10, 1921:

The rubber market continues in a dull and depressed condition, with gradually declining values. At the weekly auctions, held yesterday, prices of most grades were ¾ cents below the level of last week, the exception being brown crêpes which were in short supply. Standard ribbed smoked sheets sold at 23 to 23½ cents, and a small quantity of Standard pale crêpes sold from 27 to 28 cents, a drop of 2½ to 3 cents on both grades. Off quality sheet was difficult of sale at 3 cents down, while off latex crêpe, although readily disposed of, declined 3½ to 4 cents in the week. Browns were steady at a cent down. Dark and barky crêpes declined heavily, and it is questionable whether it is worth while preparing these grades at present values: 991 tons were catalogued at 403 tons sold. The following is the course of values:

	In Singapore per pound	Sterling Equivalent per pound in London
Sheet, fine ribbed smoked	23 @ 23½	—/ 8½ @ —/ 8⅝
Sheet, good ribbed smoked	14 @ 22½	—/ 6 @ —/ 8⅜
Crêpe, fine pale	27 @ 28	—/10½ @ —/10⅜
Crêpe, good pale	16½ @ 26½	—/ 7⅛ @ —/10
Crêpe, fine brown	16 @ 19	—/ 7 @ —/ 7⅞
Crêpe, good brown	8 @ 14½	—/ 4¾ @ —/ 6⅛
Crêpe, dark	4½ @ 12½	—/ 3¾ @ —/ 6
Crêpe, bark	5 @ 8½	—/ 3⅞ @ —/ 4⅞

PLANTATION RUBBER EXPORTS FROM MALAYA

(These figures include the production of the Federated Malay States, but not of Ceylon.)

	January 1 to April 30, 1921	January 1 to June 9, 1921			
	Singapore	Malacca	Penang	Port Swettenham	Totals
To United Kingdom ...pounds	20,688,407	2,135,687	8,324,833	8,862,012	40,010,939
The Continent...	4,068,939	1,739,185	67,867	59,132	5,935,423
Japan	14,802,868	......	......	......	14,802.868
Ceylon	23,867	......	88,133	196,087	308,087
United States and Canada	22,948,762	15,640	334,200	......	23,298,602
Australia	427,028	806	......	......	427,834
Other countries..	......	......	796,533	......	796,533
Totals..pounds	62,959,871	3,891,618	9,611,566	9,117,231	85,580,286

Compiled by Barlow & Co., Singapore.

NEW YORK AVERAGE SPOT RUBBER PRICES

Prices in Cents Per Pound

	JUNE, 1921														JULY, 1921													
	15	16	17	18	20	21	22	23	24	25	27	28	29	30	1	2*	4†	5	6	7	8	9	11	12	13	14	15	16
PLANTATIONS: Sheet:																												
Ribbed smoked..	12¼	12⅝	12	12	11¾	11¾	11⅞	11¾	11¾	11¾	11⅞	12⅜	12⅜	12¾	12¼	...	...	12½	12¾	12¾	12¾	12¾	13¼	14⅞	13⅞	14¾	15¼	15¼
Crêpe:																												
First latex......	14¼	14⅝	14	14	13¾	13½	13¾	13¾	13⅞	13¾	13¾	14	13⅞	14¾	14½	...	...	14⅜	14½	14¾	14¾	14¾	15⅛	16¼	15⅞	15⅞	16¾	16¾
Off latex........	12¾	13¾	12¾	12¾	12⅜	12⅜	13	12½	12¼	12½	12¼	13¼	12¾	13¼	13⅛	...	...	12½	12¾	13¼	13¾	13¾	14⅛	15¼	14⅞	14¼	15¼	15¼
No. 1 blanket...	11¾	11¼	11¼	11¼	11⅜	11¼	10¾	10¾	10¾	10¾	10¾	10¾	10¾	11¼	11¼	...	...	11½	11¼	11¼	11⅝	11¼	11¾	13	12¾	12¾	13¾	13¾
No. 2 blanket...	10¾	10¼	10⅜	10⅜	10⅝	10¼	9¾	9¾	10¼	9¾	10¼	10¼	10¼	10¼	10⅜	...	...	10⅜	10¼	10½	10⅝	10¼	10¾	12	11¾	11¾	12¾	12¾
No. 3 blanket ..	9¾	9¼	9¾	9¾	9¼	9¼	9¼	9¼	9¾	9¼	9¼	9½	9¼	9¾	9¼	...	...	9½	9¼	9⅝	9⅝	9¼	10¼	11¼	10¾	10¾	11¾	11¾
Clean,thin,brown.	10	11	10¼	10¼	10¼	10¼	10¼	10¼	10	9¾	9¾	10	10¼	11	10¾	...	...	10½	10¾	10¾	10¾	10¾	11	11½	12⅛	11¼	12¼	12¼
Specky brown...	9	9¼	8⅞	8⅞	9¼	9¼	8¾	9½	8⅛	8½	8¾	8⅞	9¼	9⅝	9¾	...	...	9⅜	9⅝	9⅝	9½	9½	9¾	10½	10¾	10⅛	11⅛	11⅛
Rolled brown...	8⅝	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	9	9	...	...	8¾	8¾	9¼	9½	9½	9¼	10¼	10¼	10¼	10¾	10¾

*Trade closed. †Holiday.

FEDERATED MALAY STATES RUBBER EXPORTS

An official report from Kuala Lumpur states that 7,658 tons of rubber were exported from the Federal Malay States in May, as against 7,444 tons in April and 7,627 tons in the corresponding month last year. The total exports for five months of the current year amount to 35,686 tons compared with 46,426 tons last year and 43,623 tons in 1919. Appended are the comparative statistics.

	1919	1920	1921
January ....tons	7,163	11,119	7,085
February	10,809	9,781	6,091
March	10,679	9,524	7,408
April	7,664	8,375	7,444
May	7,308	7,627	7,658
Totals........tons	43,623	46,426	35,686

STRAITS SETTLEMENTS RUBBER EXPORTS

An official report from Singapore states that 8,813 tons of plantation rubber (transhipments 1,138 tons) were exported from Straits Settlements ports in the month of May, as compared with 6,091 tons in April and 15,617 tons in the corresponding month last year. The total exports for five months of the current year amount to 33,801 tons as against 61,820 tons last year and 77,666 tons in 1919. Appended are the comparative statistics:

	1919	1920	1921
January ....tons	14,404	13,125	5,809
February	15,661	17,379	5,813
March	20,908	5,931	7,275
April	10,848	9,768	6,091
May	15,845	15,617	8,813
Totals........tons	77,666	61,820	33,801

These figures include transhipments of rubber from various places in the neighborhood of the Straits Settlements, such as Borneo, Java, Sumatra and the non-Federated Malay States as well as rubber actually exported from the Colony, but do not include rubber exports from the Federated Malay States.

CEYLON RUBBER EXPORTS

	January 1, to May 25	
	1920	1921
To United Kingdom........pounds	13,715,086	13,993,304
Belgium	106,830	249,904
France	223,107	317,900
Germany	108,228	1,653,548
Holland	28	359,021
Denmark	......	51,565
Italy	89,600	90,720
Norway	......	2,240
Western Australia	56	......
Victoria	5,440	107,970
New South Wales	158,294	73,880
United States	18,377,042	17,413,718
Canada and Newfoundland	425,600	419,148
India	586	8,132
Straits Settlements	44,800	......
Japan	155,427	140,146
Totals........pounds	33,410,124	34,881,196

Compiled by the Ceylon Chamber of Commerce.

PLANTATION RUBBER EXPORTS FROM JAVA*

	April		Four Months ended April	
	1920	1921	1920	1921
To Netherlands........kilos	471,000	691,000	1,529,000	2,852,000
Great Britain	1,157,000	1,596,000	2,324,000	3,852,000
Germany	18,000	28,000	18,000	145,000
Belgium	......	......	......	5,000
Italy	......	......	......	1,000
United States	1,005,000	488,000	5,679,000	2,391,000
Singapore	538,000	122,000	1,689,000	1,047,000
Japan	47,000	......	178,000	95,000
Australia	16,000	......	16,000	209,000
Totals........kilos	3,252,000	2,925,000	11,433,000	10,597,000
Ports of origin:				
Tandjong Priok........kilos	1,339,000	1,227,000	5,371,000	4,846,000
Samarang	36,000	36,000	185,000	131,000
Soerabaya	1,737,000	1,532,000	5,472,000	4,774,000

*The March figures are verified.

CRUDE RUBBER ARRIVALS AT ATLANTIC PORTS AS STATED BY SHIPS' MANIFESTS

PARAS AND CAUCHO AT NEW YORK

	Fine	Medium	Coarse	Caucho	Totals Pounds
May 27. By the S. S. "La Place" from Manáos.					
Paul Bertuch	92,325	4,886	6,065	....	103,276
June 14 By the S. S. "Denis" from Manáos.					
Paul Bertuch	45,864	4,508	2,849	159	53,380
Poel & Kelly	44,883	12,892	12,347	45,850	115,972
June 16. By the S. S. "Virgil" from Pará.					
Paul Bertuch	67,560	23,218	5,016	44,404	140,198
Poel & Kelly	....	935	21,639	....	22,574
General Rubber Co.	....	....	....	....	22,400*
June 24. By the S. S. "Polycarp" from Pará.					
Meyer & Brown, Inc.	42,560	....	....	....	42,560†
June 24. By the S. S. "Polycarp" from Manáos.					
H. A. Astlett & Co.	60,000	....	....	....	60,000
Paul Bertuch	15,449	....	....	....	15,449
Poel & Kelly	90,597	5,123	4,570	45,040	145,330
June 26. By the S. S "Manchurian Prince," from Pará.					
Meyer & Brown, Inc.	56,000	....	....	....	56,000†
July 6. By the S. S. "Lake Fackler" from Pará.					
Poel & Kelly	22,359	108	6,944	......	29,411
Paul Bertuch	6,746	11,550	....	....	18,296
July 14 By the S. S. "La Lande" from Manáos.					
Meyer & Brown, Inc.	91,840	....	....	....	91,840†
July 14. By the S. S. "La Lande" from Pará.					
H. A. Astlett & Co.	70,000	....	....	....	70,000
Paul Bertuch	....	11,463	....	....	11,463
G. Amsinck & Co., Inc.	....	....	3,630	....	3,630
Poel & Kelly	....	6,783	9,587	....	16,370
Baring Brothers	772	11,350	....	....	12,122

*Cameta. †Includes medium.

PLANTATIONS

(Figured at 180 pounds net to the bale or case.)

	Shipment from:	Shipped to:	Pounds	Totals
June 20. By the S. S. "Clan MacInnes" at New York.				
Paul Bertuch	Colombo	New York	7,075	
H. A. Astlett & Co.	Colombo	New York	22,000	
L. Littlejohn & Co., Inc.	Colombo	New York	156,800	185,875
June 21. By the S. S. "Eastern Exporter" at New York.				
Various	Colombo	New York	33,320	
L. Littlejohn & Co., Inc.	Singapore	New York	44,800	78,120
June 27. By the S. S. "Yapalaga" at New York.				
Poel & Kelly	Rotterdam	New York	47,520	47,520
June 22. By the S. S. "Egremont Castle" at New York.				
Thornett & Fehr	Singapore	New York	126,000	
L. Littlejohn & Co., Inc.	Singapore	New York	660,800	
Jaeger & Co.	Singapore	New York	50,400	
East Asiatic Co., Inc.	Singapore	New York	86,400	
Thomas A. Desmond & Co.	Singapore	New York	86,400	
F. R. Henderson & Co.	Singapore	New York	252,000	
Paterson, Simmons & Co.	Singapore	New York	19,260	
General Rubber Co.	Singapore	New York	53,640	
Meyer & Brown, Inc.	Singapore	New York	120,960	
Various	Singapore	New York	622,780	2,078,640
June 22. By the S. S. "Kandahar" at New York.				
J. T. Johnstone & Co., Inc.	Singapore	New York	176,896	
Eastern Rubber Co.	Singapore	New York	50,400	
Chas. T. Wilson Co., Inc.	Singapore	New York	369,180	
Baird Rubber & Trading Co.	Singapore	New York	315,000	
L. Littlejohn & Co., Inc.	Singapore	New York	1,657,800	
William H. Stiles & Co.	Singapore	New York	190,400	
Poel & Kelly	Singapore	New York	690,300	
Smith & Schippers, Inc.	Singapore	New York	100,800	
Fred Stern & Co.	Singapore	New York	45,347	
H. A. Astlett & Co.	Singapore	New York	670,000	
Rogers-Pyatt Shellac Co.	Singapore	New York	45,000	
Fred Waterhouse & Co.	Singapore	New York	21,240	
F. R. Henderson & Co.	Singapore	New York	254,340	
East Asiatic Co., Inc.	Singapore	New York	414,900	
Baring Bros.	Singapore	New York	259,200	
Raw Products Co.	Singapore	New York	54,000	
Thomas A. Desmond & Co.	Singapore	New York	37,800	
Phelan, Borland & Fearons	Singapore	New York	54,900	
Continental Rubber Co. of New York	Singapore	New York	22,320	
Pacific Trading Co.	Singapore	New York	23,040	
Huth & Co.	Singapore	New York	328,320	
General Rubber Co.	Singapore	New York	26,820	
Rubber Importers & Dealers Co., Inc.	Singapore	New York	110,880	
McAllister Bros.	Singapore	New York	80,640	
Habicht & Co.	Singapore	New York	34,560	
American Trading Co.	Singapore	New York	26,820	
Thornett & Fehr	Singapore	New York	135,000	
Firestone Tire & Rubber Co.	Singapore	Akron	201,600	
Various	Singapore	New York	354,637	
J. T. Johnstone & Co., Inc.	Malacca	New York	18,000	
The Goodyear Tire & Rubber Co.	Pt. Swettenham	Akron	167,580	
Meyer & Brown, Inc.	Penang	New York	9,900	
L. Littlejohn & Co., Inc.	Penang	New York	266,400	
Edward Boustead & Co.	Penang	New York	28,800	
William H. Stiles & Co.	Penang	New York	9,900	
Various	Penang	New York	111,960	
F. R. Henderson & Co.	Belawan-Deli	New York	18,000	
General Rubber Co.	Belawan-Deli	New York	42,300	
Various	Belawan-Deli	New York	142,920	7,567,900
June 23. By the S. S. "City of York" at New York.				
Chas. T. Wilson & Co.	Colombo	New York	181,440	
Poel & Kelly	Colombo	New York	7,560	
Baring Bros.	Colombo	New York	252,000	
Smith & Schippers, Inc.	Colombo	New York	112,680	
Goschen & Cumliffe	Colombo	New York	46,080	
Baird Rubber & Trading Co.	Colombo	New York	62,100	
A. Latham & Co.	Colombo	New York	49,860	

	Shipment from:	Shipped to:	Pounds	Totals
Meyer & Brown, Inc.	Colombo	New York	257,600	
L. Littlejohn & Co., Inc.	Colombo	New York	504,000	
Various	Colombo	New York	10,490	
Hood Rubber Co.	London	Watertown	33,660	1,517,410
June 23. By the S. S. "City of York" at Boston.				
Hood Rubber Co.	Colombo	Watertown	170,990	170,990
June 23. By the S. S. "Edgar F. Luckenbach" at New York.				
Various	Rotterdam	New York	35,100	35,100
June 26. By the S. S. "Montauk," at New York.				
F. R. Henderson & Co.	London	New York	27,540	27,540
June 26. By the S. S. "Ryndam" at New York.				
Meyer & Brown, Inc.	Rotterdam	New York	112,000	
Various	Rotterdam	New York	149,520	
L. Littlejohn & Co., Inc.	Amsterdam	New York	156,800	418,320
June 26. By the S. S. "Celebes" at New York.				
Various	T'jong Priok	New York	58,300	
L. Littlejohn & Co., Inc.	Java	New York	206,800	
M. E. Borren	Batavia	New York	9,900	
Various	Batavia	New York	4,475	
William H. Stiles & Co.	Singapore	New York	11,200	290,675
June 27. By the S. S. "Editor" at New York.				
Paul Bertuch	Rotterdam	New York	25,740	
A. C. Spencer Hess	Rotterdam	New York	121,320	
Various	Rotterdam	New York	92,747	
L. Littlejohn & Co., Inc.	London	New York	224,823	
Hood Rubber Co.	London	Watertown	22,450	487,080
July 2. By the S. S "Jersey City" at New York.				
Vernon Metal & Produce Co.	Colombo	New York	58,880	
L. Littlejohn & Co., Inc.	London	New York	112,000	170,880
July 2. By the S. S. "Nieuw Amsterdam" at New York.				
Harburger & Stack	Rotterdam	New York	72,360	
Poel & Kelly	Rotterdam	New York	9,900	
Various	Rotterdam	New York	70,560	152,820
July 5. By the S. S. "Frederick J. Luckenbach" at New York.				
L. Littlejohn & Co., Inc.	Singapore	New York	11,200	11,200
July 6. By the S. S. "Menominee" at New York.				
Various	London	New York	5,760	5,760
July 10. By the S. S. "Noordam" at New York.				
Meyer & Brown, Inc.	Rotterdam	New York	44,800	44,800
July 15. By the S. S. "Telemachus" at New York.				
Pablo Calvet & Co.	Penang	New York	70,920	
Smith & Schippers, Inc.	Penang	New York	30,240	
Various	Penang	New York	136,440	
Meyer & Brown, Inc.	Colombo	New York	235,200	
Various	Colombo	New York	127,980	
Wilson, Holgate & Co., Limited	Deli	New York	237,240	
Eastern Rubber Co.	Deli	New York	89,640	
Pell & Dumont, Inc.	Deli	New York	30,600	
Various	Deli	New York	27,900	
Various	Telok Neboeng	New York	650,160	
Firestone Tire & Rubber Co.	Singapore	Akron	201,960	
Hood Rubber Co.	Singapore	Watertown	26,100	
S. W. Bridges & Co., Inc.	Singapore	Boston	43,560	
J. T. Johnstone & Co., Inc.	Singapore	New York	136,650	
Chas. T. Wilson Co., Inc.	Singapore	New York	316,800	
Jaeger & Co.	Singapore	New York	80,640	
F. R. Henderson & Co.	Singapore	New York	142,380	
L. Littlejohn & Co., Inc.	Singapore	New York	2,083,100	
East Asiatic Co., Inc.	Singapore	New York	115,560	
Fred Stern & Co.	Singapore	New York	33,600	
Poel & Kelly	Singapore	New York	637,380	
H. Muehlstein & Co.	Singapore	New York	133,600	
Wilson, Holgate & Co., Limited	Singapore	New York	27,000	
Rubber Importers & Dealers Co., Inc.	Singapore	New York	218,880	
Thornett & Fehr	Singapore	New York	90,000	
Phelan, Borland & Fearons	Singapore	New York	254,340	
William H. Stiles & Co.	Singapore	New York	134,400	
Rubber Trading Co.	Singapore	New York	197,460	
John D. Lewis	Singapore	New York	189,900	
W. P. Mills	Singapore	New York	64,620	
Henderson, Forbes & Co.	Singapore	New York	46,080	
Peninsular Trading Agency, Inc.	Singapore	New York	32,760	
Goschen & Cumliffe	Singapore	New York	151,200	
Smith & Schippers, Inc.	Singapore	New York	100,800	
Adolph Hirsch & Co.	Singapore	New York	22,400	
Edward Boustead & Co.	Singapore	New York	54,000	
Meyer & Brown, Inc.	Singapore	New York	168,000	
General Rubber Co.	Singapore	New York	261,900	
H. A. Astlett & Co.	Singapore	New York	170,000	
Continental Rubber Co. of New York	Singapore	New York	78,400	
The Fisk Rubber Co.	Singapore	Chicopee Falls	388,326	
Various	Singapore	New York	802,424	9,045,540
July 16. By the S. S. "Saxonia" at New York.				
Goldman, Sachs & Co.	London	New York	2,675,160	2,675,160
July 16. By the S. S. "City of Dunkirk" at New York.				
Smith & Schippers, Inc.	Penang	New York	20,160	
Edward Boustead & Co.	Penang	New York	28,800	
Baird Rubber & Trading Co.	Penang	New York	99,000	
Wilson, Holgate & Co., Limited	Penang	New York	137,880	
General Rubber Co.	Penang	New York	10,800	
Various	Penang	New York	27,609	
William H. Stiles & Co.	Singapore	New York	44,800	
Poel & Kelly	Singapore	New York	352,980	
L. Littlejohn & Co., Inc.	Singapore	New York	908,200	
Fred Stern & Co.	Singapore	New York	86,408	
Eastern Rubber Co.	Singapore	New York	47,880	
Baring Brothers	Singapore	New York	252,540	
F. R. Henderson & Co.	Singapore	New York	148,860	
Jaeger & Co.	Singapore	New York	72,000	
General Rubber Co.	Singapore	New York	150,840	
The Fisk Rubber Co.	Singapore	Chicopee Falls	201,749	
Eastern Asiatic Co., Inc.	Singapore	New York	27,000	
Aldens' Successors, Inc.	Singapore	New York	46,260	
Smith & Schippers, Inc.	Singapore	New York	192,600	
Fred Waterhouse Co., Limited	Singapore	New York	9,000	
American Trading Co.	Singapore	New York	277,740	
Ajax Rubber Co., Inc.	Singapore	New York	40,140	
Huth & Co.	Singapore	New York	84,960	
J. T. Johnstone & Co., Inc.	Singapore	New York	123,167	
Edward Boustead & Co.	Singapore	New York	56,160	
Thornett & Fehr	Singapore	New York	180,000	
Raw Products Co.	Singapore	New York	90,000	
Thomas A. Desmond & Co.	Singapore	New York	151,209	
John D. Lewis	Singapore	New York	144,000	
Chas. T. Wilson Co., Inc.	Singapore	New York	183,600	
H. Muehlstein	Singapore	New York	54,000	
Phelan, Borland & Fearons	Singapore	New York	80,280	
Baird Rubber & Trading Co.	Singapore	New York	115,200	
Meyer & Brown, Inc.	Singapore	New York	721,280	
Firestone Tire & Rubber Co.	Singapore	Akron	202,320	
H. A. Astlett & Co.	Singapore	New York	200,000	
Meyer & Brown, Inc.	Medan	New York	56,000	
Hood Rubber Co.	London	Watertown	33,607	5,659,020
July 18. By the S. S. "Westerdijk" at New York.				
Various	Rotterdam	New York	265,500	265,500
July 21 By the S. S. "City of Chester" at New York.				
Continental Rubber Co. of New York	Colombo	New York	22,400	
Hood Rubber Co.	Colombo	Watertown	56,000	78,400

CENTRALS

June 25. By the S. S. "Quillota" at New York.				
G. Amsinck & Co., Inc.	Cristobal	New York	600	600

PONTIANAK

June 22. By the S. S. "Egremont Castle" at New York.				
Various	Singapore	New York	116,100	116,100
June 22. By the S. S. "Kandahar" at New York.				
H. A. Astlett & Co.	Singapore	New York	20,400	20,400

AFRICANS

July 7. By the S. S. "Londonier" at New York.				
Various	Antwerp	New York	59,800	59,800

GUTTA PERCHA

June 22. By the S. S. "Egremont Castle" at New York.				
L. Littlejohn & Co., Inc.	Singapore	New York	72,300	72,300
June 22. By the S. S. "Kandahar" at New York.				
L. Littlejohn & Co., Inc.	Singapore	New York	31,500	31,500

GUTTA SIAK

June 22. By the S. S. "Egremont Castle" at New York.				
L. Littlejohn & Co., Inc.	Singapore	New York	64,200	64,200
June 22. By the S. S. "Kandahar" at New York.				
Various	Singapore	New York	60,000	60,000

BALATA

June 21. By the S. S. "Aliança" at New York.				
E. Heaney & Co.	Cristobal	New York	10,200	
Mecke & Co.	Cristobal	New York	2,400	12,600
June 23 By the S. S. "Polycarp" at New York.				
Various	Pará	New York	1,200	1,200
June 25. By the S. S. "Quillota" at New York.				
Ultramares Corporation	Cristobal	New York	1,200	
Various	Cristobal	New York	1,500	2,700
June 28. By the S. S. "Maraval" at New York.				
Boos & Co.	Port of Spain	New York	5,760	5,760
June 29. By the S. S. "General W. C. Gorgas."				
Fromm & Co.	Cristobal	New York	1,650	1,650
June 30. By the S. S. "Aurora" at New York.				
William Schall & Co.	Caracas	New York	2,100	
Middleton & Co., Limited	Caracas	New York	4,950	7,050
July 6 By the S. S. "Lake Faekler" at New York.				
Arkell & Douglas, Inc.	Cayenne	New York	1,800	
Middleton & Co., Limited	Cayenne	New York	2,850	
Wm. Schall & Co.	Cayenne	New York	7,050	11,700
July 12. By the S. S. "Matura" at New York.				
Arkell & Douglas, Inc.	Trinidad	New York	23,700	23,700
July 19. By the S. S. "Hebe" at New York.				
Wm. Schall & Co.	Caracas	New York	2,550	
Middleton & Co., Limited	Caracas	New York	1,350	3,900

EXPORTS OF INDIA RUBBER MANUFACTURES AND INSULATED WIRE AND CABLE FROM THE UNITED STATES BY COUNTRIES, DURING THE MONTH OF APRIL, 1921

EXPORTED TO—	Belting Value	Hose Value	Packing Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Soles and Heels Value	Automobile Tires: Casings Value	Automobile Tires: Inner Tubes Value	Automobile Tires: Solid Tires Value	Automobile Tires: All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
EUROPE																
Azores and Madeira Islands													$38			$38
Belgium	$365	$3,828	$555										2,222		$4,486	11,456
Czechoslovakia										$125						125
Denmark			219			2,204	$2,938	$286	$10,794	46			1,000	$120	1,531	16,934
Finland	1,016	181							1,250		$650				81	3,178
France	323	498	288			600	668		203	63			1,823	2,892	24,878	31,636
Germany						19	17					$358				375
Gibraltar									141	17						158
Greece						32	46		1,640	695			1,028		148	3,557
Iceland and Faroe Islands						468	787									787
Italy		48								20		100	17,421	54	910	18,553
Malta, Gozo and Cyprus Islands									2,133	4						2,137
Netherlands	40	340	165	60	$177			245	2,673	639			11,259	816	908	17,262
Norway	680	264				5,845	5,185	645	38,887	1,082	400		124	48	309	47,624
Poland and Danzig									530	235			33,242	71	31	34,109
Portugal		300		96	442								2,220		20	2,982
Roumania													5	114		119
Spain								564	46,787	153	350	58	4,624	125	4,535	57,196
Sweden	1,145			1,047	4,031	402	469		47,773	1,961	2,569	4,913	321,832	187	7,060	391,940
Switzerland	622								1,548	256			2,946		2,129	7,501
Turkey in Europe									27	7			75			109
England	116	15,072	1,659	714	2,459	576	828	3,169	79,885	8,949	829		23,522	21,247	89,446	248,181
Scotland			234			7,790	5,849						3,595		25	9,703
TOTALS, EUROPE	$4,307	$21,531	$3,120	1,917	$7,109	17,936	$16,787	$4,909	$234,271	$14,252	$4,798	$5,429	$426,976	$25,674	$136,497	$905,660
NORTH AMERICA																
Bermuda		$74				633	$987	$269				$146	$967	$124	$31	$2,598
British Honduras		16				1,090	1,783	6	$365	$146			45	6	31	2,398
Canada	$12,061	3,732	$5,272	2,785	$9,597	2,177	2,759	258	40,863	3,353	$2,163	9,300	16,297	15,009	179,310	299,974
Costa Rica	2,023	106	617					624	505	41		115	2,758	168	1,016	7,973
Guatemala		1,920	39			134	163	385	1,340	223			1,801	430	410	6,711
Honduras	125	2,052	103			1,114	1,669	193	1,581	428		218	2,290	210	291	9,160
Nicaragua	1,704	118	188			216	268	359	1,437	311			391	144	95	5,015
Panama		4,638	80	72	225	476	444	2,527	7,669	1,120	2,408	2,050	4,898	687	2,652	29,398
Salvador		22				610	600	2,389		15			1,507		46	4,579
Mexico	31,676	26,362	17,305	108	566	25,656	31,135	4,645	135,777	19,808	4,894	2,617	42,038	7,389	45,470	369,682
Miquelon, Langley, etc.				980	3,270											3,270
Newfoundland and Labrador	152	91		2,712	8,887	618	596	170	2,447	358		56	69	20	77	12,923
Barbados						52	60		2,012	62	150				223	2,507
Jamaica	53	881				1,252	1,115		4,636	196	992		401	348	375	8,997
Trinidad and Tobago		353	459	3	12	4	5		6,796	1,386	1,445	81	1,969	30	225	12,761
Other British West Indies	6	799	90			275	318	148	545	104			173		363	2,546
Cuba	2,759	12,968	3,075			6,459	5,371	3,199	140,652	9,838	9,402	1,239	86,732	6,683	15,501	297,419
Virgin Islands of United States		20	41			490	654		512	228	7,582	105		2	69	9,213
Dutch West Indies			46			352	472	39	1,077	68		48	139	5	77	1,971
Haiti		429	385			144	170			64			308	111	546	2,013
Dominican Republic	124	921	1,293			2,692	3,771	398	12,326	979		57	2,716	11	563	23,159
TOTALS, NORTH AMERICA	$50,683	$55,502	$28,993	6,660	$22,557	44,444	$52,340	$15,609	$360,540	$38,728	$29,036	$16,032	$165,499	$31,377	$247,371	$1,114,267
OCEANIA																
Australia	$4,149	$1,995	$4,280	432	$1,646	1,083	$1,600		$7,250	$3,772	$821		$8,847	$1,218	$4,851	$40,429
New Zealand	2,045	357	279			336	356	$3,175	29,357	1,475	6,524	$2,112	9,806	1,372	3,966	60,824
Other British Oceania									1,280	363			36			1,679
French Oceania		21	17			96	120		568	130	138				61	1,055
Other Oceania						303	488		698	115						1,301
Philippine Islands	8,925	2,126	145	82	270	7,954	11,339	1,109	14,896	820	3,604	1,163	4,670	131	7,625	56,823
TOTALS, OCEANIA	$15,119	$4,499	$4,721	514	$1,916	9,772	$13,903	$4,284	$54,049	$6,675	$11,087	$3,275	$23,359	$2,721	$16,503	$162,111
SOUTH AMERICA																
Argentina	$2,414	$5,319	$172					$172	$19,921	$4,125	$309	$3,683	$25,276	$655	$5,954	$68,000
Bolivia	279	3,183							430	101				679	652	5,324
Brazil		12,173	295	380	$557	1,218	$1,069		5,853	540	776	87	36,330	1,232	1,650	60,562
Chile	1,783	1,908				641	695		5,918	529			5,857	12	4,388	21,090
Colombia		1,733	1,264	12	36	575	561	419	3,869	286	1,546	91	7,868	60	1,454	19,187
Ecuador	465	1,693	39						1,872	188			35	9	90	4,391
British Guiana						128	106		1,519	181			660		129	2,595
Dutch Guiana	551	74						226	407	83					21	1,362
French Guiana													768			768
Peru	4,122	7,930	66	36	300	49	100	143	8,871	2,248	1,195		30,314	704	984	56,977
Uruguay			64	24	90	5,760	4,772	205	5,401		229		7,634	190	5	18,590
Venezuela	48	1,591	443					535	11,648	2,198	97	103	856	157	1,556	19,232
TOTALS, SOUTH AMERICA	$9,662	$35,604	$2,343	452	$983	8,371	$7,303	$1,700	$65,709	$10,479	$4,152	$3,964	$115,598	$3,698	$16,883	$278,078

Exported to—	Belting Value	Hose Value	Packing Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Soles and Heels Value	Automobile Tires: Casings Value	Automobile Tires: Inner Tubes Value	Automobile Tires: Solid Tires Value	Automobile Tires: All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
Asia																
China	$887	......	......	......	......	1,170	$1,294	......	$8,601	$762	$167	......	$44,016	$1,330	$11,483	$68,540
Kwantung, leased territory	......	......	......	......	......	......	......	......	......	......	......	......	......	......	200	200
Chosen	......	......	......	......	......	120	102	......	......	......	......	......	......	......	......	102
British India	2,088	$1,508	$579	......	......	24	29	......	27,198	108	......	......	13,264	102	1,216	46,092
Straits Settlements	......	......	......	......	......	232	415	......	543	150	1,300	$697	......	420	558	4,083
Other British East Indies	......	......	......	......	......	......	......	......	1,347	30	......	......	......	......	......	1,377
Dutch East Indies	......	1,584	995	......	......	3	6	......	4,454	2,143	15,442	......	443	327	1,653	27,047
French Indo China	......	......	......	......	......	......	......	......	287	58	......	......	......	......	......	345
Hongkong	......	460	......	......	......	1,340	1,821	$196	10,303	523	190	......	......	1,607	877	15,977
Japan	......	647	5,129	6,312	$14,388	12,741	11,842	......	8,871	......	......	2	14,144	875	28,892	84,790
Persia	......	......	......	......	......	8,000	9,674	......	......	......	......	......	......	......	......	9,674
Russia in Asia	......	......	......	369	1,020	......	......	......	......	......	......	......	......	......	......	1,020
Siam	......	......	......	......	......	......	......	......	2,300	290	......	......	30	......	40	2,660
Turkey in Asia	......	......	......	......	......	14	17	......	353	118	......	......	......	19	18	525
Totals, Asia	$2,975	$4,199	$6,703	6,681	$15,408	23,644	$25,200	$196	$64,257	$4,182	$17,099	$699	$71,897	$4,680	$44,937	$262,432
Africa:																
British West Africa	......	......	......	......	......	......	......	......	$8,691	$2,431	......	......	......	......	$11	$11,133
British South Africa	$17,116	$10,143	$1,019	72	$214	100	$243	$630	260	40	$1,312	$186	$3,803	$254	782	36,002
British East Africa	......	......	......	......	......	......	......	......	659	......	......	......	......	......	......	659
Canary Islands	......	......	......	......	......	......	......	......	988	......	......	......	63	......	......	1,051
French Africa	4,500	......	108	......	......	......	......	......	......	84	......	......	3	......	......	4,695
Portuguese Africa	935	......	......	......	......	......	......	......	......	......	......	......	20	......	......	955
Egypt	......	......	......	......	......	16	32	......	2,193	149	......	......	......	......	273	2,647
Totals, Africa	$22,551	$10,143	$1,127	72	$214	116	$275	$630	$12,791	$2,704	$1,312	$186	$3,889	$254	$1,066	$57,142
Grand Totals	$105,297	$131,478	$47,007	16,296	$48,187	104,283	$115,808	$27,328	$791,617	$77,020	$67,484	$29,585	$807,218	$68,404	$463,257	$2,779,690

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORY OF THE UNITED STATES

	Belting, Hose, and Packing Value	Boots and Shoes Pairs	Boots and Shoes Value	Tires: Automobile Value	Tires: All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
Hawaii	$10,008	......	......	$93,317	$707	......	......	$36,271	$140,303
Porto Rico	1,050	......	......	63,079	90	......	......	5,716	69,935
Totals	$11,058	......	......	$156,396	$797	......	......	$41,987	$210,238

Compiled by the Bureau of Foreign Commerce, Department of Commerce, Washington, D. C.

OFFICIAL INDIA RUBBER STATISTICS FOR THE UNITED STATES

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
Unmanufactured—*free*				
India rubber				
From France	864,073	$251,239	......	......
Netherlands	133,674	54,892	622,022	$103,804
Portugal	14,100	9,869	......	......
United Kingdom	8,800,914	4,233,181	3,374,461	524,827
Canada	41,880	15,009	18,000	1,800
Central America	16,462	3,855	6,681	1,318
Mexico	7,139	2,185	......	......
Brazil	5,183,214	1,499,276	1,611,408	177,074
Peru	789,052	246,707	8,377	875
Other South Am.	113,005	27,874	170,557	22,130
British E. Indies	39,262,162	19,215,266	17,628,636	3,908,880
Dutch E. Indies	8,097,239	3,785,268	2,592,966	749,640
Other countries	306,355	145,045	54,300	14,829
Totals	63,629,269	$29,489,666	26,087,408	$5,505,177
Balata	79,073	$47,037	157,667	$95,491
Guayule	105,658	22,676	......	......
Jelutong (Pontianak)	1,720,819	298,528	140,789	25,197
Gutta percha	804,191	170,350	14,474	1,489
Rubber scrap	1,852,484	108,772	146,734	8,778
Totals, unmanufactured	68,191,494	$30,137,029	26,547,072	$5,636,132
India rubber and gutta percha ....*dutiable*	......	$73,972	......	$95,913
India rubber substitutes *dutiable*	8,946	1,539	......	......
Chicle ....*dutiable*	431,718	312,998	728,896	361,682

EXPORTS OF DOMESTIC MERCHANDISE

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
Manufactured				
India rubber				
Scrap and old	699,424	$41,888	643,664	$28,995
Reclaimed	288,008	49,231	59,011	6,776
Belting[1]	......	219,499	......	105,297
Hose[1]	......	205,573	......	131,478
Packing[1]	......	111,127	......	47,007
Boots[1] ....*pairs*	28,407	81,236	16,296	48,187
Shoes[1] ....*pairs*	741,788	683,417	104,283	115,808
Soles and heels[1]	......	107,290	......	27,328
Tires				
Casings[1]	......	3,148,845	......	791,617
Inner tubes[1]	......	370,520	......	77,020
Solid tires[1]	......	328,502	......	67,484
All other tires[1]	......	58,034	......	29,585
Druggists rubber sundries[1]	......	116,999	......	68,404
Sus enders and garters	......	301,538	......	48,153
Other rubber manufactures[1]	......	797,301	......	326,729
Totals, manufactured	......	$6,621,000	......	$1,919,868

EXPORTS OF FOREIGN MERCHANDISE

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
Unmanufactured—				
India rubber	845,016	$238,954	1,700,839	$308,835
Balata	98,419	49,485	35,680	18,735
Gutta percha	14,560	6,860	......	......
Rubber scrap	......	......	25,293	2,529
Totals, unmanufactured	957,995	$295,299	1,761,812	$330,099
Manufactured—				
Gutta percha and india rubbber	......	$1,670	......	......
Totals, manufactured	......	$1,670	......	......

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
Manufactured—				
To Alaska				
Belting, hose, and packing	......	$25,532	......	$9,794
Boots and shoes...*pairs*	11,385	43,133	6,667	19,200
Other rubber goods	......	6,316	......	2,410
Totals	......	$74,981	......	$31,404
To Hawaii				
Belting, hose, and packing	......	$23,324	......	$10,008
Automobile tires	......	91,783	......	93,317
Other tires	......	3,269	......	707
Other rubber goods	......	18,192	......	36,271
Totals	......	$136,568	......	$140,303
To Porto Rico				
Belting, hose, and packing	......	$27,571	......	$1,050
Automobile tires	......	58,390	......	63,079
Other tires	......	1,161	......	90
Other rubber goods	......	16,301	......	5,716
Totals	......	$103,423	......	$69,935

[1]Details of exports of domestic merchandise by countries during April, 1921, appear on this and the preceding page.

UNITED STATES CRUDE AND WASTE RUBBER IMPORTS FOR 1921 (BY MONTHS)

1921	Plantation	Parás	Africans	Centrals	Guayule	Maniçoba and Matto Grosso	Balata	Miscellaneous,	Waste	Totals 1921	Totals 1920
January ....tons	12,819	1,312	43	3	....	....	41	173	1,071	15,462	22,401
February	7,913	432	269	2	25	....	25	216	37	8,919	33,984
March	12,241	1,794	377	1	....	3	29	7	345	14,797	33,998
April	16,861	403	......	5	....	....	64	226	7	17,566	24,957
May	9,127	1,570	......	2	33	....	40	186	41	10,999	28,666
June	12,361	1,091	......	25	....	....	49	203	72	13,801	15,606
Totals, 6 months, 1921......	71,322	6,602	689	38	58	3	248	1,011	1,573	81,544	......
Totals, 6 months, 1920......	134,403	12,809	3,610	550	504	13	319	4,654	2,750	......	159,612

Compiled by The Rubber Association of America, Inc.

CUSTOM HOUSE STATISTICS

NEW YORK

IMPORTS

	May 1920 Pounds	May 1920 Value	May 1921 Pounds	May 1921 Value
Unmanufactured—*free*				
Crude rubber				
From Pelgium	296,404	$83,596	....	....
France	229,198	50,430	....	....
Netherlands	370,737	163.888	494,415	$95.660
Portugal	89.391	22,766	10,761	1,038
Spain	161,584	23,837	....	....
England	9,017,289	4,067,946	1,320.499	205,692
Costa Rica	223	80	....	....
Guatemala	380	95	....	....
Nicaragua	6.547	2,377	....	....
Panama	7.041	2,648	....	....
Salvador	5,710	2,642	....	....
Mexico	65,514	24,645	....	....
Cuba	44,008	15.400	....	....
Bolivia	5,809	2,971	....	....
Brazil	3,216.017	824,988	3,718,340	394,466
Colombia	32,969	17,335	234	59
Ecuador	18,034	4,104	....	....
British Guiana	1,295	961	....	....
Peru	114,308	33,794	8,541	939
Venezuela	36,547	17,009	220	45
China	149,800	59,920	....	....
British India	357,558	112,063	201,600	27.518
Straits Settlements..	16,172,710	7,965,075	10.498,899	2,020,668
British East Indies..	4.917,333	2,265,126	3,506,421	510,128
Dutch East Indies...	6,981,431	3,083,450	3,515,157	645,231
British West Africa.	18,473	2,609	....	....
Totals	42,316,310	$18,849,755	23,275,087	$3,901,444
Balata	19,127	9,033	76,506	45,679
Jelutong (Pontianak).......	673,709	135,374	70,336	3.097
Gutta percha	236,194	45,135	165.209	28,170
Totals	43,245,340	$19,039,297	23,587,129	$3,978,390
Rubber scrap and reclaimed.	751,095	56,642	....	....
Totals, unmanufactured.	43,996,435	$19,095,939	23,587,129	$3,978,390
Manufactures of rubber and gutta percha	....	$65,255	....	$48,880
Rubber substitutes	....	....	242	30
Chicle ....*dutiable*	431,274	294,961	122,006	60,037

EXPORTS

	May 1920 Pounds	May 1920 Value	May 1921 Pounds	May 1921 Value
Manufactured				
Automobile and other tires..	....	$4,253,135	....	$605,609
Inner tubes	....	391,995	....	49,498
Belting, hose, and packing..	....	480,356	....	199,609
Rubber boots and shoes.*pairs*	536,987	491,593	111.463	127,558
Soles and heels............	....	56,439	....	21,120
Druggists' sundries	....	234,956	....	27,642
Other rubber manufactures.	....	495,931	....	150,385
Totals, manufactured...	....	$6.404,405	....	$1,181,421
Insulated wire	....	$724.506	....	$708,312
Unmanufactured—*free*				
Rubber scrap and reclaimed	847,050	$109,741	333,715	$18,709

FOREIGN EXPORTS

	May 1920 Pounds	May 1920 Value	May 1921 Pounds	May 1921 Value
Crude rubber...	26,871	$11,933	34,000	$3,304
Balata	292,100	121,460	19,637	7,305
Rubber scrap and reclaimed	10,000	875	6,720	672
Rubber manufactures	....	149	....	438
Rubber substitutes	125	30	....	.....

MASSACHUSETTS

IMPORTS

	May 1920 Pounds	May 1920 Value	May 1921 Pounds	May 1921 Value
Unmanufactured—*free*				
Crude rubber				
From Straits Settlements	....	....	11,200	$1.696
British East Indies.	....	....	229,820	26,323
Totals, unmanufactured.	....	....	241,020	$28,019
Rubber manufactures.*dutiable*	....	....	....	$3,409

EXPORTS

Manufactured	May 1920 Pounds	May 1920 Value	May 1921 Pounds	May 1921 Value
Automobile and other tires..	....	$17,551	....	$303
Inner tubes................	....	249	....	....
Belting, hose, and packing .	....	6,282	....	3.255
Rubber boots and shoes.*pairs*	195,156	169,436	7,226	11,793
Soles and heels............	....	14,363	....	3,413
Druggists' sundries.........	....	6,208	....	1,059
Other rubber manufactures.	....	38,040	....	11,560
Totals, manufactured...	....	$252,129	....	$31,383
Insulated wire......... ...	....	$872	....	$2,796

BUFFALO

IMPORTS

	May 1920 Pounds	May 1920 Value	May 1921 Pounds	May 1921 Value
Unmanufactured—*free*				
Crude rubber				
From Canada............	....	....	188,262	$95,072
Rubber scrap and reclaimed.	37,773	$5,052	150,370	4,628
Totals, unmanufactured.	37,773	$5,052	338,632	$99,706
Rubber manufactures.*dutiable*	....	1,453	....	$2,784

EXPORTS

	May 1920 Pounds	May 1920 Value	May 1921 Pounds	May 1921 Value
Manufactured				
Automobile and other tires..	....	$57,368	....	$124,077
Inner tubes................	....	31,698	....	18,336
Belting, hose, and packing..	....	15,939	....	8,732
Rubber boots and shoes—*pairs*	24	114	223	707
Soles and heels............	....	....	....	593
Druggists' sundries.........	....	10,883	....	7,036
Other rubber manufactures..	....	72,816	....	66,774
Totals, manufactured...	....	$188,818	....	$226,255
Insulated wire............	....	$4,550	....	$4,558
Rubber scrap and reclaimed.	315,803	51,782	122,863	14,961

FOREIGN EXPORTS

	May 1920 Pounds	May 1920 Value	May 1921 Pounds	May 1921 Value
Crude rubber..............	316,985	$147,722	661,639	$158,134
Jelutong (Pontianak).......	92,940	18,478	40,000	4,984
Guayule	25	31	....	....
Chicle	....	....	50,200	22,590

PHILADELPHIA

IMPORTS

	May 1920 Pounds	May 1920 Value	May 1921 Pounds	May 1921 Value
Rubber manufactures.*dutiable*	....	$3	....	$1,217

EXPORTS

	May 1920 Pounds	May 1920 Value	May 1921 Pounds	May 1921 Value
Manufactured				
Automobile and other tires	....	$139,012	....	$119
Inner tubes...............	....	20,878	....	....
Belting, hose, and packing..	....	27,898	....	6,440
Rubber boots and shoes.*pairs*	2,373	5,775	....	....
Druggists' sundries.........	....	81	....	....
Other rubber manufactures..	....	490	....	591
Totals, manufactured....	....	$194.134	....	$7,150
Insulated wire.............	... ...	$5,428	....	....
Rubber scrap and reclaimed..	29,465	4,249	....	....

NEW ORLEANS

IMPORTS

	May 1920 Pounds	May 1920 Value	May 1921 Pounds	May 1921 Value
Unmanufactured—*free*				
Crude rubber				
From Mexico............	300	$68	....	....
Totals, unmanufactured..	300	$68	....	....
Chicle ....*dutiable*	8,719	$6.260	....	....
Rubber manufactures.*dutiable*	....	....	....	$7

EXPORTS

	May 1920 Pounds	May 1920 Value	May 1921 Pounds	May 1921 Value
Manufactured				
Automobile and other tires..	....	$50,698	....	$9.600
Inner tubes................	....	7,699	....	1,436
Belting, hose, and packing..	....	8.611	....	8,052
Rubber boots and shoes.*pairs*	9,267	12,581	8,912	12,034
Soles and heels............	....	2,525	....	859
Druggists' sundries	....	75	....	505
Other rubber manufactures..	....	7,050	....	599
Totals, manufactured...	....	$89,239	....	$33,085
Insulated wire............	....	$6,900	....	$3,367

OHIO

IMPORTS

	May 1920 Pounds	May 1920 Value	May 1921 Pounds	May 1921 Value
UNMANUFACTURED—*free*				
Crude rubber				
From Straits Settlements.	240,409	$141,242	....	....
Totals, unmanufactured...	240,409	$141,242	....	....
Rubber manufactures.*dutiable*	....	....	....	$718
EXPORTS				
MANUFACTURED				
Automobile and other tires..	....	....	....	$34,952
Inner tubes	....	....	....	830
Belting, hose, and packing..	....	....	....	57
Other rubber manufactures..	....	$34	....	151
Totals, manufactured...	....	$34	....	$35,990
Rubber scrap and reclaimed.	....	....	93,291	$6,993

SAN FRANCISCO

IMPORTS

	May 1920 Pounds	May 1920 Value	May 1921 Pounds	May 1921 Value
UNMANUFACTURED—*free*				
Crude rubber				
From Canada	....	....	33,435	$6,691
Straits Settlements..	1,036,866	$601,766	101,096	28,728
Dutch East Indies..	131,349	56,664	....	....
Japan	34,944	17,748	....	....
Totals	1,203,159	$676,178	134,531	$35,419
Jelutong (Pontianak)........	11,169	2,180	....	....
Totals, unmanufactured.	1,214,328	$678,358	....	....
Rubber manufactures.*dutiable*	....	$482	....	$893
EXPORTS				
MANUFACTURED				
Automobile and other tires..	....	$189,549	....	$60,079
Inner tubes	....	23,662	....	4,784
Belting, hose, and packing..	....	75,138	....	13,905
Rubber boots and shoes.*pairs*	3,107	3,698	1,687	2,330
Soles and heels............	....	3,318	....	386
Druggists' sundries	....	7,685	....	1,041
Other rubber manufactures..	....	32,150	....	2,062
Totals, manufactured...	....	$335,200	....	$84,587
Insulated wire	....	$8,250	....	$22,026
Rubber scrap and reclaimed.	179,118	8,901	....	....
FOREIGN EXPORTS				
Gutta percha...............	1	$2	....	....

WASHINGTON

IMPORTS

	May 1920 Pounds	May 1920 Value	May 1921 Pounds	May 1921 Value
UNMANUFACTURED—*free*				
Crude rubber				
From Canada	....	....	4,660	$792
Straits Settlements..	111,970	$48,000	....	....
Hongkong	180	90	....	....
Totals, unmanufactured.	112,150	$48,090	4,660	$792
Rubber manufactures.*dutiable*	....	$166	....	$31
EXPORTS				
MANUFACTURED				
Automobile and other tires..	....	$77,933	....	$610
Inner tubes	....	7,335	....	2
Belting, hose, and packing..	....	19,786	....	309
Rubber boots and shoes.*pairs*	268	1,080	240	403
Soles and heels............	....	7,287	....	805
Druggists' sundries	....	123	....	121
Other rubber manufactures..	....	2,963	....	3,220
Totals, manufactured...	....	$116,507	....	$5,470
Insulated wire	....	$454	....	$57
Rubber scrap and reclaimed.	44,634	1,765	123,195	2,888

CHICAGO

IMPORTS

	May 1920 Pounds	May 1920 Value	May 1921 Pounds	May 1921 Value
Rubber scrap and reclaimed.	....	....	65,594	$1,800
Rubber manufactures.*dutiable*	....	$12,440	....	15,879
Chicle ....*dutiable*	228,138	128,946	434,652	233,589

MICHIGAN

IMPORTS

	May 1920 Pounds	May 1920 Value	May 1921 Pounds	May 1921 Value
Rubber scrap and reclaimed.	....	$130	....	....
Rubber manufactures.*dutiable*	....	2,925	....	....
EXPORTS				
MANUFACTURED				
Automobile and other tires..	....	$40,754	....	$13,385
Inner tubes	....	7,753	....	342
Belting, hose, and packing..	....	2,440	....	2,220
Rubber boots and shoes.*pairs*	5,272	18,157	360	1,086
Soles and heels............	....	857	....	....
Druggists' sundries	....	2,362	....	620
Other rubber manufactures..	....	17,959	....	8,817
Totals, manufactured...	....	$90,282	....	$26,474
Insulated wire	....	$7,321	....	$5,424
Rubber scrap and reclaimed.	171,071	25,354	4,715	292

IMPORTS OF CRUDE RUBBER INTO THE UNITED STATES BY CUSTOMS DISTRICTS

CUSTOMS DISTRICTS	June, 1921 Pounds	June, 1921 Value
Massachusetts	329,590	$31,165
New York	33,479,406	5,605,708
Maryland	227,500	99,769
San Diego	33,099	15,612
Los Angeles	172,950	27,544
San Francisco	207,213	28,558
Oregon	11,470	4,077
Washington	118,720	14,795
Colorado	44,800	4,589
Totals	34,624,748	$5,831,817

RUBBER STATISTICS FOR THE DOMINION OF CANADA

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	April 1920 Pounds	April 1920 Value	April 1921 Pounds	April 1921 Value
UNMANUFACTURED—*free*				
Rubber, gutta percha, etc.				
From United Kingdom.....	403,302	$256,326	......	......
United States	232,178	96,446	1,049,015	$174,921
Belgium	4,306	2,050	9,682	1,783
Brazil	73,650	39,013	70,400	12,667
British East Indies				
Ceylon	33,600	22,468	478,035	167,949
India	5,300	1,974	......	......
Straits Settlements.	852,845	478,980	728,020	169,860
France	11,310	7,591	......	......
Total	1,616,491	$904,848	2,335,152	$527,180
Rubber, recovered..........	235,617	37,656	27,365	2,344
Rubber, powdered, and rubber or gutta percha scrap......	200,831	7,355	134,620	9,118
Rubber substitutes	153,970	21,244	8,616	2,045
Totals, unmanufactured..	2,206,909	$971,103	2,505,753	$540,687
PARTLY MANUFACTURED—				
Hard rubber sheets and rods.	4,952	$2,878	638	$447
Hard rubber tubes..........	......	1,859	......	2,634
Rubber thread, not covered...	4,240	6,373	2,664	3,536
Totals, partly manufactured.	9,192	$11,110	3,302	$6,617
MANUFACTURED—				
Belting	......	$16,275	......	$6,610
Hose	......	6,243	......	6,848
Packing	......	6,929	......	4,246
Boots and shoes............	......	59,178	......	6,720
Clothing, including waterproofed	......	25,061	......	18,701
Gloves	......	549	......	774
Hot-water bottles	......	2,496	......	1,065
Tires, solid	......	20,835	......	7,161
Tires, pneumatic	......	149,214	......	60,770
Inner tubes	......	7,532	......	4,531
Elastic, round or flat.......	......	45,420	......	21,266
Mats and matting...........	......	202	......	577
Cement	......	3,501	......	1,950
Other rubber manufactures...	......	126,023	......	146,386
Totals, manufactured..	......	$469,458	......	$287,605
Totals, rubber imports..	2,216,101	$1,451,671	2,509,055	$834,909
Insulated wire and cables				
Wire and cables covered with cotton, linen, silk, rubber, etc.	......	$11,078	......	$12,584
Copper wire and cables, covered as above...........	......	11,981	......	6,964
Chicle	......	......	252	97
Fillets	......	661	......	......
Webbing	......	101,061	......	20,059
Fountain pens	......	3,066	......	776

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS

	April 1920 Produce of Canada Value	April 1920 Reexports of Foreign Goods Value	April 1921 Produce of Canada Value	April 1921 Reexports of Foreign Goods Value
UNMANUFACTURED—				
Crude and waste rubber.....	$15,014	$1,751	$2,024	$1,302
MANUFACTURED—				
Belting	$2,017	......	$298	......
Hose	4,786	......	5,139	......
Boots and shoes............	115,529	......	38,271	14
Clothing, including waterproofed	930	......	1,503	358
Tires, pneumatic	929,006	......	86,080	......
Tires	440	10,746	1,319	1,781
Other manufactures	28,229	1,433	8,750	9,721
Totals, manufactured..	$1,080,937	$12,179	$141,360	$11,874
Totals, rubber exports.	$1,095,951	$13,930	$143,384	$13,176
Chicle	......	......	$3,396	......

UNITED KINGDOM RUBBER STATISTICS

IMPORTS

	May			
	1920		1921	
	Pounds	Value	Pounds	Value
Unmanufactured—				
Crude rubber				
From—				
Straits Settlements	1,081,200	£126,976	5,149,200	£240,642
Federated Malay States	2,902,000	340,596	4,839,000	240,021
British India	1,347,500	157,435	996,900	48,503
Ceylon and dependencies	1,537,700	169,157	2,526,000	124,019
Other Dutch possessions in Indian Seas	372,700	44,672	929,600	47,208
Dutch East Indies (except other Dutch possessions in Indian Seas)	638,600	75,987	2,153,500	115,490
Other countries in East Indies and Pacific, not elsewhere specified	188,300	21,079	247,900	12,035
Brazil	2,988,600	310,858	177,100	7,617
Peru	1,000	31	5,600	270
South and Central America (except Brazil and Peru)	16,200	1,590	5,000	250
West Africa				
French West Africa	540,500	47,502	22,400	746
Gold Coast	500	22	22,800	1,320
Other parts of West Africa	76,000	5,957	14,900	671
East Africa including Madagascar	143,200	15,110	56,600	1,920
Other countries	199,900	18,493	2,200	105
Totals	12,033,900	£1,335,465	17,148,700	£840,817
Waste and reclaimed rubber	1,093,800	29,931	6,300	71
Totals, unmanufactured	13,127,700	£1,365,396	17,155,000	£840,888
Gutta percha and balata	980,100	174,813	377,000	67,128
Rubber substitutes	44,800	1,700	......	......
Manufactured—				
Boots and shoes...*dozen pairs*	29,726	£79,943	5,239	£14,155
Waterproof clothing	......	1,258	......	110
Insulated wire	......	2,197	......	1,114
Tires and tubes	......	315,041	......	374,058
Other rubber manufactures	......	63,202	......	41,209

EXPORTS

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Unmanufactured—				
Waste and reclaimed rubber	1,741,200	£36,204	320,200	£9,933
Rubber substitutes	167,700	7,562	800	22
Totals	1,908,900	£43,766	321,000	£9,955
Manufactured—				
Boots and shoes...*dozen pairs*	13,752	£30,852	6,640	£15,700
Waterproof clothing	......	256,498	......	36,088
Insulated wire	......	142,619	......	112,239
Submarine cables	......	107,527	......	807,090
Tires and tubes	......	483,176	......	137,434
Other rubber manufactures	......	400,202	......	139,409

EXPORTS—COLONIAL AND FOREIGN

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Unmanufactured—				
Crude rubber				
To Russia	6,500	£620	......	......
Sweden, Norway and Denmark	357,600	35,701	172,500	£13,605
Germany	1,344,900	139,660	1,165,900	38,524
Belgium	274,000	30,975	126,900	4,640
France	3,345,900	400,825	645,700	27,063
Spain	32,300	3,786	9,100	447
Italy	704,100	86,833	51,700	2,350
Austria-Hungary	62,400	6,692	130,300	3,291
Other European countries	67,800	7,228	250,600	5,818
United States	4,713,600	554,515	942,500	41,629
Canada	449,300	52,663	15,700	1,020
Other countries	219,500	27,299	28,500	1,526
Totals, rubber	11,577,900	£1,346,797	3,539,400	£139,913
Waste and reclaimed rubber	16,300	£664	......	......
Gutta percha and balata	171,700	32,298	36,800	£6,888
Manufactured—				
Boots and shoes...*dozen pairs*	21	£191	28	£79
Insulated wire	......	97	......	......
Tires and tubes	......	10,941	......	27,750
Other rubber manufactures	......	6,040	......	2,639

RUBBER STATISTICS FOR ITALY

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	January			
	1920		1921	
	Quintals[1]	Lire[2]	Quintals	Lire
Unmanufactured—				
Crude rubber and gutta percha—raw and reclaimed:				
From French Colonies in Asia	312		....	
India and Ceylon	400		149	
Straits Settlements	...	1,294,850	2,228	3,680,300
French African Colonies	152		...	
Brazil	309		178	
Other countries	100		1,319	
Totals	1,363	1,294,850	3,874	3,680,300
Rubber scrap	11	1,650	...	......
Totals, unmanufactured	1,374	1,296,500	3,874	3,680,300
Manufactured—				
India rubber and gutta percha—				
Threads	13	37,700	31	89,900
Sheets, including hard rubber	1	1,000	2	3,800
Tubes	1	1,400	25	34,750
Belting	56	92,400	37	61,050
Rubber-coated fabrics in pieces	14	29,200	31	65,400
Boots and shoes.........*pairs*	13,030	260,600	38	760
Elastic webbing	3	10,200	18	61,200
Clothing and articles for travel	8	32,000	18	72,000
Tires and tubes				
From Belgium	148		......	
France	2		460	
Great Britain	302	1,274,000	562	2,867,200
United States	3		......	
Other countries	......		2	
Other manufactures	266	502,700	640	1,207,600
Totals, manufactured	......	2,241,200	......	4,463,660
Total imports	......	3,537,700	......	8,143,960

EXPORTS OF CRUDE AND MANUFACTURED RUBBER

	1920 Quintals	1920 Lire	1921 Quintals	1921 Lire
Unmanufactured—				
India rubber and gutta percha—raw and reclaimed:				
To United States	245	122,500	......	258,500
Other countries	......		517	
Totals	245	122,500	517	258,500
Waste	180	36,000	358	71,600
Totals, unmanufactured	425	158,500	875	330,100
Manufactured—				
India rubber and gutta percha—				
Threads	50	155,000	3	9,300
Sheets, including hard rubber	50	71,000	18	23,400
Tubes	54	67,600	78	98,000
Rubber-coated fabrics in pieces	9	27,000	6	18,000
Elastic webbing	28	106,400	34	129,200
Clothing and articles for travel	1	5,000	9	45,000
Tires and tubes:				
To Austria	9		73	
Belgium	3		135	
France	......		2	
Great Britain	......		865	
Spain	4		43	
Switzerland	69	230,000	9	4,467,500
India and Ceylon	......		175	
Dutch East Indies	......		225	
Argentina	......		116	
Brazil	1		......	
Other countries	6		144	
Other rubber goods	213	395,800	357	681,200
Totals, manufactured	......	1,057,800	......	5,471,600
Total exports	......	1,216,300	......	5,801,700

[1]One quintal equals 220.46 pounds.
[2] One lira equals $0.193 (normal).

THE MARKET FOR COTTON AND OTHER FABRICS

NEW YORK

American Cotton. The lack of trade buying has been the primary cause of the quiet conditions ruling in the spot cotton market during July. Prices have fluctuated from 10 to 35 points, showing a tendency to lower values at the end of the month. On July 1, spot middling uplands was quoted at 12 cents as compared with 40 cents a year ago. During the first part of the past month prices fluctuated mildly and on July 21, recorded 12.85 cents, the highest figure for the month. The absence of trade interest carried values to lower levels and quotations for spot middling uplands were 12 cents on July 26.

Egyptian Cotton. This market has shown a little life during this past month, and prices have therefore stiffened somewhat. Medium grades of uppers have sold around 16 cents, c. i. f. Boston. Although neglected, medium grades of Sakellarides have been bought at 28 to 30 cents, duty paid. Crop reports from Egypt are not good as a water shortage is feared. The plant got a late start and is progressing slowly under adverse conditions.

Arizona Cotton. Arizonas have been moving slowly on a basis of 32 cents for extra. Reports from Phoenix indicate that a great deal of cotton is for sale there. The crop is progressing favorably, but, this acreage being reduced, it is estimated that not over 30,000 bales will be ginned.

Sea Island Cotton. This market has been quiet although some business has been done in extra choice at 40 cents. Reports indicate that an acreage was planted slightly larger than last year, but the ultimate yield depends on the boll-weevil menace.

Mechanical Ducks and Drills. Considerable activity has been noted in this market, resulting in firmer prices, and higher quotations on some fabrics. The broad inquiry developed during the past month reflects the improved condition in the rubber manufacturing industry.

Raincoat Fabrics. Business in these materials has been quiet and slow with small inquiry from the manufacturers. Prices have not shown any radical changes.

Sheetings. The market for light weight sheeting has been stronger, but 40-inch goods are still going slowly at bottom prices. Buying is spasmodic and lacks healthy activity. The rubber trade is actually showing very little interest in sheetings at present.

Tire Fabrics. The well-defined improvement in tire production has not yet been felt in this market which continued to be upset. The wide range of prices that are being quoted on tire fabrics effectively discourages buying except on a hand-to-mouth basis.

NEW YORK QUOTATIONS

July 25, 1921

Prices subject to change without notice

BURLAPS				
32—7-ounce	100 yards		@	
32—8-ounce			@	
40—7½-ounce			@	
40—8-ounce			@	
40—10-ounce			@	
40—10½-ounce			@	
45—7½-ounce			@	
45—8-ounce			@	
45—10-ounce			@	
DRILLS				
38-inch 2.00-yard	yard	.12½	@	
40-inch 3.47-yard		.07¼	@	
52-inch 1.90-yard		.14¾	@	
52-inch 1.95-yard		.14½	@	
60-inch 1.52-yard		.18⅛	@	
DUCK				
CARRIAGE CLOTH				
38-inch 2.00-yard enameling duck	yard	.13	@	
38-inch 1.74-yard		.13⅞	@	
72-inch 16.66-ounce		.31¼	@	
72-inch 17.21-ounce		.32¼	@	
MECHANICAL				
Hose	pound	.24	@	
Belting		.25	@	
HOLLANDS, 40-INCH				
Acme	yard	.20	@	
Endurance		.22½	@	
Penn		.25½	@	
DEAD FINISH				
Piece		.20	@	
Cut		.25	@	
FLAT FINISH				
Piece		.16½	@	
Cut		.18½	@	
LONSDALE				
White		.48	@	
Green or blue		.56	@	
Colors		.51	@	
NAINSOOKS				
White		.18	@	.21½
Flesh		.22	@	
RAINCOAT FABRICS				
COTTON				
Bombazine 64 x 60	yard	.12½	@	
60 x 48		.11½	@	
Cashmeres, cotton and wool, 36-inch, tan		.60	@	
Twills 64 x 72		.10	@	.12
60 x 102		.14	@	
Twill, mercerized, 36-inch, blue and black		.26½	@	
tan and olive		.24½	@	
Tweed		.40	@	1.00
printed		.18	@	
Plaids 60 x 48		.10	@	
56 x 44		.11	@	
Repp		.24	@	
Prints 60 x 48		.13	@	
64 x 60		.14	@	

IMPORTED WOOLEN FABRICS SPECIALLY PREPARED FOR RUBBERIZING—PLAIN AND FANCIES				
63-inch, 3¼ to 7½ ounces	yard		@	
36-inch, 2¾ to 5 ounces			@	
IMPORTED PLAID LINING (UNION AND COTTON)				
63-inch, 3½ to 7 ounces	yard		@	
36-inch, 2 to 4 ounces			@	
SHEETINGS, 40-INCH				
48 x 48, 2.50-yard		.09½	@	
48 x 48, 2.85-yard		.08½	@	
64 x 68, 3.15-yard		.09¾	@	
56 x 60, 3.60-yard		.08¼	@	
48 x 44, 3.75-yard		.07	@	
SILKS				
Canton, 38-inch	yard	.27½	@	
Schappe, 36-inch		.45	@	
STOCKINETTES				
SINGLE THREAD				
3½ Peeler, carded	pound		@	
4½ Peeler, carded			@	
6½ Peeler, combed			@	
DOUBLE THREAD				
Zero Peeler, carded	pound		@	
3½ Peeler, carded			@	
6½ Peeler, combed			@	
TIRE FABRICS				
BUILDING				
17¼-ounce Sakellarides, combed	pound	.90	@	
17¼-ounce Egyptian, combed		.70	@	
17¼-ounce Egyptian, carded		.65	@	
17¼-ounce Peelers, combed		.70	@	
17¼-ounce Peelers, carded		.52	@	

CORD				
15-ounce Egyptian	pound	.76	@	
BICYCLE				
8-ounce American	pound		@	
10-ounce American			@	
CHAFER				
9¼-ounce Sea Island	pound		@	
9¼-ounce Egyptian, carded		.80	@	
9¼-ounce Peeler, carded		.67	@	

*Nominal.

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS

NEW YORK

The beginning of the new quarter saw no new prices for leads, zinc oxide or lithopone. In general, business in the usual list quoted in these columns has been routine with tendency to normal demand in a few items, notably zinc oxide and lithopone. Continued improvement in tire production is reported from the Akron district. In other rubber manufacturing lines increase of activity has not been as marked.

Aniline Oil. Supplies are abundant but demand has been limited to small quantities. Prices early in the month ranged from 19 to 26 cents a pound, closing at 20 to 25 cents.

Barytes. Imports of German barytes have been of small volume. Consumption has shown an increase with prices holding steady the entire month.

Benzol. Owing to the curtailment of coke production from which the bulk of benzol is derived as a by-product, the supply of benzol has been greatly restricted. It is much in demand, both here and abroad, as a source of motor fuel. Recent large export orders have been filled with difficulty. The active demand for 90 per cent benzol has produced a scarcity of the pure grade.

Blanc Fixe. During most of the month business ruled dull although an improvement has latterly been reported.

Blue Lead. The price has been maintained steadily at 7¼ to 7½ cents a pound. An improvement in the demand has been noted.

Cadmium Sulphide. Early in the month supplies for the rubber trade were quite active with better inquiry continuing as the month progressed. Prices steady at $1.10 to $1.35 a pound.

Carbon Bisulphide. The middle of the month was marked by improvement in business from the rubber trade. The market was active at 6 to 7½ cents a pound.

Carbon Tetrachloride. This solvent was in much less demand than carbon bisulphide, although conditions improved in this regard as the month progressed.

China Clay. This material was fairly active. Large arrivals of foreign stock had no influence on prices.

Dry Colors. Radical reduction in the prices of iron blues failed to increase demand and business in most colors ran under normal.

Gas Black. Following routine inquiry, the latter part of the month showed an increase in business from the rubber trade.

Litharge. Slow movement of stocks marked trade in litharge with no change in prices.

Lithopone. Same prices were announced for the third as ruled in the second quarter of the year. Certain manufactures are busy and the material is in good demand.

Solvent Naphtha. This market has been quiet. Prices range from 24 to 28 cents a gallon.

Sublimed Lead. Some improvement in demand. Prices unchanged and the outlook reported hopeful.

Sulphur. Business routine at steady prices.

Talc. There are ample stocks of all grades. Prices are steady and domestic grades are in fair demand.

Whiting. The market has been dull for the month with price reductions toward the close, of five to ten cents a 100 pounds.

Zinc Oxide. Prices on all grades were reduced July 1 from ⅝ to 1¼ cents a pound to stimulate business. The desired effect was produced and demand from the rubber tire trade increased. Consumption is rapidly resuming normal proportions.

NEW YORK QUOTATIONS

July 25, 1921

Prices subject to change without notice

ACCELERATORS, ORGANIC				
Accelerene (f. o. b. English port)	lb.	13s.	@	
Accelemal (bbl.)	lb.	$0.60	@	
Adco	lb.	.75	@	
Aldehyde ammonia crystals	lb.	.95	@	1.00
Aniline oil (drums extra)	lb.	.20	@	.25
Excellerex	lb.	.55	@	.75
Formaldehyde aniline	lb.	.60	@	.65
Hexamethylene tetramine	lb.	.95	@	1.00
Lead oleate (drums, 500 lbs.)	lb.	.13½	@	
N. C. C.	lb.	.45	@	
No. 999	lb.	.14	@	
Paradin	lb.	.70	@	
Paraphenylene diamine	lb.	1.75	@	2.00
Thiocarbanilide	lb.	.45	@	.65
Vulcocene	lb.	.35	@	
X L O	lb.	2.00	@	
ACCELERATORS, INORGANIC				
Lead, dry red	lb.	.10	@	
sublimed blue	lb.	.07¼	@	.07½
sublimed white	lb.	.07¼	@	
white, basic carbonate	lb.	.07½	@	.08
Lime, flour	lb.	.02	@	.02½
Litharge, domestic	lb.	.08¾	@	.09¾
imported	lb.	.17	@	
sublimed	lb.		@	
Magnesium, carbonate, light	lb.	.08	@	.10
calcined light	lb.	.25	@	.30
extra light	lb.	.50	@	
medium light	lb.	.25	@	
calcined heavy (bbl.)	lb.	.06½	@	.07
ACIDS				
Acetic 28 per cent	lb.	.02½	@	
glacial, 99 per cent	lb.	.11½	@	
Cresylic (97% straw color)	gal.	.80	@	
(95% dark)	gal.	.75	@	
Muriatic, 20 degrees	lb.	.02	@	
Nitric, 36 degrees	lb.	.05¾	@	
Sulphuric, 66 degrees	lb.	.01½	@	
ALKALIES				
Caustic soda	lb.	.04	@	.04½
Soda ash, 58%	cwt.	1.90	@	2.25
COLORS				
Black				
Bone, powdered	lb.	.06½	@	.08½
Carbon black (sacks, factory)	lb.	.10½	@	.20
pressed	lb.		@	
Dipped goods	lb.	1.00	@	
Drop	lb.	.07	@	.16
Ivory black	lb.	.15	@	.45
Lampblack	lb.	.15	@	
Oil soluble aniline	lb.	.95	@	
Rubber black	lb.	.10	@	.16
Rubber makers' non-flying black	lb.	.40	@	
Blue				
Cobalt	lb.	.25	@	.30
Dipped goods	lb.	1.00	@	
Prussian	lb.	.50	@	
Rubber makers' blue	lb.	3.50	@	
Ultramarine	lb.	.16	@	.35
Brown				
Iron oxide	lb.	.04	@	.06
Sienna, Italian, raw and burnt	lb.	.06½	@	.12½
Sienna, Italian, raw (tan color)	lb.		@	
Umber, Turkey, raw and burnt	lb.	.05½	@	.06½
Vandyke	lb.	.06	@	.10
Green				
Chrome, light	lb.	.32	@	.34
medium	lb.	.34	@	.39
dark	lb.	.43	@	.47
commercial	lb.	.12	@	
tile	lb.	.08	@	.17
Guignet	lb.	1.50	@	
Dipped goods	lb.	1.00	@	
Oxide of chromium	lb.	.55	@	
Rubber makers' green	lb.	3.50	@	
Red				
Antimony, crimson	lb.	.42	@	.51
crimson, E. 15/17% (bbls.)	lb.	.48	@	
crimson, F.	lb.	.35	@	
crimson, R. M. P.	lb.	.55	@	
Antimony, golden	lb.	.22½	@	.27
golden, R. M. P.	lb.	.25	@	
golden 1	lb.	.30	@	
golden 2	lb.	.25	@	
golden, E. 15/17% (bbls.)	lb.	.25	@	
7-A	lb.	.42	@	
vermilion	lb.	.55	@	
red sulphuret	lb.	.25	@	
Arsenic, red sulphide	lb.	.12½	@	
Dipped goods, red	lb.	1.00	@	
purple	lb.	1.00	@	
orange	lb.	1.00	@	
Indian	lb.	.13½	@	
Iron oxide, reduced grades	lb.	.04	@	.13½
pure bright	lb.	.15½	@	

COLORS—Continued

Maroon oxide	lb.	$0.13½ @
Oil soluble aniline, red	lb.	1.75 @ 2.00
orange	lb.	1.50 @
Oximony	lb.	.17½ @
Para toner	lb.	1.40 @
Red excelsior	lb.	@
Rubber-makers' red (four shades)	lb.	3.50 @
purple	lb.	2.50 @
Spanish natural	lb.	.04½ @ .05
Toluidine toner	lb	2.75 @ 3.25
Venetian	lb.	.03 @ .06
Vermilion, American	lb.	.25 @ .30
permanent	lb.	.30 @
English quicksilver	lb.	.90 @ 1.00

White

		C.L.	L.C.L.
Albalith	lb.	.07¼ @	.07½
Aluminum bronze	lb.	.60 @	.65
Lithopone, Beckton white	lb.	.07 @	.07½
Lithopone, domestic (factory)	lb.	.07 @	.07½
Ponolith (carloads, factory)	lb.	@	
Rubber-makers' white	lb.	@	
Zinc oxide. American Horse Head (factory)	lb.	.08¾ @	.09¼
Special	lb.	.08¼ @	.08½
XX red	lb.	.08½ @	
French process, Florence brand (factory):			
White seal	lb.	.11 @	.11¼
Green seal	lb.	.10 @	.10¼
Red seal	lb.	.09 @	.10½
White seal	lb.	.14 @	
Azo (factory):			
ZZZ (lead free)	lb.	.07½ @	.08
ZZ (under 5% leaded)	lb.	.07¼ @	.07¾
Z (8-10% leaded)	lb.	.07 @	.07½

Yellow

Arsenic, yellow sulphide	lb.	.70 @
Cadmium, sulphide	lb.	1.10 @ 1.35
Chrome, light and medium	lb.	.21 @
C. P.	lb.	.21 @
Dipped goods	lb.	1.00 @
Ochre, domestic	lb.	.02½ @ .03½
imported	lb.	.04 @ .04½
Oil soluble aniline	lb.	1.60 @
Rubber makers' yellow	lb.	2.50 @ 3.50
Zinc chromate	lb.	.35 @

COMPOUNDING INGREDIENTS

Aluminum flake (carloads)	ton	25.00 @ 33.00
hydrate, light	lb.	.22 @ .25
Ammonium carbonate (lump)	lb.	.07½ @ .10
Asbestine	ton	20.00 @
Barium, carbonate precipitated	ton	85.00 @
dust	ton	100.00 @
Barytes, pure white (carloads)	ton	28.00 @ 30.00
off color (carloads)	ton	20.00 @ 25.00
uniform floated (carloads)	ton	28.00 @
Basofor	lb.	.05 @
Beta-naphthol	lb.	.40 @
Blanc fixe	lb.	.04½ @ .05
Bone ash	lb.	@
Carrara filler (factory)	ton.	16.00 @
Chalk, precipitated, extra light (f. o. b. factory)	lb.	.03½ @ .04¼
heavy (f. o. b. factory)	lb.	.02½ @ .03¼
China, clay, Dixie	ton	22.00 @ 32.00
Blue Ridge	ton	22.00 @ 32.00
domestic	ton	7.50 @ 9.00
imported	ton	16.00 @ 24.00
Cotton linters, clean mill run (factory)	lb.	.02½ @
Diatomite	lb.	.03½ @
Fossil flour (powdered)	ton	60.00 @
(bolted)	ton	65.00 @
Glue, high grade	lb.	.30 @ .40
medium	lb.	.24 @ .30
low grade	lb.	.16 @ .18
Graphite, flake (400-pounds bbl.)	lb.	.10 @
amorphous	lb.	.05 @
Ground glass FF. (bbls.)	lb.	@
Infusorial earth (powdered)	ton	60.00 @
(bolted)	ton	65.00 @
Liquid rubber	lb.	.15½ @
Mica, powdered	lb.	.15 @
Phenanthrene	lb.	@
Pumice stone, powdered (bbl.)	lb.	.03 @ .08
Rotten stone, powdered	lb.	.02½ @ .04½
Rubber paste	lb.	@
Silica, aluminum	ton	25.00 @ 30.00
gold bond	ton	28.00 @
silver bond	ton	22.00 @
Soap bark, powdered	lb.	.23 @
Soapstone, powdered (bags)	ton	15.00 @ 20.00
Starch, powdered corn (bags)	cwt.	2.33 @
(bbls.)	cwt.	2.61 @
Talc, powdered soapstone	ton	18.00 @ 20.00
Terra blanche	ton	25.00 @ 28.00
Tripoli flour, air-floated, cream or rose (factory)	ton	25.00 @
white (factory)	ton	27.00 @
Tyre-lith	ton	90.00 @
Whiting, Alba	cwt.	1.50 @ 1.80
Columbia	cwt.	@
commercial	cwt.	1.10 @ 1.20
Danish	ton	18.00 @
English cliffstone	cwt.	1.75 @ 2.00
gilders	cwt.	1.20 @ 1.35
Paris, white, American	cwt.	1.35 @ 1.50
Quaker	ton	13.00 @ 15.00
Superfine	ton	15.00 @ 17.00
Wood pulp, imported	ton	@
XXX	ton	34.00 @
X	ton	30.00 @
Wood flour	ton	35.00 @ 40.00

MINERAL RUBBER

Elateron (c. l. factory)	ton	@
(l. c. l. factory)	ton	@
Gilsonite	ton	$70.00 @
Genasco (c. l. factory)	ton	50.00 @
(l. c. l. factory)	ton	52.00 @
Hard hydrocarbon	ton	35.00 @ 45.00
Soft hydrocarbon	ton	30.00 @ 40.00
320 M. P. hydrocarbon (c. l. factory)	ton	50.00 @ 55.00
(l. c. l. factory)	ton	57.50 @
300/310 M. P. hydrocarbon (c. l. factory)	ton	40.00 @
(l. c. l. factory)	ton	45.00 @
M. R. X.	ton	@
Pioneer, M. R. (c. l. factory)	ton	46.00 @
(l. c. l. factory)	ton	48.00 @
Raven M. R.	ton	@
Robertson, M. R. pulverized (c. l. factory)	ton	@
M. R pulverized (l. c. l. factory)	ton	@
M. R. (c. l. factory)	ton	52.50 @
M. R. (l. c. l. factory)	ton	55.00 @
Rubrax (factory)	ton	50.00 @
States "A" (c. l. factory)	ton	43.00 @
No. 1 (c.-l. factory)	ton	38.00 @
Synpro, granulated, M. R. (factory)	ton	59.50 @ 75.00

OILS

Avoilas compound (bbl.)	lb.	.14 @
(kegs)	lb.	.18 @
Castor, No. 1, U. S. P	lb.	.10½ @
No. 3, U. S. P	lb.	.09 @
Corn	lb.	@
refined	lb.	@
Cotton	lb.	.09½ @
Glycerine (98 per cent)	lb.	.14½ @ .15
Halowax	lb.	.26 @
Linseed, raw	gal.	.75 @
Linseed compound	gal.	@
Palmoline	lb.	@
Palm niger	lb.	.07½ @
Peanut	lb.	.10 @
Petrolatum, standard	lb.	.05 @ .07
Petrolatum, sticky	lb.	.10 @ .12
Pine, steam distilled	gal.	1.10 @ 1.30
Rapeseed, refined	lb.	.11 @
blown	lb.	.12 @
Rosin	gal.	.38 @ .45
Synpro	gal.	.35 @ .60
Soya bean	lb	.08 @
Tar	gal.	.30 @ .37

RESINS AND PITCHES

Cantella gum (carloads)	lb.	.50 @
Cumar resin, hard	lb.	.09 @ .13
soft	lb.	.09 @ .13
Tar, retort	bbl.	12.00 @
kiln	bbl.	11.50 @
pine retort	bbl.	14.00 @
Pitch, Burgundy	lb.	.05 @ .05½
coal tar	ton	20.00 @
pine tar	lb.	.03½ @
ponto	lb.	.10 @
Rosin, K (bbl.)	280 lbs.	5.70 @
strained (bbls.)	280 lbs.	5.00 @
Shellac, fine orange	lb.	.84 @ .90

SOLVENTS

Acetone (98.99 per cent, drums [6.62 lbs. per gal.])	lb	.12½ @ .13½
Benzol (water white, 90% [7.21 lbs. per gal.])	gal.	.25 @ .31
pure (drums, extra)	gal.	.27 @ .38
Carbon bisulphide (drums [10.81 lbs. per gal.])	lb.	.06¾ @ .07½
tetrachloride (drums [13.28 lbs. per gal.])	lb.	.11 @ .12½
Paracymene (factory)	gal.	5.00 @
Motor gasoline (steel bbls.)	gal.	.23½ @
73@76 degrees (steel bbls.)	gal.	@
68@70 degrees (steel bbls.)	gal.	@
Naphtha, V. M. & P. (steel bbls.)	gal.	.23 @
solvent (drums extra)	gal.	.32 @
Toluol, pure (7.21 lbs. per gal.)	gal.	.28 @ .34
Turpentine, spirits	gal.	.61 @
wood	gal.	.59 @
Xylol, pure (7.21 lbs. per gal.)	gal.	.40 @ .43
commercial	gal.	.28 @ .35

SUBSTITUTES

Black	lb.	.08 @ .14
White	lb.	.10 @ .16
Brown	lb.	.12 @ .15
Brown factice	lb.	.07 @ .15
Rubber factice	lb.	.03¾ @
White factice	lb.	.08 @ .16
Paragol, soft and medium	cwt.	6.81 @
hard	cwt.	6.81 @

VULCANIZING INGREDIENTS

Lead, black hyposulphite (black hypo)	lb.	.40 @
Orange mineral, domestic	lb.	.11¾ @ .13½
Sulphur chloride (jugs)	lb.	.20 @
(drums)	lb.	.08 @
Sulphur, flour, Brooklyn brand (carloads)	cwt.	@
Brooklyn brand (less carload)	cwt.	@
Bergenport brand (bbls.)	cwt.	2.55 @
(bags)	cwt.	2.30 @
superfine (carloads, factory)	cwt.	@

(See also Colors—Antimony.)

WAXES

Wax, beeswax, white, commercial	lb.	.55 @
ceresine, white	lb.	.14 @
carnauba	lb.	.16 @
Montan	lb.	.07 @
ozokerite, black	lb.	.30 @
green	lb.	.30 @
paraffin	lb.	.03½ @ .08
sweet wax	lb.	.12 @

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CAOUTCHOUC GUTTA-PERCHA

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THE PASSING OF A GREAT LEADER

Colonel Samuel Pomeroy Colt, whose untimely decease is chronicled in this issue, will go down in history as one of America's great industrial leaders. It was his vision, determination and management that transformed the United States Rubber Company from a promoters' plaything, debt-ridden and tottering, into a prosperous $150,000,000 corporation, amply financed, with modern equipment, high-class products and splendid executive personnel. To accomplish this the ability to deal successfully with strong men of varying types, temperaments and ambitions was an absolute necessity. This Colonel Colt possessed to a remarkable degree. To unify such potent and individual human factors as Joseph Banigan, E. S. Converse, J. D. Vermeule, F. M. Shepard, Charles R. Flint, L. K. McClymonds, R. D. Evans, George H. Hood, Charles H. Dale, the Fords, and many others, required great diplomacy, vast knowledge of men and endless patience. They were all pioneers, creators of big business along lines of their own, and were possessed by a deep-rooted antipathy to control, as well as an old-fashioned suspicion of competitors. Their factories, located in widely separated states, were run under widely differing conditions, with their own compounds, products and selling methods. With all of these varied problems—financial, mechanical and human—Colonel Colt grappled and successfully solved them.

Pleasantly aggressive, far-sighted, tireless, he labored to build always bigger, better, stronger. As to his triumphs in other fields, as in the creation of the great Industrial Trust Company of Providence, they do not enter into the field of rubber, but are cited merely to show the business and creative ability possessed by this leader of men. In his passing, industrial circles lose a most notable figure, and the rubber trade its best-known member.

SHORTAGE OF COTTON IMMINENT

Coming at a juncture when there is urgent need for revision downward in cost production and selling price in order to stimulate sluggish trade into reasonable activity, comes official confirmation of the report that, despite favorable midsummer growing conditions, the United States cotton crop will scarcely total 8,500,000 bales, or some 5,000,000 less than last year, and almost 8,000,000 less than the record crop of 1914. Nor does it seem at all probable that the figure named will be raised when the crop is marketed, or that the average price for spot cotton will work in any direction other than away from the June, 1921, low of 10.85 cents a pound, as compared with 43.75 cents in June, 1920. The carry-over is not considerable in view of the potential demand. American cotton acreage has been reduced between 25 and 30 per cent, and needy Europe, largely through credits allowed to idle mill owners, is absorbing much of the restricted cotton production of the Nile Valley and elsewhere in the Old World. All these are factors tending to make cotton dearer and to add to the cost of rubber goods containing that staple.

An immense amount of cotton is used in the various branches of the rubber industry, and the needs of the latter are certainly not growing less; yet it is doubtful if even a fair allowance has been made for the requirements of the industry by its leaders. Many buyers have sensed to a degree the demands that will be made and have made fair provision, but it is feared that too many manufacturers of rubber goods have not materially anticipated the demands that will be made on them. In other words, they have not stocked up to the extent that trade in the near future would appear to justify. Even prudent purchasers may hold out too long in the hope of seeing still lower cotton prices, unmindful of the fact that present-day conditions may not be judged by criteria of the past, and that influences are working inexorably toward hardening rather than softening of cotton prices.

A resumption of activity is noted among the textile manufacturers, but the demand comes largely from merchants rather than from the tire, proofing, footwear, and other branches of the rubber trade. With dearer cotton in prospect and little likelihood of reduction in labor cost, the prospect favors an upward trend in the price of textiles. Certainly it seems that the rubber manufacturer who looks far enough ahead in contracting for woven material will have an advantage over him who has overstayed his time in bargain-hunting. He may have to ask

a little more later on for his finished goods than present prices, but still he will be able to quote closer figures than his competitor who bought at the eleventh hour on a rising market.

HIGHER RUBBER AND SOON?

That the price of crude rubber will continue at its present low figure is hardly a possibility. To be sure, the rule has been that however one guessed as to the future trend of prices in this commodity the guess was usually wrong. Nevertheless, low rubber has always in time been succeeded by high rubber. The three-dollar level of a few years ago in the light of future needs looked fairly permanent, but such was not the case. High tides recede and "low water" in time is succeeded by high. If for no other reason the forced cessation of tapping on the part of so many planters will bring the supply down and the price up. Those who are able to hold on will profit, those who do not will lose. It is a great pity that planters in the Far East who so ably came forward and supplied the rubber so vital to industry should suffer and perhaps lose all. It would also be unfortunate if some great monopoly gathered in the bulk of the far eastern plantations. In all probability nothing of the kind will occur. The advance of a few cents a pound would clear the skies, and that is sure with the world's manufacturers soon coming into the market for rubber, and lots of it.

THE NATION'S HIGHWAYS

Apart from the production of rubber tires and his interest in the vehicles using them, there is scarcely anything with which a tire manufacturer might more properly concern himself than the roads on which his product plays such an important part in transporting men and materials. Readily does he sympathize with all endeavors for the betterment and extension of the country's roads, but too often he allows his affairs to so engross his time that he scarcely notices the laudable efforts of those working for the benefit of the whole community, and much less does he give them a word of direct encouragement. He quite appreciates the great advantages accruing to the nation from ample, well-made, properly maintained highways. He knows that their early construction would hasten the return of normalcy and add wonderfully to the comfort, well-being, and convenience of millions. He doubtless realizes that national and state governments have appropriated approximately a billion dollars for making new or overhauling old arteries of travel, yet unthinkingly he leaves largely to venal or careless politicians the matter of deciding how such an immense fund shall be expended.

It is begging the question to say that the politicians will have the determining voice, no matter what good counsel is offered them, and that they will only too often serve special interests rather than work for the common benefit. But they can be influenced for good as well as for ill. They can be shown the advantage of rendering conspicuous public service, of doing something that is of lasting credit to them, and which would largely atone for remissness in other directions.

It is in this connection that such a body as the Advisory Board on Highway Research of the National Research Council can be very helpful. Its disinterestedness, its great accumulation of valuable data, and its readiness to aid in solving present-day problems in highway making, maintenance, and financing, as well as the use and restriction of vehicles and the question of transportation from every angle, must appeal even to the politician of ordinary stamp.

An organization such as this, which has the active cooperation of the Engineering Foundation, army and automotive engineers, national and state highway departments, and leading technical societies and educational institutions, certainly merits the lively interest, not of tire manufacturers alone, but of all rubber men who would, while promoting their own welfare, do an immense amount of good for their fellow countrymen.

THE STRAIGHT-SIDE WINNING

In spite of European conservatism and dread of change, the straight-side tire is steadily proving its superiority over the clincher. The conversion of the Dunlop Rubber Co., Limited, to straight-side superiority will have an enormous effect. The great French, Italian and German tire companies will be forced into line to keep their business. To a degree it is the story of the rubber-cored golf ball translated into terms of tires.

One of the best recommendations made by the American delegates at the session of the International Chamber of Commerce in London was for the appointment of a permanent International Committee to adjust difficulties in the exchange of goods between nationals of different countries. Nor could a better agency be selected for the elimination of unnecessary friction, often due to mere misunderstanding, in the conduct of individual transactions in international trade. A comprehensive plan is provided for rectifying, simplifying and expediting negotiations; and not the least important reforms proposed are those for establishing a council of arbitration to save delay and expense in litigation, the interchange of accurate credit information, equal opportunities for business, the lessening of artificial trade restrictions, the accurate national branding of merchandise, and measures to stamp out trade mark, patent, and copyright piracy.

The rubber tent used so successfully in gas fumigation had but one rival, a scale-eating bug known as *Pediculoides*. The past tense is used advisedly, for the "Peds," once the scale is destroyed, turn ravenously upon human beings and have already put many in hospitals. The bug is therefore to be exterminated, if that can be done, and the tent comes into its own again.

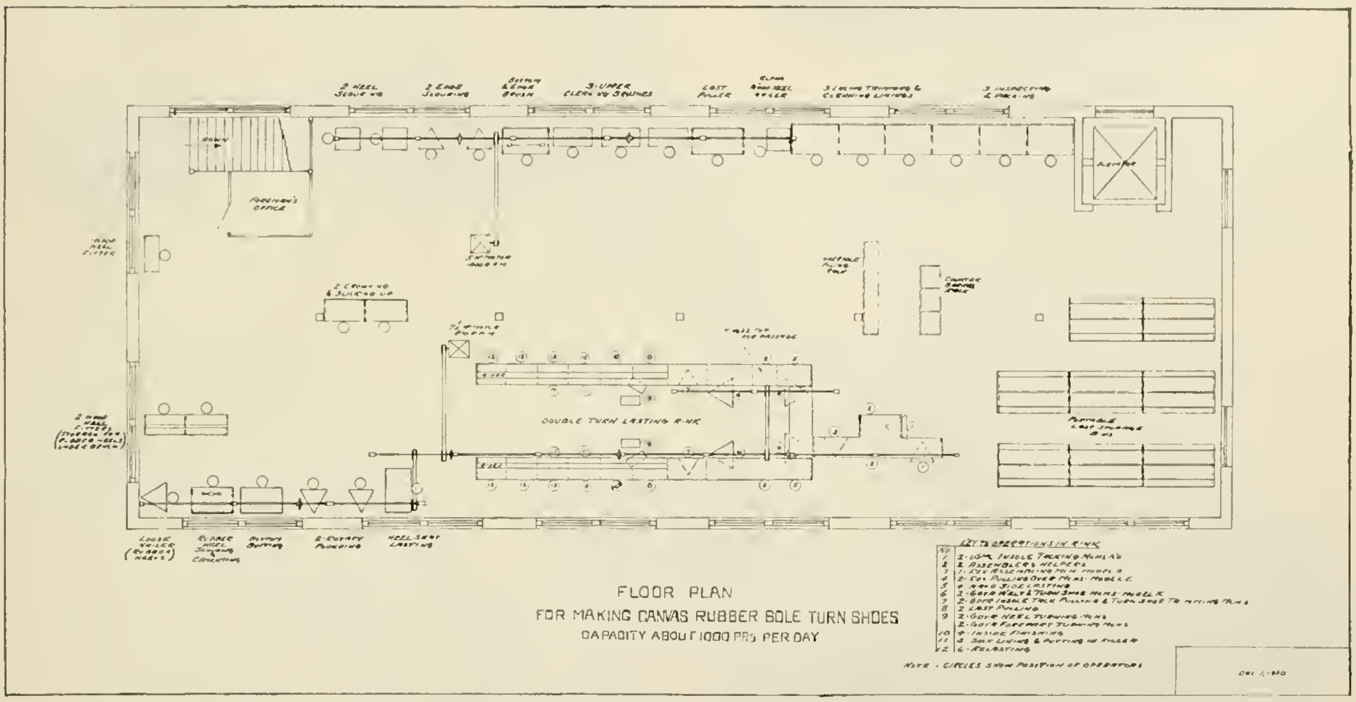
The Rubber Sole Turn Shoe Perfected[1]

A New and Important Development

A new type of footwear which, in the opinion of those who have tested it from the standpoint of both the wearer and manufacturer, and which is destined to be a factor of no small consequence in the shoe trade of the immediate future, is the Goodyear rubber sole turn shoe.

POSSIBILITIES OF THE PROCESS

This new development is the direct outcome of the great effort made to conserve materials and improve methods which came during the war, and to provide, as well, a more practical construction for the manufacture of canvas rubber shoes. The



Typical Factory Plan Showing Arrangement of Machines and Operations

Goodyear Turn Sole Rink Showing Trimming Machine, Goodyear Heel Turning and Forepart Turning Machines, and Relasters

[1] The information and illustrations used in this article were obtained from the United Shoe Machinery Corporation, Boston, Massachusetts.

process is by no means confined to manufacturers of rubber footwear, but presents advantages which should appeal very strongly to all makers of shoes in which rubber has a place.

A NEW TYPE OF SHOE

The new type of footwear embodies to an extent hitherto unknown in the rubber shoe trade the three desirable and important features of a good shoe—style, comfort and durability. Vulcanization other than in the preparation of the sole is entirely eliminated, and, as the method of manufacturing and the equipment used is exactly that employed in making high-grade and comfortable leather turn shoes so much in demand at the present time, the possibilities which the new process brings to the producer of fabric shoes are only just now being realized.

Goodyear Turn Sole Without Heel

BASIC FEATURES

The basis upon which the whole success of the new method is built is the construction of a turned shoe sole of the so-called "fiber compound" or "composition rubber," which is molded with a rib or shoulder and strongly reinforced to withhold the strain of the sewing. A fabric pocket is provided for a steel shank piece, which is inserted at the proper time to give permanent form to the arch of the shoe. This method of preparing the turn sole has been developed to the point where it has met every requirement and stood every test that has been placed upon it. It is made by the use of a special and ingenious set of molds which have been perfected and can be obtained by those manufacturing this type of shoe.

Beginning of the Process, Insole Tacking and Assembling Machines

THE RUBBER TURN SOLE

The sole is molded with or without a heel and, as will be seen by the accompanying illustrations, is of such construction that, with the inserted sock lining or slip sole in the completed shoe, it does not in any way interfere with the comfort of the wearer.

In the preparation of this turned sole, several operations are combined. The making of the heel as an integral part of the sole does away with all of the operations necessary in completing this part of the shoe, and the forepart carries the separations or indentations which usually appear on the upper surface of a leather turn or welt shoe.

TYPICAL FACTORY PLAN

The system of machinery used at the present time has been so thoroughly organized that the work passes with the greatest rapidity from one operation to another up to the point of completion. The accompanying detailed plan shows the arrangement of the various machines required in the making of this shoe and the organization of the work, which has been the outcome of long study and experiments.

PULLING AND LASTING

The shoe upper is prepared in the regular way, the molded sole being fastened on the last by machinery. Where the heel is an integral part of the sole a recess last is used for first lasting only. The fitted upper and the molded sole are assembled together on the lasts by means of the Rex assembling machine, after which it then passes to the pulling-over machine, at which point the shoe is pulled in the regular way by driving nine tacks, so distributed that the complete toe and forepart of the shoe is thoroughly pulled and lasted. In making shoes with sewed seats, after placing a few anchor tacks in the side, further lasting is unnecessary, as the operation of the Goodyear turn sewing machine, which immediately follows the pulling and lasting, draws the shoe upper securely and smoothly to the last at all points. In instances where a superior type of shoe is made and a nail seat is desired, the heel-seat lasting machine may be used.

Goodyear Turn Sole With Heel

UPPER SEWING AND HEEL TURNING

After the pulling and lasting operations mentioned above, the shoe is ready for the Goodyear turn sewing machine and the upper is fastened to the sole in the same manner that it is in factories where this fine class of leather footwear is made. The upper is then trimmed and the last is withdrawn, and the shoe goes to the Goodyear heel turning machine, which is a recently perfected one. The turning operation on the heel heretofore has required exceptional skill and long training on the part of the operatives. This machine is now very successful in its work and operators very readily become accustomed to it.

Pulling-Over Machine and Goodyear Turn Shoe Sewing Machine

TURNING THE FOREPART

After turning the heel, the forepart is turned by a Goodyear forepart turning machine, which is also a new machine, invented for this purpose, and does its work with a rapidity and

accuracy which has been long sought for in making this type of shoe, for the number of operators experienced and skilled in this operation has been extremely small and the demand for them has been very great. As with the heel-turning machine, the operation of this machine is rapidly learned by operators who become very skilful in doing this wonderful and essential part in making a turn shoe.

After the shoe has been partially turned, or to that point where the shank no longer is disturbed, the steel shank piece intended to give permanent form to the shank of the shoe is inserted in a pocket which holds it permanently in place and gives definite form to the shank.

RELASTING, TRIMMING AND FINISHING

With the completion of the turning operation, the shoe is again relasted by hand lasters who place within it a smaller last and straighten the linings so that the shoe is ready for the operation of trimming forepart and heel and the subsequent insertion of the sock liner or filler. The necessary finishing operations are observed in making a marketable shoe of the character and type for which there has been an active demand in the last two years.

The finished shoe is of such flexibility and comfort that the demand for it, in the opinion of those who are familiar with what has been accomplished in perfecting this system of manufacture, is destined to increase rapidly when the public becomes familiar with the desirable qualities which the shoe possesses. It can safely be said that no recent development in shoemaking is of greater importance, particularly to concerns that have heretofore confined their shoe manufacturing to those methods which required the use of vulcanization. It will well repay any manufacturer of fabric shoes to thoroughly investigate this process. The four types of shoes shown in the accompanying illustrations are examples of what can be achieved by the Goodyear turn-sole system.

High-Cut Boot for Women

Men's Spring-Heel Oxford

Women's Oxford

Men's Sport Oxford

Finished Products of the Goodyear Turn Sole System, Made for Style, Comfort and Durability

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HOW TO REMOVE PNEUMATIC TRUCK TIRES

The United States Tire Co., New York, N. Y., pioneer builder of truck pneumatics, points out briefly how handling a change of tires on the road can be made a one-man job.

To dismount the tire and rim from the wheel, jack up the car, loosen the tire bolts and then the rim by shock, and turn the wheel so that the sector containing the valve is near the ground. Grasp the tire with both hands at points just below the hub level, and lift the rim away from the top of the wheel, watching the valve to make sure that it does not bind in the felloe when the rim slides off the felloe band. This method of dismounting the tire and rim from the wheel requires very little lifting, and does no damage to valve or tube.

To detach the tire from the rim lay the tire on level ground, locking-ring side up, remove the valve plunger to complete deflation, and push back the valve stem inside the rim. Remove locking and side rings, loosen flap all around and lift tire straight up off the rim. Reverse the operations when the tire is ready for replacement on the rim.

In applying the rim and tire to the wheel engage the valve stem in the felloe at a point level with the hub, push the rim firmly against the felloe and turn the wheel until the valve is at the highest possible point. The rim will drop into place on the felloe. This knack of first engaging the valve, then turning the tire and rim on the wheel eliminates all direct lifting, and makes the applying of even an eight-inch tire a comparatively simple matter.

WHY BURIED CABLES HEAT

British electrical engineers have been trying to find a way to lessen the tendency of buried cables to deteriorate through heating, and through the same cause to suffer a loss in conductivity. At a recent conference in Liverpool experts reporting the results of various tests showed that paper-covered wires, unlike those insulated in rubber or gutta percha, were subject to considerable variations in longitudinal expansion. A rise from the "normal" earth temperature of 60 degrees F. to 120 degrees in a 220-yard strand of armored copper cable caused an expansion of 4½ inches, distorting the inelastic lead covering and occasioning much trouble. Over 120 degrees the dielectric loss rose rapidly, or, in other words, the efficiency of the insulating medium decreases proportionally to the increase in heat. Many factors, it was pointed out, favored the rise in the temperature of the copper conductor and lessened its current-carrying capacity, such as a considerable increase in voltage, a very dry or loose soil, and particularly trapping of air in minute films between the paper coating and the copper, or differing degrees of intimacy of contact between the dielectric and the conductor.

A Glossary of Words and Terms Used in the Rubber Industry—VII[1]

By Henry C. Pearson

Pneumatic Tire Definitions[2]

The following definitions relating to pneumatic tires are presented subject to additions and corrections. They are purposely brief, the plan being ultimately to expand those of major, and delete those of minor importance. Factory terms, machines and processes have, in this section, been excluded except when they explain finished products.

Pneumatic Tire. A circular rubber and fabric tube for attachment to the rim of a wheel, inflatable with air or gas under pressure, usually through an affixed valve. The fabric supplies strength and checks undue expansion. The rubber binds the plies of fabric together, insulates threads or cords that they may not chafe, protects from moisture and abrasion, presents a surface adapted for traction, resistant to side slip, and confines the air. Pneumatic tires are called in French, "pneumatiques," in English, "pneumatic tyres," and in almost all other languages, "pneumatics," sometimes, "pneus."

There are two general types, double tube and single tube. The double tube consists of two separate parts, the casing and the inner tube. The casing is a concave band of rubber and fabric, open throughout its whole inner circumference and nearly horseshoe-shaped in cross-section. Its parts in general are: rubber tread, rubberized fabric breaker strip, carcass built of plies of rubberized building fabric, or of cords or cord fabric, side-walls, and rim attachment beads of rubber and fabric or rubber fabric and wire. Its office is to envelop, retain, and protect the inner tube and afford a suitable surface for road contact.

Three types of casings are used, fabric, cord and cord fabric. The fabric type is built up of plies of frictioned square-woven fabric so applied that warp and woof threads lie diagonal to the circumference of the tire. Cord tire casings are made of separate cords, rubber impregnated, laid diagonally in two or more separate plies, each cord and each ply separated, cushioned and isolated by coatings or layers of rubber. Cord fabric tire casings are made of cord layers (plies) which consist of close-lying parallel warp cords lightly held together with tie-in-threads, rubber impregnated and insulated. They are ordinarily made of 6, 8, or more plies, the cords of each lying diagonal to the circumference and also to the other plies in alternation.

The inner tube is usually a circular, endless, elastic tube of rubber to which an inflation valve is affixed, or a straight tube sealed at the ends which butt together when it is fitted within the circular casing. Its office is to hold air under pressure, being enveloped and protected by the casing into which it fits. The single-tube tire used chiefly on American bicycles is an endless tube of rubber and fabric brought by pressure and vulcanization into a homogeneous unit. It consists of rubber lining, frictioned fabric plies, rubber cover tread and valve.

The pneumatic tire is used on passenger automobiles, motorcycles, motor trucks, airplanes and bicycles, and to a lesser degree on racing sulkies, carriages, perambulators and jinrickishas.

Abrasion. The wearing away of the surface of a tire by rubbing off or attrition, as tread abrasion.

Absorbability. A quality possessed in a marked degree by pneumatic tires, whereby they resist compressive shocks, or take up and disperse through the resilient casing and the elastic, inflated inner tube, the jarring or concussion due to the striking of or passing over minor obstructions of the road, with minimum vibration and loss of energy.

Accelerated Cure. See Vulcanization.

Accessible Valves. Inner tube valves within easy reach, in contradistinction to valves set on the inner side of a wheel, as on types of disk wheels which by reason of their inaccessibility make frequent pressure testing difficult and tend to the neglect of proper inflation.

Accessory Kit. A trade term for an assortment of rubberized fabric and rubber patches, cement, etc., for emergency work in tire repair. See Repair.

Acid. A shop term applied to cold-cure solutions containing chloride of sulphur. See Cold Cure.

Acid Cure Cement. A cold cure, self-vulcanizing cement used in splicing inner tubes, affixing valve patches, and other repair work; a typical formula being 1.7 fluid ounces of sulphur monochloride to 1 gallon of carbon tetrachloride mixed with pure rubber. See Cement.

Adhesion. The friction strength of union between the component parts and the materials in a casing. See Specifications.

Adjuster. One who adjusts. See Adjustment.

Adjustment. A refund or allowance to the buyer of a tire claimed to have failed to give satisfaction through defect in material or workmanship. See Guaranty.

Aerial Wheel. A name given to the first pneumatic vehicle tire patented in England in 1845 by Robert W. Thompson.

Aftercure. A slow process of spontaneous vulcanization in normal atmospheric temperature, remarked in the aging of rubber when it becomes inelastic and inclines to chip and check on its surface.

Aging Qualities. Properties possessed by a tire, involving materials and make-up, which determine the duration of its normal service. Often applied to side-wall stock. See Life.

Air Cure Cement. India rubber in a volatile solvent so compounded that it cures on exposure to the air; self curing cement. See Acid Cure Cement.

Air Gage, or Gauge. A small instrument applied to a valve for determining the pressure of air in an inflated inner tube, and usually self-recording. See Pressure Gage.

Air Nipples. Rubber devices attached to tires in which valves are fastened.

Air Pressure. The expansive stress of the air in pneumatic tires proportioned to tire size and maximum load. See Load.

Air Releaser. A contrivance for screwing upon a valve which, by depressing the plunger pin or check, allows an inner tube to deflate, as for repair. See Deflator.

Air Substitutes. Various devices and materials designed to supplant compressed air for resilience in pneumatic tires. See Fillers.

Air Tube. A British term for inner tube.

Air Tube Protector. An interliner of several plies of friction fabric molded to fit inside a casing and having beveled or feathered edges. Designed to protect the inner tube when a casing has been pierced. It is placed over the inner tube and inserted with the latter but not cemented to the casing. See Reliners.

Air Valve. The channel through which compressed air is supplied to or expelled from an inner tube. See Valve.

Airplane Tire (Aeroplane Tire). A light cord or fabric tire, for airplanes. First manufactured as a single-tube tire, then as a clincher fabric tire, and finally as a clincher cord tire. At present the Palmer type of clincher cord airplane tire with a wire reinforcement in the bead is generally used. This allows a smaller bead to be used and lightens the tire, and also allows

[1] Continued from The India Rubber World, July 1, 1921, pages 723-725.

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tires of the clincher type to be used up to 200 millimeters section diameter. See Specifications and Sizes.

Alarms. Various attachments on inner tube valves for indicating automatically by whistling, bell striking, cap explosion, clicking, bumping, or concussion, deflation of a tube below a predetermined minimum of pressure.

Alinement. Paralleling of motor-car wheels to avoid uneven wear of tires.

All Rubber Patch Stock. A strong, cured stock used in repair, having a layer of uncured gum. See Patches.

All Warp Tire Fabric. A material for a tire carcass invented by John Fullerton Palmer, an American, and brought out in 1893 in the United States and Great Britain. It consists wholly of warp (lengthwise) threads with no weft (crosswise) threads, calendered on sheet rubber, then cut into strips wound spirally on a mandrel, and overlaid with similar strips in reverse direction.

Anti-Rust Strip. A British term for a circular flap of rough rubber sheet fitted to the bed of an inner tube used with a clincher type tire, and designed to protect the tube from a rusty rim.

Armor. A modified form of chain protection for a casing employing, in one type, numerous bands 2 inches wide, of flat steel links ⅛-inch thick hooked together, and which may be hooked to a rim or put on like a tire. Often used like a boot, in one or more bands, to protect a casing damaged by a blow-out or rim cut.

Armored Tire. A so-called puncture proof tire having leather or rubber treads in which wire, chain, metal bands or disks are embedded, or to which they are attached, to reinforce the casing. See Treads.

Association Guaranty. A standard form of guaranty, adopted in 1896 by the Rubber Tire Association, comprising leading bicycle tire manufacturers in the United States, to correct many troubles caused by vague and difficult guaranties and the demands on manufacturers for replacements. Revised, and restrictions added, in 1898.

Auto Tread Stock. A reclaimer's term for a carcass comprising tread and three or four outer plies.

Automobile Tire. A pneumatic, solid, cushion or spring tire used upon self-propelled passenger vehicles. See Specifications and Sizes.

Axle Load. The weight of an automobile and its contents upborne by the axles as set in the wheel hubs; a factor determining—with the tire size—the proper pressure to be carried in a tire, the load-weight being calculated by weighing the front and rear of the leveled, fully loaded car separately and dividing by two, reference to the inflation scale then giving the correct air pressure. See Load.

Baby Cab Pneumatic. An inflatable single-tube tire for perambulators, and somewhat smaller than a bicycle tire.

Bailey Tread. The first practical rubber non-skid tread using small rubber studs or buttons. Named after the inventor.

Balance. A manufacturer's term referring to a harmonious combination of quality of material, quantity proportion, workmanship, and vulcanization, with a perfect working together of carcass, tread and bead.

Balloon Tire. A slighting term applied in the early nineties to pneumatic bicycle tires which, unlike the solids, had to be blown up like a balloon.

Bandage Wrapping. An operation whereby a strip of cloth is dampened and wound spirally about a built-up tire and its core—usually in three layers—before the tire is put in the vulcanizer. See Single Cure.

Bandage Wrapping Fabric. A light-woven cotton sheeting used for winding around built-up casings or inner tubes in the open-cure process.

Bareback. A fabric frictioned on one side only and used in repair work.

Bartlett Tire. The original clincher tire patented in Great Britain in 1889 by William Erskine Bartlett. See Clincher.

Basic Materials. Fundamentals used in tire manufacture, india rubber, cotton, compounding ingredients, and solvents. See India rubber, Cotton, Ingredients, Solvents.

Bead. The thickened, stiffened edges of a tire casing by which it is fastened to a wheel rim, made usually with semi-hard rubber cores for clincher tires, or with rubber-embedded steel piano wire, or braided spring steel ribbon for quick detachable and straight side tires. The parts of a bead are: core, cover, toe and heel.

The varieties of beads suitable for different patterns of rims include: clincher, in which the extensible inner edges of the casing are made to spring over and hook under the incurved edges of the rim by means of a shoulder on the outer side of the casing edge, the bead core being usually of semi-hard rubber; straight-side, in which the outer edges of the beads are flattened and at right angles to the base of the bead, in which strands of wire or braided wire embedded in rubber form an inextensible core, the casing being adapted to quick detachable and quick demountable rims on which a removable outer flange allows ready removal or application of a casing: combination bead, a straight-side bead with a quick detachable filler shoulder of hard rubber attached to make a straight-side tire adaptable to a clincher rim.

Bead Cover. A light, frictioned fabric lapped over a bead from toe to side wall. See Chafing Strip.

Bead Fabric. See Chafing Strip.

Bead Heel. The outside edge of the bead. See Bead.

Bead-Lock Inner Tire. An interliner consisting of four or five plies of frictioned fabric molded to fit over the inner tube with one ply of the fabric forming flaps at either side to fit over the beads and be locked between the tire beads and the wheel rims. See Reliner.

Bead Section. Insertion of new section where a bead has been broken. A repair term.

Bead Tie-in. An operation in tire construction, in which, after the several plies of fabric have been stretched on the core, all plies—in clincher casings—are trimmed at the toe of the bead. In wire-bead casings the plies are alternately folded across the base of the bead and trimmed. A cover of rubber about 1/16-inch thick and of compound similar to that used on the fabric is then applied over all.

Bead Toe. The point of the bead nearest the tube. See Bead.

Beaded-Edge Rim. A British term for a clincher type rim. See Rims.

Beaded-Edge Tyre. A British term for a casing of the clincher type. See Clincher.

Beading. The application of a bead strip to the base of a tire carcass and the overlapping of it with gum or fabric, or the removal of tire beads—a reclaimer's term.

Beadless Tires. Discarded tires lacking beads but not stripped. A reclaimer's term.

Beads, Semi-Hard. Term applied to a special rubber compound forming the bead core of many of the smaller automobile tires and most motorcycle tires of the clincher type. The cores afford enough stretch to permit the finished tires to be easily pulled off a one-piece vulcanizing core mold as well as to be readily sprung on a clincher rim.

Bias Fabric. A square-woven frictioned fabric cut into bias strips. A rubber manufacturer's term.

Bias-Woven Fabric. A non-raveling fabric, the warp threads of which, in weaving, remain in the usual lengthwise position, but the fillers or weft threads of which are inclined at an angle of 45 degrees, more or less, to the warp threads.

Bicycle Rims. Wood or metal wheel bands of a bicycle. See Rims.

Bicycle Tire. A rubber and fabric pneumatic tire, of single-

tube or double-tube construction. Used on bicycles and light vehicles. See Specifications and Sizes.

Bicycle Tire Cement. Rim cements for attaching single tube tires to wheel rims. They are of two varieties, quick drying rubber solutions, and an easily melted gutta percha compound.

Bicycle Tire Fabric. A square-woven cotton duck, ordinarily of 8 and 10½-ounce material. For bicycle cord tires, 15-ounce cord fabric similar to that for cord tires is employed, using two plies in building.

Bicycle Tire Sizes. See Sizes.

Binder Strip. A term sometimes applied to the rubber cushion under the tread. See Cushion.

Blemished Tires. Factory-inspected tires in which defects appear, often sold as seconds, or first and second blemished; a euphemism for N. F. C. tires. See N. F. C.

Blister. First: a puffing in or under a tread, due to imprisoned air, sand, etc., caused by neglected tread cuts. Second: a curing defect due to a "bunching" in part of the fabric layer. Third: the result of the expansion under heat of air, moisture or gas imprisoned between plies or pocketed in the tire compound.

Blocking Out. The cutting or stepping of plies of fabric in rectangular sections preparatory to building-in repair sections.

Bloom. The efflorescence, or the working to the surface, of uncombined or excess sulphur on tires, tubes or accessories.

Blow Holes. Perforations resulting from blisters between fabric plies or beneath the tread. A repair term.

Blowout. An explosion of the air-inflated inner tube through fabric rupture of the casing.

Blowout Bead. A bulging out of line of a bead, sometimes occurring in curing repairs by live steam.

Blowout Boot. See Boot.

Blowout Chain. A device for emergency repair of a rim-cut or blown-out tire, consisting of several loops of chain across the casing, fastened at either side in a plate which hooks on the rim. Used to protect a damaged casing and supplement a canvas inner patch.

Blowout Patch. Sections of rubberized fabric reaching from bead to bead, placed inside of a punctured or torn casing.

Bolted-on Tire. A method of fastening the tire to a specially constructed rim by means of locking-rims fitted over the bead and retained by bolts. See Rims.

Boot. A short section of fabric plies with extra rubber for a tread, and laced, strapped or hooked over a damaged casing and about the rim for temporary repair. Occasionally made of raw-hide or leather and steel-studded.

Boothroyd Tire. The original single-tube tire, the invention of which is credited to A. Boothroyd, of England, who failed to patent it, and which under other names became for many years the standard type for bicycles in the United States.

Braided Fabric. Tire-building fabric braided upon a series of annular cores of the size and shape of the tire casing.

Brake-Skidding. An uneven wearing down of a tire tread due to an abrupt checking of speed and consequent road scraping or to unequal adjustment of brakes.

Brand. An identification mark placed on their products by tire, tube and accessory manufacturers. The brand on tires may include: the degree of inflation required, indicated by pounds of air pressure for the size and character of the tire; the manufacturer's name, trade name and size of the tire, the size being given in inches and usually also in millimeters; the date of manufacture, generally in code; the serial number, all such markings being molded in relief on the side-wall—and to which may be added the name of the tread pattern, often impressed by a mold on the tread.

The brand on tubes includes: the maker's name; trade name of tube, and the size in inches, and often in millimeters, printed on the tube; the size and serial number molded in the tube, and to which may be added a seal or stamp to indicate that the tube is of the heavy or tourist type, the absence of which seal or stamp implying that the tube is of the regular type.

Breaker Fabric. See Breaker Strip.

Breaker Strip. A band of coarsely woven, frictioned fabric coated with a soft rubber compound adapted to adhere tenaciously to the stiff tread and designed to break the force of the road blows and so distribute them as to divert carcass break-down.

Broken Backs. A term applied to casings which have their fabric framework practically fractured, the break-down usually resulting from rim pinching or running a tire flat.

Broken Bead. Rupture of the solid rubber core or wire cable and encasing fabric cover of a tire bead.

Buffing. Roughening of a damaged part with a file, sand-paper, emery-cloth or wire brush to obtain a clean, abraded surface for the application of repair gum or cement.

Buffings. A reclaimer's term applied to the rubber dust produced in the making of new and repair of old tires.

Builder Fabric. (1) Usually a square-woven fabric used in the construction of a tire carcass. (2) For motor tires generally a long-staple cotton is used, also plied yarns, squarely woven and usually weighing 17.25 ounces per square yard. (3) A square-woven fabric usually made from 11-ply yarns in both warp and filling.

Building Fabric. See Builder Fabric.

Building Up. Overlaying rubberized fabric sections and gum in repair work to conform to the original tire construction; also in repairing large pneumatic truck tire treads, the use of successive layers of tread stock so as to form a semi-flat surface.

Built-up Tread. A smooth tread made by superimposing strips of tread gum upon one another in graduated widths so that the middle of the tread is thicker than the edges. See Camel-back.

Butt-End Adjustable Flaps. Inner-tube protecting flaps or interliners with ends cut flush and sides feather-edged to prevent friction between tube and casing. Often cotton-covered to prevent tube chafing.

Butt-End Tube. An inner tube usually with sealed ends made so as to lie within a casing, and butted or jointed together. In one type one end is so rimmed that it will fit within a collar on the other end, and inflation will give an air-tight lock. In another, one end is cone-shaped, fitting into a cavity in the other end, both ends being sealed. An advantage possessed by the jointed inner tube is that it may be applied or removed from a wheel without taking the latter off the frame.

Cable Cord. Cord used in construction of cord tires, usually made of long-staple cotton comprising four or six unit threads—usually six—about the size of average sewing cotton. After being rubber solutioned until about 40 per cent rubber in weight, they are twisted into a unit cord with a tensile breaking strength of 230 pounds. Such unit cords, in groups of three, four, or six—usually four—are again rubber-solutioned and twisted into a cable cord.

Cable Cord Tire. See Cord Tire.

Calendered Stock. Unvulcanized dry mixed rubber in sheet form, with or without fabric backing insertion, or friction, for tire building or repair.

Caliper Gages. Instruments using the caliper principle for measuring external dimensions of tires to determine proper inflation.

Camelback. A ready-made tread. A complete tread stock formed in layers with the flattened center much thicker than the sides—used to hasten retread work.

Canvas. See Fabric.

Canvas Tyres. A British term for fabric tires.

Carcass. The body or foundation of the tire casing built of rubberized fabric, cord fabric, or cords, and rubber.

Cases. Another name for casings. See Casing.

Casing. The external covering or shoe of a double tube tire, and excluding the inner tube.

Caterpillar Tire. A trade term given to a form of tire armor made of rejected or worn casings cut into short segments and linked with a chain above the bead around a complete tire.

Cement. A general term referring to a substance or composition which causes bodies or materials to stick or adhere to each other. As employed in tire making and repairing, a rubber compound—rarely gutta percha—virtually fused between two surfaces to be united in vulcanizing, or a solution of rubber in a solvent. The efficacy of cement is dependent on various factors, such as the quality of the rubber, the mode of application, the cleanliness of the bodies to be joined, the adhesive attraction of such bodies for the particles composing the cement, etc. In tire building and repair a general rule obtains that the cement stock should be practically the same as the gum in the frictioned fabric or other material of which the casing is made in order that their curing time will synchronize, and defective union through under or overcure be obviated. Pneumatic tire cements include: air cure, acid cure, compound, dough, outer case, patching, plugging, quick cure, rim, self-curing, solid and vulcanizing cement. See Air Cure, Acid Cure, etc.

Cementless Blanket. Repair stock in sheet form, usually 1/16-inch thick, to be cut as desired, made with a cured or semi-cured backing and a facing of adhesive unvulcanized gum.

Cementless Tube Patch. A tube patch for emergency repair, made of thin, feather-edged wafers of semi-cured rubber with an unvulcanized rubber backing or "self-cementing" piece of pure gum coated with air-drying rubber cement. See Self-Curing Patch.

Chafer Fabric. A light—usually 9¼ ounce—frictioned, woven material applied as a strip over the bead extending from the toe of the bead to a point ½ to ¾-inch above the bead, and underlying the side-wall.

Chafing. A term comprehending many forms and occasions of tire and tube trouble. Treads of casings may be chafed or worn away abnormally through irregular contact with the road, due to wheel misalinement, driving in street-car tracks, skidding through too sharp application of brakes, and through contact with a fender bolt. Side-walls may be chafed by grazing street curbing, running in rough roads or through heavy sand, or from uneven internal pressure caused by bulging of a casing under a heavy load, or when tire is run flat or underinflated. Fabric plies of casings may be chafed by punctures, through sharp flexing as when the tire is underinflated, by the admission of grit through a break in the outer covering of the casing, or by ill-fitting flaps or reliners. Tubes may be chafed when a bead toe lifts under a load—a slight continuous motion soon rubbing away part of the tube wall—through insufficient inflation whereby it fails to tightly fill up the casing bore, or through the friction on it of the ends or sides of a flap or reliner.

Chafing Strip. See Chafer Fabric.

Chain-Binding. Gouging and tearing of tires through excessive use of chains and other anti-skid devices, or through ill fitting of chains; chain wear.

Chains. Small rings or links of metal looped transversely on a tire to arrest skidding and give added traction on slippery pavements or on soft roads.

Char-à-Bancs. A sturdy type of pneumatic tire generally used in tourist service, especially on motor omnibuses and wagonettes—char-à-bancs; still largely of fabric construction and of clincher type.

Checkerboard. A heavy, open-weave cotton fabric frictioned and skim-coated on both sides and used for breaker strips. See Breaker Strips.

Checking. A fault developed in tire side-walls whereby checks, chinks, or minute cracks result, usually from underinflation, curb abrasion, rubber aging, etc.

Clincher Automobile Tire. A tire casing having springy, or in many types inextensible, outcurved beads with solid cores which engage the incurved flanges of a clincher rim so that inflation of the inner tube holds the casing firmly in place. The clincher type is based upon the patent of William Erskine Bartlett, 1890, owned by the North British Rubber Co., Limited, Edinburgh, Scotland, and sold, except shop rights, to the Dunlop Pneumatic Tyre Co., of London, England.

Clincher Bicycle Tire. A bicycle tire open on its inner circumference, the two sides of which have a circular bead or molding which fits into a corresponding groove around the wheel rim, enabling the tire to grip the rim firmly when inflated.

Clincher—Michelin Tire. A tire made by Michelin & Cie., Paris, France, under contract (1903) with the North British Rubber Co., Limited, Edinburgh, Scotland, which had acquired the original clincher tire patents of William Erskine Bartlett (1889 and 1890). In this tire the casing had a beaded edge fitting into incurved flanges of a clincher rim, inflation of the tire holding it in place. See Clincher Automobile Tire.

Closed-End Tube. A butt-end inner tube used on bicycles and motorcycles; a non-continuous tube. See Butt-end Tube.

Cloth Wrapping. See Bandage Wrapping.

Cold Cure. The surface curing of rubber by the application of a solution consisting of a mixture of chloride of sulphur and bisulphide of carbon, patented by Alexander Parks in England, in 1846. See Vulcanization.

Cold Patch. Application of a gum patch to a tube with air-drying or acid-cure cement in emergency repair.

Combination Cure. A mode of vulcanization whereby a carcass with its side walls and top cover is first semi-cured, and then the entire casing—after the addition of cushion, breaker, undertread, and tread—is given a final cure.

Combination Tread Stock. A repair stock consisting of tread, cushion, and breaker strip formed into a single unit. See Camelback.

Complete Section. A repair for blowouts, cuts, etc., in which the ply-cutting or stepping extends across the tire and the section is built anew. See Full Section Repair.

Compound. The rubber compositions used in treads, friction, cushions, skim coats, side-wall, bead center and cement gums.

Compound Cement. A vulcanizing cement made of compounded rubber, a typical formula being: fine Pará gum 33 parts, litharge 6 parts, and sulphur 3 parts, one pound being mixed with a gallon of naphtha.

Compound Specifications. Requirements set by the United States War Department as to tire ingredients. See Specifications.

Compression Inner Tube. A more or less puncture-proof inner tube having a thick wall and of greater cross-sectional diameter than the space it is to occupy in the casing. When inflated, the walls compress a puncturing object tightly, thus preventing the exit of air; and when the object is withdrawn the compression automatically closes the hole.

Consumers' Tires. As applied to motorcycle tires, sizes most used, including 26 by 2¼, 26 by 3, 28 by 3, and 29 by 3½. See Sizes.

Coordination. The perfect working together through equal adherence, and unified resistance of the various tire parts.

Cord Bicycle Tire. A bicycle tire, usually made of two plies of cord fabric so laid as to form two continuous bands of rubberized cords about its entire circumference, each band lying diagonally to the adjacent one and well insulated and cushioned with rubber.

Cord Fabric. Carcass material made up of rubberized cords in parallel and held in place with a few light "tie-in" cords. See Fabrics.

Cord Fabric Tire. A pneumatic tire, the carcass of which is made up of cord fabric.

Cord Patch. A built-up bias cord-fabric section vulcanized inside a cord tire casing for repairing small breaks beneath a tread.

Cord Reinforcement Patch. A pad of several layers of cord rebuilding fabric superimposed in graduated sizes, impregnated with rubber and semi-cured. Used either for inside reinforcement of outside sectional repairs, or for mending a casing which has a minor injury in several of its plies.

Cord Repairing Fabric. A textile practically identical with the original cord fabric used in building tires and heavily impregnated with rubber. See Cord Fabric.

Cord Section. A repaired section of a cable cord tire through the removal of damaged cords and the insertion of new.

Cord Separation. An injury to cord and cord-fabric tires due usually to sand and water working through tread cuts and resulting in a chafing of one or more of the cord plies.

Cord Tire. A tire, the carcass of which is built with two layers—as the Silvertown type—of heavily rubberized cable cords placed diagonal to each other, each layer being insulated in rubber. Also a tire of the multiple-cord type, built of cord fabric using smaller cords and more plies. See Silvertown and Multiple Cord.

Cord Tire Tubes. Inner tubes with thick walls often made with nine plies of laminated rubber instead of the usual six, and designed to better fill out the bore of cord tires which is slightly larger than that of fabric tires, and to offset the inflation strain and chafing to which regular tubes would be subjected in such casings. See Inner Tube.

Corded Fabric. See All Warp Tire Fabric.

Cords. Heavily rubberized cotton cables used in the carcass of cord tires; also, colloquially, cord tires.

Coreless Beads. A reclaimer's term for material stripped from the beads of old tires.

Cotton. A basic material forming the skeleton of the pneumatic tire. The proportion of cotton in a tire varies with different makes. In an average distribution of materials 23 per cent by weight may be allotted to fabric.

The varieties of cotton used in tire duck cord fabric, and cords include: American peeler, a strong fiber—1⅜ to 1⅝-inch—grown in Alabama, Mississippi, Louisiana, and Arkansas; Sea Island, a very choice quality, grown chiefly on islands off the Georgia Coast, the fibers ranging from 1½ to 2½ inches; Egyptian, also called "Sak" or Sakellarides, an excellent sort raised in the upper valley of the Nile, with a fiber of from 1¼ to 1½-inch; Peruvian (smooth), with a 1⅜-inch fiber; and American-Egyptian, now grown extensively in the reclaimed, arid lands of the Southwest, and developed since 1910 by government experts from Egyptian Sakellarides into two sorts, Pima and Yuma, after two districts in Arizona in which the experimental growths were conducted. The fiber of American-Egyptian ranges from 1-7/16 to 1-11/16 inches. It is strong and silky, is especially adapted for low number yarns, and is preferred by many spinners for tire fabrics on account of its superior twist.

Cousin Stock. A stock that is less supple than cushion but more so than tread, applied between breaker and tread. Designed to lessen road shock to the cushion and the carcass.

Cover. See Casing.

Creeping. Longitudinal movement of a tire on its rim, or of an inner tube in its casing.

Cross Weave (Square Weave). The plain or square interlacing of yarn or thread as found in tire duck.

Cured-Back Gum. Sheet rubber with one side cured, used for inside reinforcement of heavy inner tubes, the uncured side preventing adhesion to the opposite side of the tube in repairing.

Curing. Applying heat to effect the chemical union of rubber and sulphur, with or without other ingredients. See Vulcanizing.

Curing Scale. In steam curing, a table showing the amount of pressure needed to develop proper vulcanizing temperature; as, 40 pounds will yield 286.7 degrees F.; 60 pounds, 307.2 degrees F., etc.

Cushion. A resilient layer of rubber placed under or over the breaker strip, designed to bind it and the tread firmly to the carcass, and to cushion the carcass from shocks.

Cushion Gum. See Cushion.

Cushion Stock. See Cushion.

Cut Filler. A rubber dough or putty used to fill tread cuts. See Dough.

Dead Ends. Sealed terminals of non-continuous inner tubes.

Deflation. Exhaustion or removal of air from an inner tube. Accomplished by rolling the tube from a point opposite the valve, or by connecting the valves with air-suction apparatus. See Deflator.

Deflator. A vacuum pump repair-shop and tire-factory device for withdrawing air from tubes that have been inflated for testing, and to permit the tubes, when new, to be folded, packed, and shipped, or to allow them to be mended after usage.

Demount. To remove a tire from a rim, or a rim from its setting.

Demountable Pneumatic. A motorcycle, passenger, or truck pneumatic tire that may be removed with its rim. See Rims.

Demountable Rim. See Rims.

Depressed Tread. A tire having a tread with a hollowed out design intended to afford security against skidding.

Detachable Demountable Rim. A rim so made that the tire alone may be removed or that both tire and rim may be removed together. See Rims.

Detachable Pneumatic. A motorcycle, passenger, or truck pneumatic tire that may be removed from a wheel rim. See Rims.

Detachable Tube. The inflatable member of a double-tube bicycle tire, differentiated from the vulcanized-in type used in single-tube tires.

Dismountable Rim. A demountable rim. See Rims.

Double Bead Tire. A tire having its bead cores formed of many wire cables embedded in semi-hard rubber, and bisected throughout with four plies of cord fabric to impart extra rigidity and strength to bead and casing.

Double Clinch. A type of double-tube bicycle tire, in which the toes of the soft bead casing are made to engage a flange between two rim channels and the heels to fit under the incurving flanges on the edges of the rim. See Rims.

Double Cure. A manufacturing term. In repairing, a trouble experienced in using cavity retread molds, whereby in vulcanizing adjoining sections a part already cured receives a second and undesired curing. See Combination Cure.

Double Lock Blowout Patch. A frictioned fabric inside patch to hold a blowout or rim cut, with wings with which it can be double-locked over each bead.

Doudle Tube Tires. An early designation of the modern pneumatic automobile tire, referring to a tire having a removable, inflatable tube included in a protective outer cover, attachable to a rim.

Dough. A self-curing, plastic rubber composition for filling tire cuts. See Cements.

Dry Cure. A repair term, applied to the vulcanizing of treads, sections, patches, etc., in heated molds and without direct contact with steam or moist heat.

Drying. The removal of all moisture from tire material in repair, preliminary to cementing or curing.

Dual Pneumatic Tire. Two pneumatic tires applied side by side on a truck wheel—but little used now, owing to difficulty in maintaining uniform air pressure and distributing car load.

Duck Plies. Layers of tire builder canvas.

Dunlop Tire. The prototype of the present-day pneumatic tire. Originally a simple, inflated rubber tube taped on a bicycle wheel and patented in Great Britain in 1888 by John Boyd Dunlop, of Belfast, Ireland. Now a tire of the double-tube variety made by the Dunlop Rubber Co., Limited, and having a wire-edge casing with an endless inner tube.

Elastic Tyres. A British term generally applied in patent ap-

plications to all forms of pneumatic, solid, cushion, or other rubber or rubber substitute tires, or tires containing springs or other mechanical devices to afford resilience.

Electric Tire. A term early applied to a tire built up of parallel cords laid in two plies transverse to each other and regarded as more "electric" or resilient than a fabric tire. See Cord Tire.

Emergency Strap. A leather strip wound about a damaged tire as temporary repair. See Boot.

Enameling Duck. A medium-weight, plain-woven cotton duck with laid warp and plied yarn weft, suitable for enameling and used for spare tire covers.

Endless Inner Tubes. Air-containing tubes of the all-circle, continuous type. See Molded Inner Tubes.

Exceptions. A repair term applying to tires not of standard construction.

Extensible Beads. Semi-hard, stretchable, projecting flanges on the inner periphery of a tire casing, adapted for fitting into the upraised, incurving edges of a clincher wheel rim. See Clincher Tire.

Ten Years' Experience With Aging Tests[1]

By William C. Geer, Vice-President, and Walter W. Evans, Development Manager, The B. F. Goodrich Co., Akron, Ohio.

INTRODUCTION

The most prominent problem that has confronted the rubber chemist is the prevention of deterioration of vulcanized rubber with age. We deal with a perishable vegetable material, and there is no problem quite so important to manufacturer and consumer as the too rapid change in physical properties on simple standing. On account of this change in vulcanized rubber it has become common practice to build into our compositions excess properties beyond the real needs of service, in order to make allowance and leave after a period of time sufficient quality to withstand the service for which the articles were designed.

In dealing with this problem some years ago the writer analyzed the situation and determined that the first step in its solution, and the most necessary one for immediate use, was a means by which the rate of decay could be predicted. Even, therefore, if a knowledge of means of preservation was lacking it would at least be possible to so handle materials that the maximum life with present knowledge could be determined. This led to a study of accelerated aging tests, and the development of the one described in this paper.

Let me assure you that there has not been and there is not now any attempt to claim perfection, or even near perfection. This paper attempts to describe simply an experience good, bad, or indifferent, as that may happen to be to those who may wish to use it. The facts are that this experiment has proved to be a valuable means of approximately predicting the relative rate of deterioration of a variety of rubber compounds. The proof of the value has been determined over a period of ten years, and I thought that it might be interesting if the experience were to be written and the conclusions presented to the International Rubber Congress. I do not doubt that you will find many flaws in the method, that you will find many differences in the conclusions, and I make no claim other than an attempt to point out one company's results.

HISTORY

The work on accelerated aging extends over a number of years. It is difficult to recognize definitely the contributing factors, much less to distinguish between the ones which had a direct and those which had an indirect influence on working out a test which would have practical significance in the rubber industry. For this reason, in giving a historical outline of the accelerated test the theoretical work on oxidation of rubber is included without any attempt being made to evaluate any contribution to the fund of knowledge on oxidation, or its result, aging.

The earliest observation on the aging of rubber goods was made by Spiller in 1865[2]. He noticed that "patent waterproof felt" after six years' service did not possess the close structure and waterproof qualities of the original article; upon extraction of the rubber goods and evaporation of the residue, a resinous film which differed from the characteristic rubber film was obtained. This product was known as "Spiller's resin" and the phenomenon which was held responsible for its formation was recognized as oxidation.

About the same time W. A. Miller[3] published the results of his findings on investigating the effect of light and exposure to air and moisture of raw and manufactured gutta percha and caoutchouc.

In 1885 Thomson[4] observed that vulcanized elastic fabric oxidized very rapidly on exposure to the air at a temperature about 100 degrees C. The rubber became harder, and the theory was advanced that vulcanization was being continued. He also noticed that ozonized air had little action on unstretched or unstrained rubber, but that it acted very rapidly on rubber thread in the stretched or strained condition.

The first practical accelerated aging test was devised by C. O. Weber[5] and was termed "sun cracking test," the theory being that the detrimental changes in vulcanized rubber goods were caused by oxidation hastened by sunlight. In attempting to duplicate actual conditions in a laboratory test in which the time involved would be appreciably shortened, ozone was at first considered as an oxidizing medium, but was rejected as impractical since it was difficult to secure regularly a gas of uniform concentration. The weighed rubber strips—in this case tire covers—were immersed in a mixture consisting of acetone and hydrogen peroxide for at least two days, after which time the strips were dried at 100 degrees C., weighed and compared with an untreated sample. The increase in weight denoted the amount of oxygen absorbed and was considered a fairly reliable measure of the sun cracking liability of the sample tested.

Herbst[6] studied the action of atmospheric oxygen on purified Pará rubber and the constitution of the resultant products. By passing a current of air through a solution of the rubber dissolved in benzene and heated under a reflux condenser for 140 hours he obtained a light brown liquid and resinous products similar to Spiller's resin.

In the same year Ditmar[7] published a laboratory method for testing the durability of rubber and rubber goods; this method could well be termed an accelerated aging test. It was based on the assumption that the durability of rubber and of rubber goods varied inversely to the ease with which they were oxidized by atmospheric oxygen and thus partially converted into resinous products of the nature of Spiller's resin. The sample to be

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[1] Paper read at the International Rubber Conference, London, England, June 7-13, 1921.
[2] Journal of the Chemical Society, Vol. 18, 44-6, 1865.
[3] Journal of the Chemical Society, Vol. 18, 273-8, 1865.
[4] Journal of the Society of Chemical Industry, Vol. 4, 710-19, 1885.
[5] Weber, "Chemistry of the Rubber Industry," 229-30, 1902.
[6] Berichte der Deutsche Chemische Gesellschaft, Vol. 39, 523-5, 1906.
[7] Gummi-Zeitung, Vol. 20, 628, 1906.

examined was rolled into a thin sheet and dried to constant weight in vacuum over calcium chloride or in a drying oven at 100 degrees C. Four-tenths to eight-tenths-gram of the dried sample was then sealed in a thick-walled tube from which the air had been displaced by oxygen and heated for 5 to 20 hours at 100 degrees C. The tube was then allowed to cool, the rubber removed, weighed rapidly, and the increase in weight taken as an inverse measure of the durability of the sample. The increase in weight shown by a sample of good rubber in five hours amounted to from 2 to 4 per cent.

Ditmar also conducted tests for determining the influence of various constituents, such as powdered glass[8] and barytes[9], on the oxidation of rubber as well as the influence of vulcanization pressure[10].

In connection with work on aging and oxidation one should not neglect citing the work of Harris[11] on determining the structure of rubber by means of ozone, since these researches are of importance in throwing light on the nature and constitution of the rubber molecule.

In a similar sense the discovery by Spence[12] of the presence of oxidases in rubber, as well as his work on after vulcanization, should be recognized for its effect on research along these lines.

The majority of the work on aging from 1906 to date was conducted for the following purposes: to study the theoretical nature of oxidation, to define and determine the oxidation products; and to study the effect of aging on vulcanized rubber in determining the state of cure and the "optimum" or correct cure.

Peachey in 1912[13] carried out experiments on crude rubber to determine the number of oxygen atoms which are concerned in effecting complete "atmospheric oxidation" of the $C_{10}H_{16}$ unit of the rubber molecule. At temperatures in the neighborhood of 80 degrees C. pure rubber was readily attacked by oxygen, and it was not difficult to bring about complete oxidation of a film.

Later Peachey and Leon[14] amplified these earlier researches by conducting a series of experiments on the effect of moist oxygen on vulcanized as well as crude rubber. One of the results noted was that vulcanized rubber oxidized far less rapidly than crude rubber, but that the amount of oxygen consumed was ultimately the same. The oxidation products were analyzed.

Bing[15] had earlier determined the presence of sulphuric acid in vulcanized rubber, and the accelerating, deteriorating effect of copper salts. No change in normal oxidation was observed in nine months, but when copper chloride was used deterioration set in within a week.

A quantitative study was made by Kirchhof[16] on the oxidation products, both of crude and vulcanized rubber.

Gorter[17] and Kerbosch[18], as well as Peachey and Kirchhof, already mentioned, have studied the theoretical nature of the oxidation of rubber. Van Rossem's work[19] in which conclusion that the oxidation of rubber is a secondary process which can take place only when rubber has been previously depolymerized to a definite critical viscosity is not in disagreement with the experiments of the above mentioned. Fickendy[20], by exposing rubber to sunlight in tubes containing air and other gases, proved that the presence of oxygen was necessary to produce tackiness.

The researches of Stevens[21], de Vries[22], Eaton and Day[23] and Schidrowitz and Goldsborough[24] were carried out for the purpose of determining a correct or "optimum" cure. Aging is studied with this purpose in mind and also for its effect on the stress-

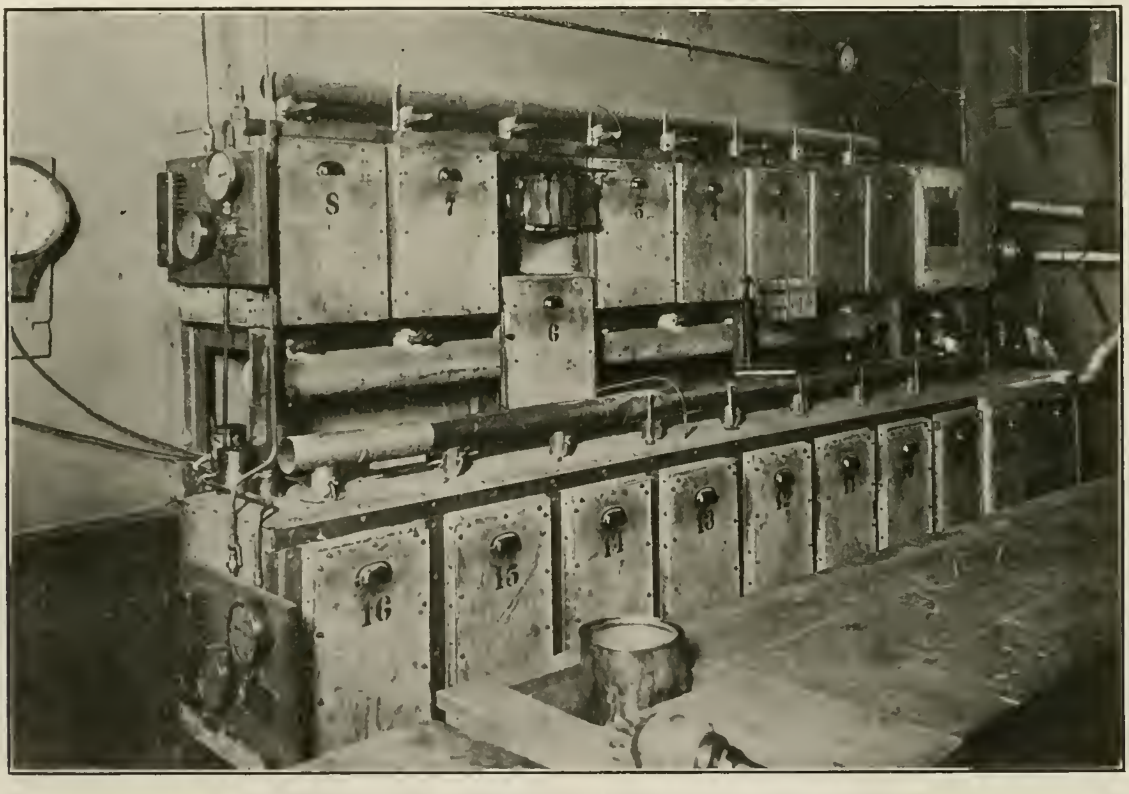


Fig. 1. Apparatus for Testing Age of Vulcanized Rubber

[8] Ibid, Vol. 21, 418-9, 1906
[9] Ibid, Vol. 21, 234-5, 1906.
[10] Chemische-Zeitung, Vol. 31, 638-9, 1907.
[11] Berichte der Deutsche Chemische Gesellschaft. Vol. 37, 2708, 1904; Vol. 38, 1195, 3987, 1905.
[12] Biochemical Journal, Vol. 3, 165, 351. Kolloid-Zeitschrift, Vol. 10, 299, 1912.
[13] Journal of the Society of Chemical Industry, Vol. 31, 1103-5, 1912.
[14] Ibid, Vol. 37, 55T-60T, 1918.
[15] Kolloid-Zeitschrift, Vol. 4, 232-5, 1909.
[16] Kolloid-Zeitschrift, Vol. 13, 49-61, 1913.
[17] Mededeelingen over Rubber, No. 11.
[18] Ibid, No. 111.
[19] The Rubber Industry, 1914, p. 149. Communications of the Netherland Government Institute, Part 4, p. 120.
[20] Kolloid-Zeitschrift, Vol. 9, 81, 1911.

strain curve. In most of their experiments a normal and not an accelerated aging period is used, the time in most cases being at least a year. De Vries, however, heated the vulcanized sample at 72 degrees C. or 65 degrees C. for 12 to 16 days.

The action of light as a factor in accelerating oxidation was studied by de Vries and more recently by Porritt[25].

where a lesser number of tests are to be made and where a standard type of electric drying oven is available, this can be adapted to such work, provided a mechanical agitator is placed inside the oven to insure an even temperature throughout, and a constant supply of fresh air heated to 160 degrees F. is maintained throughout the test. As an example, the type known as

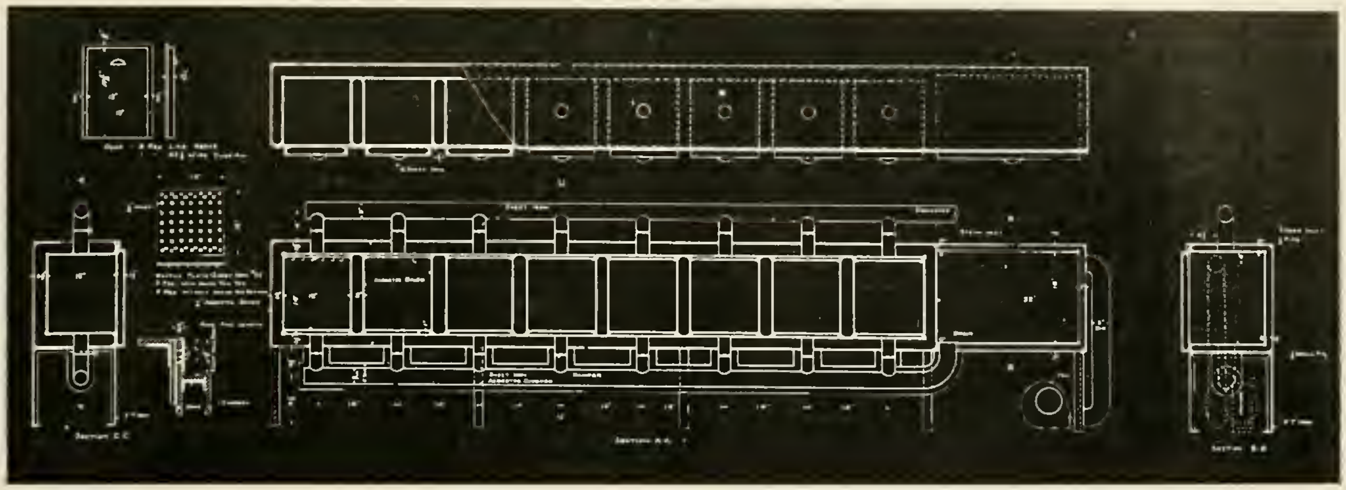


Fig. 2. Plan and Elevation of Age-Testing Apparatus

the Freas electric ovens, equipped with electric agitator on the inside, has proved most satisfactory.

The accelerated life test as worked out and put into practice at The B. F. Goodrich Co. was described at the September, 1916, meeting of the American Chemical Society[26].

The first work done in the laboratories of The B. F. Goodrich Co. on accelerated age tests was in the fall of 1907, at which time a suggestion came to us from Dr. Van Der Linde, of the Gutta Percha & Rubber Co., Toronto, Canada, who used a very fast aging test. He performed it upon three small pieces of rubber. The samples to be tested were put in an air bath of heated air about 140 degrees C. for a period of one, two and three hours, taken out, and examined for cracking, hardening, or to ascertain whether they were becoming soft. This method was not parallel with actual aging in any particular and we came to the following:

PRESENT METHOD OF MAKING TESTS

The age-testing apparatus used in the present method is shown in Figs. 1 and 2. Into this oven, heated air was blown at a temperature of 160 degrees F., care being taken to see that a continuous supply of hot fresh air was added during the entire aging period. A number of samples 3/32-inch thick were previously cut in the form of our standard test strip and placed in this air bath. The test strips were suspended by punching a hole in the enlarged end, passing a wire through and placing between each strip a rubber disk about the same thickness as the test piece, to keep the individual strips separated and allow a free circulation of air so that the entire surface was exposed. The air was then started circulating and the test continued for a period of two weeks, taking out three samples each day. These were allowed to stand for 24 hours at room temperature until they reached a state of equilibrium, after which they were tested for tensile strength and elongation.

While we have referred to a particular type of oven in which to perform these aging tests, we wish to point out that

The data plotted in curve form give a time-decay curve of the compound. For a long time these were always run in comparison with a standard compound, that is, at least two sets of samples were run at the same time. Thus, by comparing the curve of a compound the age of which we knew, and the curve of a compound which we did not know, we obtained a reliable indication of the service to be expected from this new compound. It is worth while to point out that we consider this purely a practical and not an ultimate test. Our experience, however, based on many thousands of these curves, indicates to us that this method of determining the approximate aging of a commercial rubber product is reliable, and is of great value as an aid to a compounder in a manufacturing plant, permitting him to study the aging of the composition of compounds.

No attempt has been made until recently to determine the probable chemical reactions involved. It seems reasonable to assume, however, that at the temperature employed and with the current of fresh air passing over the samples, an oxidation occurs, forming one of the unstable peroxides and at the same time causing an increase in the coefficient of vulcanization, similar to that resulting from the aging of rubber under normal conditions.

Having now described the method by which the test is performed, let us proceed to examine a few curves taken from the records of our laboratory. We have many thousand curves, and we have chosen a few of those which illustrate certain typical characteristics and of which natural aging data were available.

CURVES SHOWING TYPICAL AGING CHARACTERISTICS

The compound used in Fig. 3 is one of the older types so common in rubber thread. This curve shows the change in the elongation and in the tensile strength over a period of seven days. The curves are sharp and the deterioration was rapid. Fig. 4 shows the decay of the same compound and cure, although tested at a different time and upon different strips. The heavy line is the curve plotted from the data taken from the strips that had been subjected to the aging cabinet described in the foregoing. The broken line is the plot from the data obtained from strips that had been filed away in a dark room kept at ordinary

[21] Journal of the Society of Chemical Industry, Vol. 35, 872-4, 1916; Vol. 37, 280-4T, 305-6T, 340-2T, 1918; Vol. 39, 826A, 1920. The India-Rubber Journal, Vol. 52, 679-80, 794, 1916; Vol. 53, 220-2, 366, 1917.

[22] The India-Rubber Journal, Vol. 53, 101, 1917; Vol. 57, 77, 1919; Vol. 61, 87-90, 1921.

[23] Journal of the Society of Chemical Industry, Vol. 38, 339-45T, 1919.

[24] The India-Rubber Journal, Vol. 52, 615-20, 757, 795, 1916; Vol. 53, 327-8, 1917.

[25] The India-Rubber Journal, Vol. 60, 1159-62, 1920.

[26] The India Rubber World, Vol. 55, 127, 1916.

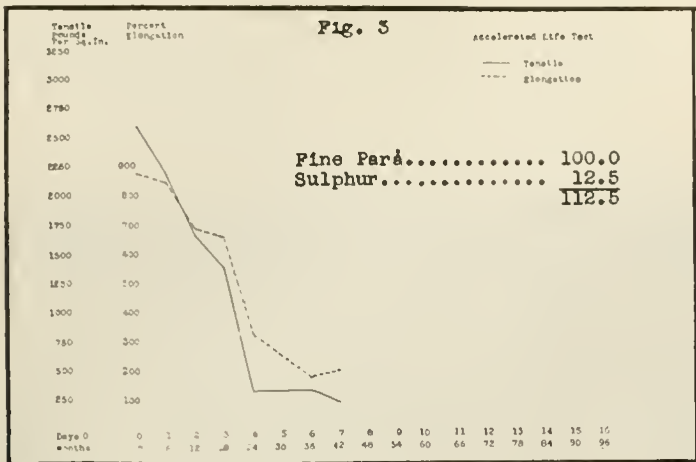


Fig. 3

Fig. 4

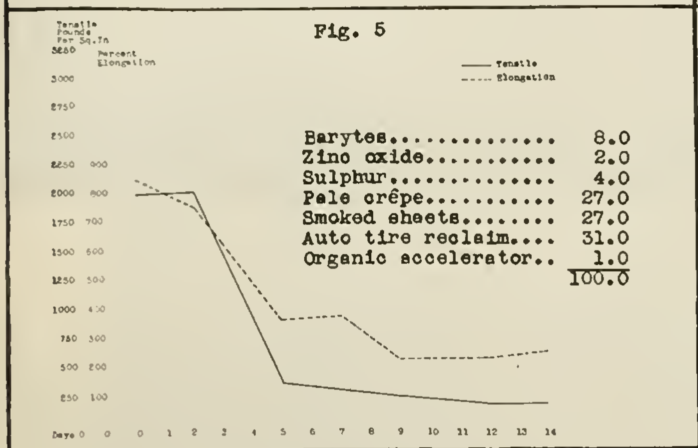


Fig. 5

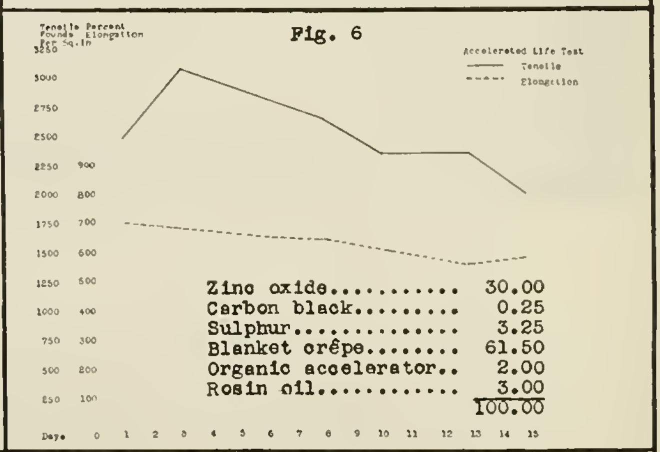


Fig. 6

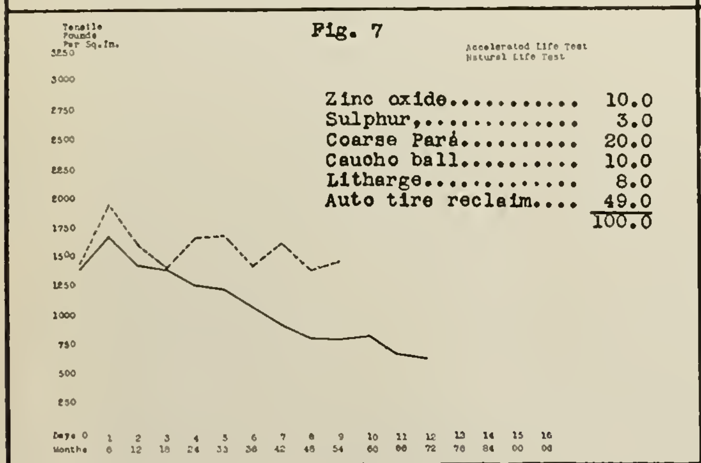


Fig. 7

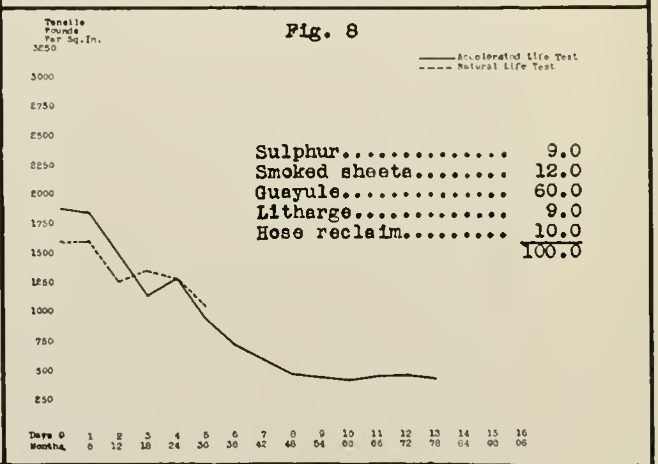


Fig. 8

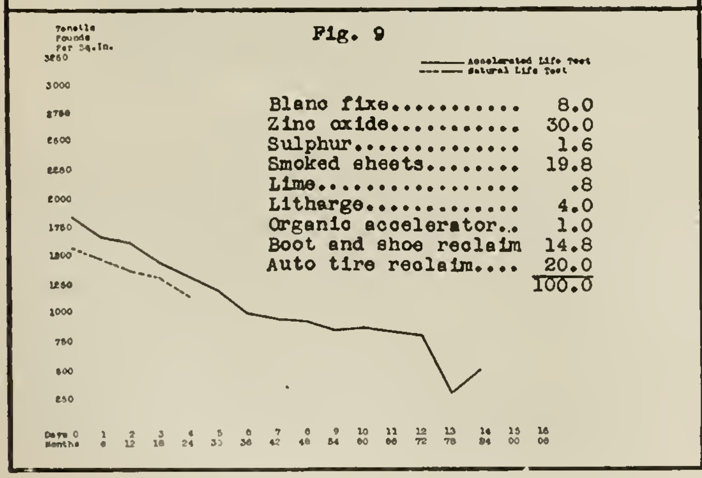


Fig. 9

Fig. 10

Fig. 11

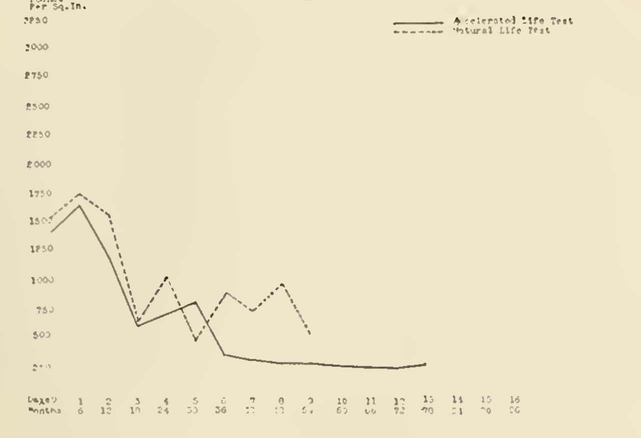


Fig. 12

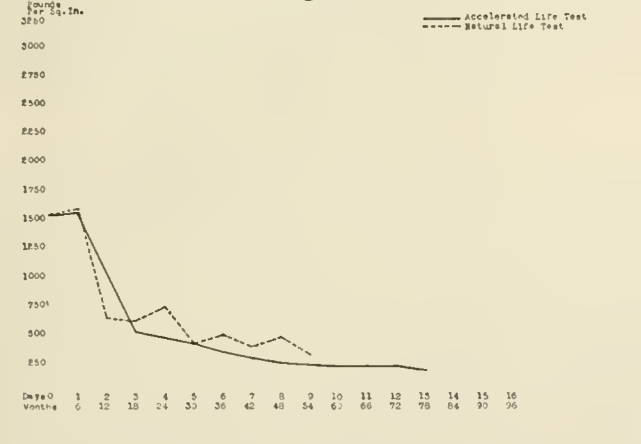


Fig. 13

temperatures and in the dark, and test strips removed at intervals over a period of a little more than five years. From these curves it is to be seen that the accelerated-life test is somewhat more severe than the natural-life test, although there is some degree of correspondence in the general shape of the curves.

The curves of Fig. 5 were made from data obtained as those of Fig. 3, and, like Fig. 3, the curves show sharp deterioration. In each of these cases, we should judge from the experience of our laboratories that the compound thus made and vulcanized would decay too rapidly in natural life.

Fig. 6 shows a different compound and a different cure. It is also chosen to show a wholly different type of aging curve. In this case the tensile strength and elongation have remained at high levels, and one would judge this compound to be a good one. In point of fact it is a remarkably good one, and while we cannot show you the curves from natural life it has stood the test of time in a highly satisfactory manner.

The next diagram to which your attention is invited is Fig. 7. Here have been plotted the data from the natural and short-life tests and tensile strengths only. The compound is one of the older type composed of natural grades of rubber and litharge as the accelerator. The accelerated-life test again shows more severe than the natural aging. These curves may be considered typical, and one of the general conclusions may be anticipated at this point, which is that when an accelerated aging curve shows a type where the tensile strength is nearly constant for the first three or four days and no severe decline following, it is pretty general to find the natural-life test is at least as good, and usually better. One must here warn those who may use this method to gain experience in judging curve data, to follow the method of comparison of unknown with known compositions before predicating any considerable volume of output upon uncompared data.

Fig. 8 is intended to describe a relatively close comparison of accelerated and natural-life tests of a lower-grade composition.

Fig. 9 is the data of a lower-grade compound the natural-life test for which was run but 24 months. The parallelism is fairly close. The fact of the natural tensiles being under the others is probably due to difference in the original mixings.

The next four, Figs. 10, 11, 12 and 13, are from a compound of the type, plantation 50, caucho ball 50, sulphur 8. The first shows how one may be misled, due to irregularities in tensile strength. Of course, in making any curve to relate functional data where irregularities exist one should follow a physical method of averaging, but the average rubber chemist has neither the time nor the facilities for so elaborate a method. We, therefore, are in the habit of disregarding the obviously low figures. In the four diagrams one judges that as the time of vulcanization increases, the rate of decay increases and the parallelism with the natural life becomes more apparent. This we conclude to mean that the short or accelerated aging test can and does show us, if nothing else, how to determine the correct degree of vulcanization necessary to insure the maximum possible length of natural life.

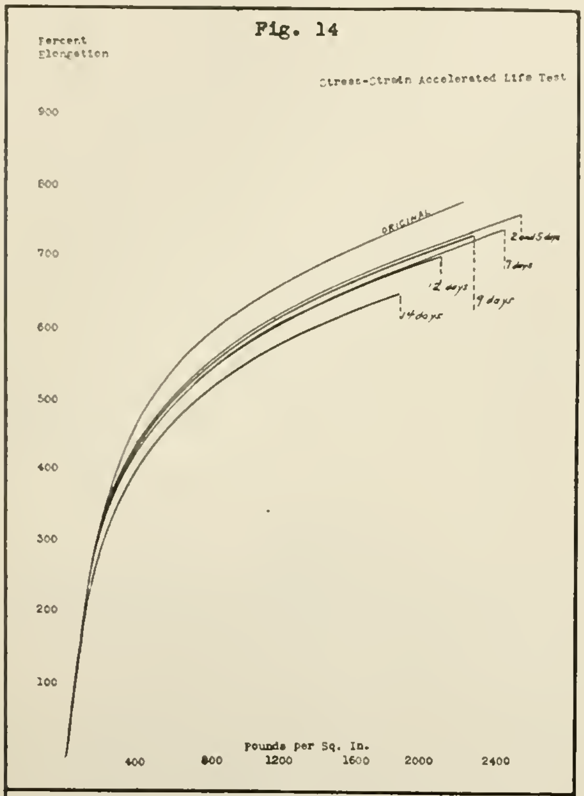
Fig. 14 illustrates the effect of the life test, described in the foregoing, upon the stress-strain diagrams that have been of late discussed so widely. The compounds are of the inner tube variety, that is to say, composed of rubber, sulphur and accelerator. This chart is of a high-grade type and shows the high resistance to aging. There is, as will be observed, but little change in the form of the curves. The compound has become stiffer and weaker.

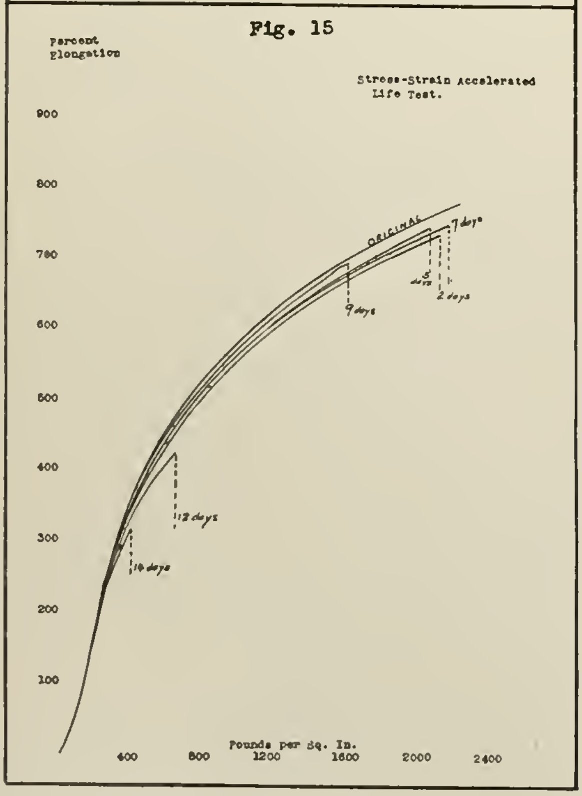
The last diagram is Fig. 15, in which are shown the results of the aging test upon a similar compound, but one which resisted the effect of the heating to a lesser degree than the one shown in Fig. 14. There is very little that we can say regarding the effect of aging on the stress-strain curves. Our work has had to do more largely with the effect upon that more basic property, tensile strength.

CONCLUSIONS

In the foregoing paper an attempt has been made to describe a test the use of which might permit one to predict the probable effect of natural aging upon culcanized rubber. No one realizes better than the authors, the shortcomings of the presentation and the incompleteness of the proofs offered. So much in our work upon rubber goods is approximate and incapable of any real degree of scientific proof that it is with a feeling almost akin to apology that it has been presented at all. Yet we have worked

with and used this test for a matter of twelve years, and it has so often demonstrated its value that this International Rubber Conference is a most fitting place to tell of its practical value.





Let me now briefly review in conclusion the lessons that we feel have been learned during these years.

(1) We consider it more reliable to plot the curves and compare them than to consider the percentage deterioration from the original tensile strength.

(2) The samples are not hardened as in actual aging, but are definitely weakened.

(3) Sulphur changes are noticeable, but not important.

(4) The test is of little or no value when used upon compositions of which the tensile strengths are under about one thousand pounds per square inch.

(5) Despite the fact that the curves of short and natural-life tests do not exactly parallel, the short-life test is somewhat more severe in general than the natural life.

(6) Most important. We are convinced that in the vast majority of cases too rapid deterioration of rubber compounds is due to over or undercure, and chiefly overcure, rather than to any one or more compounding ingredients. This life test with us has been of utmost value in leading us to correctness of cure. Our troubles with organic accelerators, various grades of unfamiliar crude rubber, mineral fillers of various kinds, and so on, have been due chiefly to our attempts to graft a new material upon an old practice and often with fatal results.

(7) This test is a comparative and not an absolute one and should never be used to compare compounds of different type.

(8) When used properly, there has been found to be an approximate correspondence between short-life and natural-life test, after four days in the oven, of one short day equalling six months.

RUBBER HOSE IN DUST-SPRAYING

As an accessory of vacuum cleaners, rubber hose has been long and efficiently employed in removing dust, but it has remained for agriculturists to utilize hose in blowing dust upon growing plants to save them from the ravages of insects and give them a more salable appearance.

The dust is usually a powder containing a large proportion of nicotine, pulverized dry-lime sulphur, or a pure tobacco dust; and aphis, thrips, slugs, codling-moth, and other orchard and garden pests are readily destroyed with such dry-spraying. The average cost of dust and applying to a full-grown walnut tree

Dust Sprayer Drawn on Skids Between Rows

is 45½ cents. For this work the largest size of power dusting-machine is used, and a 4-inch hose, 20 feet long, is employed. The workers prefer light, rubber, cotton-jacketed hose.

For light truck gardening, hand-dusters—with the powder under pressure—to which are attached 1-inch rubber canvas-covered hose, are much used; but for large ranches a duster operated with gasoline power and mounted on a truck is generally preferred. A small power outfit uses either one 3-inch rubber hose or two of 1½-inch diameter each. Better dust distribution is effected, it is claimed, with the two separate and smaller lines of hose than with the single and larger hose. So, too, the work can thus be done in a shorter time, which means much in checking infestation.

Activities of The Rubber Association of America

P. L. PALMERTON TO HEAD RUBBER INDUSTRIAL DIVISION

In an endeavor to cooperate with the Department of Commerce, The Rubber Association of America has granted a leave of absence to P. L. Palmerton, manager of the association's foreign trade bureau, in order to enable him to accept the position as chief of the Rubber Industrial Division in the Bureau of Foreign and Domestic Commerce.

The plan of the last-mentioned bureau is to establish, under the direction of Mr. Hoover as Secretary of Commerce, from twelve to fifteen divisions similar to the one referred to, by means of which the interests of the industries represented will be furthered.

Mr. Palmerton's absence does not mean a cessation of activity on the part of The Rubber Association. The service functions of its foreign trade bureau will be practically transferred to Washington, or, when this is impracticable, to New York. Mr. Palmerton will continue to keep in close contact with the interests of the Association, but will also have the advantage of having at command the facilities afforded by the Bureau of Foreign and Domestic Commerce.

REDUCED RATES FOR SHIPMENT OF PNEUMATIC TIRES

The rating on pneumatic tires when in wrapped bales or bundles, less carloads, has been reduced from 1½ times first class to first class in all classification territories. This rating became effective August 31.

ILLINOIS RATING ON PNEUMATIC TIRES REDUCED

The Illinois State Classification, which applies on shipments moving wholly within the State of Illinois, has been amended to provide for a reduction in rating on pneumatic tires in wrapped bales or wrapped bundles, less carloads, from 1½ times first class to first class, and became effective August 10, 1921.

PACIFIC COAST RUBBER GOODS RATES REDUCED

The following rates on rubber products in carloads to Pacific Coast points will be published to apply from all Eastern groups, Atlantic Seaboard and points west thereof:

Belting, Hose and Packing. $2.10 per 100 pounds, representing reductions from the former rates ranging from 7 to 21 per cent.

Rubber and Felt Boots and Rubber Shoes or Rubber Shoes with Canvas Tops. $2.30 per 100 pounds, representing reductions from former rates of from 1½ to 14 per cent.

Pneumatic Tires and Tubes for Export. $2.50 per 100 pounds, representing a reduction from the former rate of 25 per cent. The effective date of these changes has not yet been announced.

TIRE AND RIM ASSOCIATION

The Tire and Rim Association, during the month of June, 1921, inspected, and approved 1,034,715 pneumatic tire rims in the various plants of the United States and Canada. Following are the respective sizes and number approved:

30 x 3	13,455
30 x 3½	756,123
32 x 3½	8,964
32 x 4	141,435
33 x 4	52,141
34 x 4	4,530
32 x 4½	20,265
34 x 4½	30,884
36 x 4½	1,686
34 x 5	4,437
36 x 6	655
38 x 7	125
40 x 8	15
	1,034,715

TIRE MANUFACTURERS' DIVISION TO MEET IN SEPTEMBER

The first of the quarterly meetings of the Tire Manufacturers' Division will be held in New York on Thursday, September 22, 1921. The Executive Committee will hold its regular monthly meeting on the previous day and such recommendations as may be formulated then will be considered at the division meeting.

STATISTICS REGARDING CALENDERED RUBBER GOODS

The Calendered Rubber Clothing Manufacturers' Division of The Rubber Association was the first among the Association's divisions to prepare monthly statistics concerning production, orders, etc. The total number of rubber coats and sundries for 1920, for instance, was 968,312 pieces, and the total amount of net orders was estimated at 751,245. The tables following are interesting for purposes of comparison:

1922	Production, Cumulative and Monthly. No. of Pieces	Net Orders, Cumulative and Monthly. No. of Pieces
Calendered rubber coats, men's	439,226	386,947
Calendered rubber coats, boys'	207,632	189,904
Calendered rubber sundries, flat	159,619	103,870
Calendered rubber sundries, made-up	161,835	70,524
Totals	968,312	751,245

CALENDERED RUBBER GOODS—1920 VS. 1919

	Production, Per Cent	Net Orders, Per Cent
Flat sundries	Increase 60	Increase 27.5
Made-up sundries	Increase 27	Decrease 35
Men's coats	Decrease 4	Decrease 17
Boys' coats	Increase 53	Increase 9.5

JUDICIAL DECISIONS

North British Rubber Co., Limited, vs. Racine Rubber Tire Co. of New York. United States Circuit Court of Appeals, New York.

The Johnson design patent, No. 45,092, for a tire design consisting of a raised ridge extending around the tire and having extensions forming crosses and diamonds or squares, held invalid as an effort to secure a monopoly of the mechanical excellences thought to inhere in the peculiar arrangement of ridges and hollows, or to prevent the making of tires like those patented in another country by mechanical patent.—*Federal Reporter*, Volume 271, page 936.

TREASURY DECISIONS

Protest of V. Mueller & Co., Chicago, Illinois., July 15, 1921.

Druggists' Sundries. Articles classed as manufactures of india rubber commonly known as druggists' sundries at 15 per cent ad valorem under Paragraph 368, Tariff Act of 1913, are claimed dutiable under the same paragraph at 10 per cent as manufactures of india rubber.

It was asserted that the articles in question were purchased from a manufacturer of surgical supplies and are not kept in stock or sold by druggists, but are sold direct to physicians and surgeons. As there was nothing in the record to show that they were druggists' sundries, the claim for classification as manufactures of india rubber not specially provided for was sustained.—*Treasury Decisions*, July 28, 1921, Volume 40, No. 4, page 20.

Automobile Parts. The fourth paragraph of Article 15 of Regulations No. 47 (revised December, 1920), relating to the taxation of automobile parts has been amended as follows: Component parts of articles taxable under this definition are taxable when sold separately if they have reached such a stage of manufacture that they are primarily adapted for use as a component part. Thus plates, jars, and separators for automobile storage batteries are taxable when sold separately. Blowout boots are subject to tax as "parts," regardless of the fact that they may be made from old casings.—*Treasury Decisions*, August 4, 1921, Volume 40, No. 5, page 26.

What the Rubber Chemists Are Doing

PROPERTIES AND VALUATION OF PLANTATION RUBBER[1]

Testing a colloid like rubber, especially as to its mechanical properties, is complicated by the fact that no absolute but only relative values can be obtained, dependent upon many details of the method chosen. Average values obtained are determined to form a base of comparison, and the ordinary variation of plantation rubber has to be determined to ascertain what should be called normal, and what abnormal values. The results of any single test should then be compared with these average and normal values, and the rubber judged accordingly.

STRENGTH OF UNVULCANIZED RUBBER

The strength of unvulcanized rubber, tested in its crude form is certainly not independent of the method of preparation. Data on this point are rather scarce, as the rubber is not in suitable form for accurate tests.

More important for the real quality of the rubber is the resistance to stretching in the vulcanized state, especially at high elongations. This property finds expression in the slope of the stress-strain curve, that is, the ratio of stress to strain. It has hitherto attracted less attention than it deserves. Apart from its own importance, its close relationship to such characteristics as deformation or set, and thereby to the intimate structure of the rubber, should give it a prominent place in rubber testing.

The slope is influenced by factors originating in the latex as well as in preparation. Young trees or heavily tapped trees give a vulcanizate which is less resistant to stretching, and in such cases the composition of the latex must be the cause. Use of sodium sulphite, bisulphite or other chemicals which prevent oxidation of serum substances, and also maturation of coagulum which is accompanied by a decomposition of serum substances, cause an improvement in slope which must probably be ascribed to a change in the non-rubber substances. On the other hand, all the factors which cause a real deterioration (oxidation or decomposition) of the rubber are accompanied by a higher figure for slope, that is, a decrease in quality. It seems, therefore, that slope is a rather complicated property which depends both on the caoutchouc hydrocarbon and on the non-rubber substances.

Besides tensile strength and slope which express the properties of the rubber after vulcanization, the rate of cure is also an important factor upon which attention has mainly been focused. Differences in rate of cure are in the majority of cases, if not always, caused by the non-rubber substances, which act as catalyzers of the vulcanization process, and often in very small amounts. Many of the chemicals which have been tried either as coagulants or for other purposes, have an accelerating or retarding effect; but the powerful catalysts have to be looked for among the substances present in the latex or formed during preparation.

It has been proved that nitrogenous bodies, amines or amino-acids, which have a part in the building up or decomposition of proteins, are, in the majority of cases, responsible for differences in rate of cure. Which amines are actually present in latex and rubber, and in what amounts they work is not yet known. Especially in simple rubber-sulphur mixtures the rate of cure is very sensitive to small differences in content of these by-substances, so that nearly every change, either in the condition of treatment of the trees or in method of preparation, makes itself felt in the rate of cure.

The subject has been studied systematically and the influence of most factors is known, so that the properties of plantation rubber in this respect are now well in hand. Methods of preparation have been worked out which, even with the variations unavoidable in actual practice, assure a sufficiently uniform product.

EXAMPLE FROM ACTUAL PRACTICE

On most plantations the trees are regularly tapped the whole year around, until lately every day, nowadays often on alternate days. The tree adapts itself to the treatment it is subjected to and regularly yields a latex of fixed composition, which represents an equilibrium between what is taken away in the form of latex and bark and what the tree can produce during the period between two tappings. No doubt the regularity in tapping operations together with the adoption of very similar and simple tapping systems, has in later years done much to insure a larger degree of uniformity in the latex and in the output of estates in general.

This regularity in the daily routine was sometimes broken up by the resting of the trees, for instance, during the dry months, at which time Hevea drops its leaves and develops a new crown of foliage. This practice was rather exceptional in Java but seems to have been applied more often in other rubber-producing countries. Of late, resting the trees has been resorted to as a general measure on account of low prices and restriction of output.

The physiological condition of the tree, of course, changes when the regular loss of latex and bark comes to a stop, and the consequence is that when tapping is restarted, a latex of deviating composition is obtained which yields rubber of very abnormal vulcanizing properties. This makes itself felt, especially in the first days or weeks after starting tapping. Gradually, on continued tapping, the condition of the tree changes, until after three or four weeks a state of equilibrium between the condition of the tree and the tapping system is reached again and the usual regularity is restored. The abnormal composition of the latex after resting the trees is evident at once from its color, which is yellow instead of bluish-white. This color remains very evident in the rubber when it is prepared in the form of crêpe, which then shows a deep yellow, often saffron-yellow color. In smoked sheet this irregularity is practically invisible, as it is covered up by the dark-brown color of the smoke.

Another abnormal property of the latex is shown in the rubber content, which on the first two or three days may amount to 45 to 50 per cent or even more, and very gradually drops to 35 or 30 per cent, which corresponds with the state of equilibrium already mentioned. The amount of latex, which on the first tapping is rather small, quickly increases from day to day by virtue of that remarkable property of the Hevea tree, which forms one of the principal pillars of its culture, namely, the wound response. In two weeks the yield of latex reaches its maximum and then drops again somewhat to reach its normal level.

MINOR DEVIATIONS

These are the easily visible signs of the large deviations found when tapping a tree that has had a rest, and it is not to be wondered at that the composition of the latex is also abnormal. This is very much so as regards its content of natural accelerators, which determine the rate of cure of the rubber. The rubber obtained from the first day's tapping vulcanizes with abnormal slowness. Taking 100 as the normal figure for time of cure, a figure of 150 to 160 may be expected for the above abnormal rubber, and even 180 is no exception.

These are values that are never met with in ordinary plantation rubber which on the above scale seldom cures more slowly than in 130 minutes. Therefore, tapping trees that have had a rest means a serious disturbance of the general uniformity of plantation rubber. A yellow color in crêpe may also be obtained in

[1]Abstract of a paper by Dr. O. de Vries, director of the Central Rubber Station, Buitenzorg, Java, read at the Fifth International Rubber Exhibition, London, England, June 3-9, 1921.

other cases, in which the vulcanizing properties are wholly normal. For instance, the ordinary changing over to a new tapping surface is mostly accompanied by a yellow color in the crêpe without any change in its rate of cure or other properties. This is an interesting physiological fact as it shows that the yellow substance in the latex is locally fixed in the tree, in contrast to the accelerators of vulcanization which seem to travel easily through the tree and are present in the same proportion over the whole tapping area.

Besides the properties about which a few details have here been given there are certainly others that are of importance in manufacture, but about which little is known. A systematic study of such points can be arranged only when more is known about the necessary methods of testing and about the ends that should be attained.

REAGENTS FOR VULCANIZATION

An invention has recently been patented[1] for the vulcanization of natural or synthetic rubber by the employment of special reagents to insure the following advantages: (1) the diminution or elimination of the quantity of sulphur which otherwise always remains in a free state in vulcanized rubber, with the consequent elimination of the efflorescence on the articles produced; (2) the elimination of all immediate or subsequent over-vulcanization; (3) an improvement in the mechanical qualities and durability of the product.

The reagents employed in the process are salts of bivalent or trivalent metals of the N., monoalkyl, or N.N., dialkyl, or N.N. alkylene-dithio-carbamic acids or other mono or bisubstituted dithio-carbamic acids, having the general formulas where R′ can be an alkylic or other monovalent radical or chain, R″ an alkylenic radical or other organic bivalent radical with open or closed chain, etc., and Me″ a bivalent metal such as magnesium, zinc, cadmium, mercury, etc., or an inorganic bivalent radical such as uranyl and the like. The letters N. and N.N. are used

$$\left[\begin{array}{l} \diagup NHR' \\ C{=}S \\ \diagdown S \end{array}\right]_2 Me'' \text{ or } \left[\begin{array}{l} \diagup NR'_2 \\ C{=}S \\ \diagdown S \end{array}\right]_2 Me'' \text{ or } \left[\begin{array}{l} \diagup NR'' \\ C{=}S \\ \diagdown S \end{array}\right]_2 Me''$$

as above to indicate that the alkyl or other radicals are bound to the nitrogen atom and not to the sulphur atom. Corresponding formulas may be adopted for the salts of trivalent metals such as aluminum, iron, chromium, antimony, etc.

The process is carried out by adding to mixings of rubber and sulphur suitable quantities of the reagents named. The employment of the salts allows the rubber to vulcanize with the use of a quantity of sulphur less than two per cent of the rubber present, a quantity which may be reduced to 0.2 per cent, whereas by all other known processes of hot vulcanization it is necessary to employ five per cent. The rubber thus treated shows after vulcanization no efflorescence due to free sulphur and cannot be overcured even by prolonged reheating.

[1] G. Bruni, British patent No. 140,387.

SLAB RUBBER [1]

The uniformity of rubber from matured coagulum (slab rubber) has been ascertained experimentally to be not more uniform in rate of cure than crêpe, but the reverse. Whether or not air has access during maturation has little or no influence on the rate of cure of matured rubber.

In each of two series of matured sheets of increasing thickness the rate of cure is observed first to fall with increasing thickness and then to rise. The irregular results obtained are not unexpected when we remember that during maturation the coagulum provides a medium for the growth of every kind of micro-organism, at the same time and in competition with one another. As each organism will probably produce different products in different proportions, and as chance circumstances will largely determine which of these organisms will flourish and which will not, we can only expect the formation of a variable product.

We know that the changes taking place during maturation at the exposed surface of the coagulum are different from those taking place in the interior of the mass. The surface becomes coated with an alkaline slime, which does not form when the air is excluded as in the anaerobic coagulation process. The substances which accelerate vulcanization have alkaline properties, consequently we should conclude that the aerobic change must result in a faster curing rubber. Previous negative or irregular results may be due to the relatively small surface of the coagulum exposed to the air. The surface is soft and slimy, and much of it would be washed away during crêping. Hence the exposed surface, although containing accelerating substances in relatively large proportions, might not have much effect on the rate of cure of the whole mass when washed, crêped and dried.

We may conclude that aerobic influences account for the formation of at least part of the accelerating substances. As, however, beyond a certain thickness, an increase in rate of cure takes place, it appears that accelerating substances are also formed under anaerobic conditions.

[1] H. P. Stevens. Bulletin of the Rubbers Growers' Association, 2, 1920, 68-77; ibid 1, 1919, 42-4; ibid 2, 1920, 212-4.

METHOD OF AVOIDING RESINIFICATION

The inconvenience of the resinification and decomposition of india rubber, balata, gutta percha or compositions containing any one of these substances, when vulcanized in hot air has hitherto been obviated by incorporating litharge, or its derivatives, in the rubber, notably in the case of rubber shoes or rubber-coated fabrics. This plan, however, by reason of the temperature and the presence of sulphur, causes the formation of lead sulphide which imparts a black color to the rubber.

If litharge, etc., is replaced by reducing substances it is possible to avoid resinification and retain the colors imparted to the rubber mixing by organic coloring matters. This method allows manufacturing objects of all colors, by the hot-air vulcanization process. The reducing agents used should be easily oxidizable, in order that they may be acted upon by atmospheric oxygen during vulcanization before the rubber itself is acted upon. The presence of the reducing agent in neutral or alkaline rubber compounds facilitates the formation of nascent colloidal sulphur, as well as its vulcanizing action upon the rubber. Their protective action is more effective, the more intimate the mixture, and depends also upon the extent to which they are able to effect the fixation of free oxygen, and the stability of fixation of this oxygen in the molecule of the reducer.

Examples of suitable reducing agents are: hydroquinone, pyrogallol, the tannins and their derivatives, paramido-phenol, glycine, trioxymethylene and other derivatives of formaldehyde, hydro-sulphite, such as those of magnesium, calcium, zinc or soda and its derivatives, the neutral sulphites, etc. The reducing agent should not, in general, exceed ten per cent of the amount of rubber present. A perceptible effect is obtained by the use of two per cent of tannin or hydroquinone, from two to five per cent being sufficient for the hot-air vulcanization, at 130 degrees C. for two hours, of a white composition containing 30 to 50 per cent of rubber, white coloring matters and sulphur.—André Heilbronner, 74 Boulevard Malesherbes, Paris, France. British patent No. 142,083.

LEAD PIGMENTS[1]

In addition to leaded zinc oxide and zinc-lead oxide, two other lead pigments are made directly from ore, namely, sublimed white lead and sublimed blue lead. Sublimed white lead consists of lead sulphate 75 per cent, lead oxide 20 per cent, and zinc oxide five per cent. Sublimed blue lead con-

sists of lead sulphate 50 to 53 per cent, lead oxide 41 to 38 per cent, with small proportions of lead sulphide, lead sulphite, and zinc oxide. Zinc-lead oxide contains from 46 to 50 per cent of lead sulphate, from 52 to 46 per cent of zinc oxide, and a small quantity of zinc sulphate. No zinc-lead oxide is made at present. Leaded zinc oxide may vary from 4 to 20 per cent in lead sulphate, the remainder being zinc oxide with a small proportion of zinc sulphate.

As there are but two producers of sublimed or basic lead sulphate, the output may not be revealed. The production of litharge in 1918 was 44,102 short tons.

[1]Mineral Resources of the United States, 1918, Part I.

MANUFACTURE OF RUBBER FROM THE LATEX[1]

Crude rubber is made direct from the latex, either at the plantation or elsewhere, eliminating evaporation and smoking. The latex is treated with a preservative mixture of very dilute aqueous solution of alkalinized phenol to keep it fluid. Dilute acid sufficient to neutralize the alkalinity of the preservative treatment and acidify the latex is added, whereby nascent phenol is liberated, causing rapid and complete coagulation—the bulk of the impurities originally contained in the latex remaining in solution. The coagulum is then subjected to a mechanical dehydrating treatment adapted to disperse any bubbles formed and to expel much of the moisture contained in the coagulum. Subsequently it may be dipped in hot water, rolled into crêpe and kneaded until solid, or be pressed into blocks. In this way the bulk of the mother liquor and dissolved impurities remaining in the coagulum are sufficiently expelled without evaporative drying or other treatment preparatory to shipment.

[1]British patent No. 159,602. S. C. Davidson, Sirocco Engineering Works, Belfast.

"AKSEL," A NEW ACCELERATOR

"Aksel," the new vulcanization accelerator, is a dithiocarbonic compound and is said to be the most active accelerator known at present. Its activity in comparison with thiocarbanilide or hexamethylene tetramine is dependent upon the kind of compound used for comparison. In a zinc-crude-rubber compound containing four per cent of sulphur, it is approximately 25 times as active as thiocarbanilide, and five times as active as hexamethylene tetramine.

It is a non-poisonous open-chain compound that works well in the lowest grades of reclaimed rubber, and can replace litharge at considerable saving in volume cost. It can be used satisfactorily with litharge, lime, or magnesia, but not with antimony sulphide. It is active in the hot-air cure.

Rubber samples vulcanized three years ago are said to have aged perfectly although they contained so much Aksel that they were cured in three minutes at 50 pounds of steam. This remarkable aging quality is probably due to the polymerization being carried to such a degree in the rubber that it is rendered inert to further chemical change. Because of this quality this accelerator is especially useful in improving the aging quality of very low-grade stocks.

CHEMICAL PATENTS

THE UNITED STATES

Process of Devulcanizing Rubber consisting in subjecting vulcanized rubber scrap to the action of oxalic acid.—William Beach Pratt, Wellesley, Massachusetts, assignor to Rondout Rubber Co., East Dedham, Massachusetts. United States patent No. 1,382,669.

Rubber Article and Method of Manufacture, which comprises mixing the rubber with a vulcanizing ingredient by a suitable masticating operation and giving it an extended form, then without further mastication dividing the rubber body into relatively small lumps, pressing the lumps together into a mass having a form approximating that of the finished article and vulcanizing the article.—William C. Geer, Akron, Ohio, assignor to The B. F. Goodrich Co., New York, N. Y. United States patent No. 1,382,774.

Composition for Shoe Soles. A wear-resisting composition body comprising several layers of woven fabric impregnated with and maintained in cohesion by rubber cement mixed with powdered iron ore, the fabric material constituting the major portion of the composition.—Henry K. Eckel, Milwaukee, Wisconsin. United States patent No. 1,383,793.

India Rubber Composition comprising a vulcanized mixture of a caoutchouc-like substance and vulcanized fiber.—Arthur Nixon, Manchester, England. United States patent No. 1,384,400.

THE UNITED KINGDOM

India Rubber Compositions. Resins are melted with calcium chloride and filtered. About 10 per cent chloride of lime and 2½ per cent of calcium chloride are added and the mixture distilled. That which passes over at 160 to 180 degrees C. is separated from the oils passing over at 340 degrees C. These oils are again distilled with addition of 4 to 6 per cent of chloride of lime and the oil chlorinated by a third distillation with 10 to 40 per cent chloride of lime. To this product is added 1/6 of regenerated rubber previously extracted by ether or alcohol to remove tarry impurities, or 1/12 new rubber to form in 12 to 24 hours a pasty mass. Oil from the second distillation is added and the whole is vulcanized as usual.—G. F. de la Rosée, Garmisch-Partenkirchen, Bavaria, Germany. British patent No. 164,006.

Heel and Sole Composition. The following parts by weight: solid tire scrap, 22; heel scrap, 10; black pigment, 3; magnesium oxide, 13; sulphur and lime, ¼ each; reclaimed rubber, 7; crude rubber, 4; and floating substitute, 2. This mixing is vulcanized 25 minutes in an ordinary press and cooled five minutes.—A. A. Crozier, Cambridge Street Rubber Mills, Bradford Road, Manchester. British patent No. 164,159.

Thio-Ureas are obtained by interaction of carbon bisulphide and aliphatic or aromatic amines at temperatures above the boiling point of the bisulphide, and between the melting and boiling points of the amines. If aniline is used, it may be mixed with 0.25 to 5 per cent or more of sulphur as a catalyst and heated with stirring to 88 to 92 degrees C. while a stream of carbon bisulphide vapor, with or without a little liquid bisulphide, is passed through it. The temperature may be raised slowly to not to exceed 110 to 115 degrees C. The escaping vapor passes through a condenser and an aniline scrubber to remove carbon bisulphide, and the residual hydrogen sulphide may be burned or absorbed in caustic soda. When the reaction has materially slackened, the supply of carbon bisulphide is stopped and the liquid heated to 130 to 135 degrees C. and then run into a churn containing cold water. Steam is passed through the pasty product to remove free amine, the water is drained off, and the product dried in air or vacuum. The process may be applied to toluidines, xylenes, amino-dimethyl-aniline, amino-cymene, etc.—The Goodyear Tire & Rubber Co., Akron, Ohio, assignee of W. J. Kelly, Akron, Ohio, and C. H. Smith, Edgewood, Maryland. British patent No. 164,326.

Plastic Compositions. A moldable composition applicable as a substitute for vulcanite, consists of peat, sawdust, or other vegetable fiber, india rubber, gelatine, sulphur, lampblack, shellac, and stearine pitch.—F. L. Schauerman, East Twickenham, Middlesex. British patent No. 164,392.

GERMANY

Insulation for Submarine Telephone Cables. Gutta percha partly or completely freed from resin and then mixed with natural or synthetic rubber possesses certain advantages over

untreated gutta percha as an insulating material. Felten und Guilleaume Carlswerk A.-G. German patent No. 303,871, April 15, 1916.

OTHER CHEMICAL PATENTS

GERMANY

PATENTS ISSUED, WITH DATES OF ISSUE

340,491 (January 27, 1920) Process for vulcanizing rubber and similar substances. The Dunlop Rubber Co., Limited, London; represented by R. H. Korn, Berlin S. W. 11.

LABORATORY APPARATUS

USE OF ALUNDUM FOR FILTRATION

The alundum filters, funnel and crucible, have many advantages over the old funnel, filter paper and porcelain crucible in that there is no carbonaceous matter to reduce the precipitate when it is ignited. However, the filtration of finely divided precipitates is difficult except in the finest grades and sometimes they do not retain the precipitate. They are also slow if there is much of a precipitate. The same can be said of the old Gooch crucible when its asbestos mat becomes filled with precipitate.

Therefore, to speed up the filtration, retain the finest precipitates and do away with the reduction of the precipitate, the following method was devised:

A thin asbestos mat, just enough to cover the holes, is put into an ordinary Gooch crucible. Then "RR" alundum powder, 90-mesh, alkali free, for carbon determinations, is put in to form a mat about one-quarter of an inch deep. It is then washed with a wash bottle until the surface is flat. The whole is then dried in the oven, when it is ready for use.

Care should be taken when the precipitate is poured into the filter not to wash the alundum away from the sides. The alundum should be covered with precipitate before the suction is applied. After filtration, the Gooch is dried or ignited as desired. This method has been found much faster and more efficient than any of the regular methods of filtration.—I. C. Guest in *The Chemist-Analyst.*

HOME-MADE POLICEMAN

The home-made policeman herein described has given good service. Close one end of a piece of rubber tubing with a tight-fitting solid-rubber plug (one of the "cores" obtained in boring rubber stoppers) and slip the other end of the tube onto a glass rod until the rod meets the plug. With a sharp knife cut through the tube and plug so as to produce a smooth, flush end surface and leave about one-half inch of the plug in the tube.

Incidentally the cores cut from rubber stoppers come in handy for a variety of purposes, such as closing the ends of glass tubes, for which none of the standard stoppers are small enough, plugging up the holes in rubber stoppers, etc. They are especially valuable as a substitute for the usual glass plug for closing the end of the Bunsen valve tube in a wash bottle. These tubes become "dead" and loose after long use with boiling water, and fall into the wash bottle. Where glass plugs are used a broken bottle sometimes results.—Seth S. Walker in *The Chemist-Analyst.*

UNITED STATES LITHOPONE PRODUCTION

It is estimated that the rubber industry consumed 7,700 tons of lithopone in 1919. The quantity, value and average selling price of lithopone marketed in the United States in 1919 and 1920 follows:

Year	Short Tons	Value	Average Sales Price Per Ton
1919	78,365	$10,218,850	$130.40
1920	89,373	12,484,925	139.69
Increase	11,008	2,266,075	9.29
Percentage	14.0	22.2	7.10

The New York market quotations showed very little variation throughout 1920, the lowest price being 7¼ cents per pound and the highest 8½ cents. The average quotation for the entire year was 7.9 cents.

BASIC CAUSES FOR STICKINESS IN CRUDE RUBBER

By André Dubosc

I review again the work of Brindejonc, especially as his conclusions may have an excellent effect not only upon African rubbers, but on Central and South American rubbers as well, and perhaps upon plantation rubbers. Brindejonc's and my own observations are briefly summarized below.

Sticky rubber is black, devoid of elasticity, and thereby has lost the greatest part of its value. In order to determine the reasons for this change, Brindejonc made a series of tests in which he used Landolphia rubber. By extraction from the dry Landolphia bark he obtained sheets of rubber, which were very spongy and sensitive to the slightest causes of deterioration.

GENERAL CAUSES OF STICKINESS

The following factors in the deterioration of rubber were studied: (1) The action of salt, which is used generally as a coagulant in the Niger and Soudan regions; (2) The action of dilute acetic acid and carbolic acid, which can be formed in the serum if the latex commences to ferment. (3) The action of heat without light, within the limits in which it is met in practice; (4) The action of sunlight; (5) The action of diffused sunlight.

During these experiments, a fact of great significance was developed, namely, that the rubber which has been affected by one or the other of the agents indicated above, continues to deteriorate, even when the primary cause of the deterioration has disappeared.

Therefore when a mass of rubber begins to become sticky it will continue so until the entire mass has been converted into a viscous product. The goods made from this rubber are bound to deteriorate in spite of vulcanization. They are even capable of contaminating other manufactured rubber goods with which they come in contact.

SALT AND ALKALINE CHLORIDES HARMFUL

Samples of standard Landolphia rubber or of Landolphia bark were dipped into solutions of sodium chloride of the concentrations 1 to 100, 1 to 250, and 1 to 500. In humid atmosphere and a temperature varying from 25 to 40 degrees C., when the tests were made in the dark, the action of 1 to 100 solution was apparent at the end of 20 days. The other two solutions—1 to 250 and 1 to 500—did not have any effect until 30 days had elapsed. Hence very small amounts of salt in the rubber, even when the rubber is not exposed to sunlight, are able to produce the phenomenon of sticking.

Up to the present time no importance has been attached to the presence of sodium chloride in the ash obtained by the burning of rubber. Brindejonc's work shows that salt, far from being inoffensive, is capable, although the action is slow, of causing the entire mass of rubber to become sticky throughout. From its outward appearance, the rubber containing salt is apparently in a good condition.

It is of the highest importance, in analyzing old rubber, to determine its sodium chloride content, for its tendency to stick is a direct function of its salt content. If this is greater than a few thousandths of a per cent, the rubber should be washed immediately to prevent it from becoming sticky. In using rubber to coat fabrics, it is important to see whether or not the sizing used in the cloth contains any traces of salt or of magnesium chloride, which is often used for this purpose. This substance, just like common salt, is capable of producing the phenomenon of sticking in rubber coatings, even though the merchandise is placed where it is absolutely dark.

Here is one of the causes of rubber sticking, which is very little known and to which we cannot call the attention of the

rubber manufacturers too often or too strongly: the presence of alkaline chlorides, or alkaline earth chlorides, either in the rubber or in the sizing of the fabrics.

ACETIC ACID CAUSES STICKINESS

Under the same conditions of exposure to light and of temperature, Landolphia bark or thin sheets of rubber, impregnated with very dilute solutions of acetic acid and carbolic acid, change in fifteen days and the sticking action develops with rapidity. This phenomenon is produced even in samples placed in sealed tubes or in flasks with ground stoppers which have been previously sterilized. The action of acetic acid is particularly important as it is used universally in producing the coagulation of plantation rubber.

Rubber which has not been washed sufficiently after coagulation and contains traces of acetic acid, is capable of becoming sticky very rapidly, particularly when in the form of thin sheets. This is the case with rubberized cloth.

DRY RUBBER IMMUNE IN THE DARK

Rubber free from harmful substances, or rubber coagulated with salt, but absolutely dry, does not deteriorate no matter how long it is exposed to the action of heat in the dark. The enzymes to which the deteriorative action is assigned, are incapable of acting in an anhydrous medium. However, if moisture is present then sticking takes place at once on standard rubber as well as on the salted rubber. Moreover, the development of the sticking action is more rapid as the temperature increases.

SUN BURNED RUBBER

Three samples of Landolphia rubber were exposed to sunlight. One was placed in dry air, another in an atmosphere saturated with moisture and the third in water. At the end of two hours the first two samples had become sticky. The sample placed in an atmosphere saturated with moisture was even more strongly attacked by this deteriorative phenomenon than the sample in the dry atmosphere. This difference becomes more pronounced as the exposure to the sun increases. On the other hand, the sample immersed in water did not undergo any change, even after an exposure to the sun for twenty days.

Other samples of rubber were exposed to direct sunlight, one under water, the other under a protective covering of a saturated solution of alum. After four hours, the first sample became sticky while the other remained intact.

We may therefore conclude that it is the heat of the sun that brings about the phenomenon of sticking. The raw rubber is burnt to a certain extent, analogous in a marked degree to the action of the sun's rays on the skin, resulting in sunburn.

LIGHT, HUMIDITY AND ELEVATION

Light of moderate intensity does not produce the sticking, even at the end of three years of exposure. If the light is strong, however, the rubber becomes sticky. The rapidity of this action increases as the humidity of the air becomes greater. An elevated temperature promotes the reaction.

The action is very marked on ordinary commercial Landolphia rubber in balls, and at a constant temperature it is more rapid than on the samples described above. The ease with which sticking is produced is probably due to the salt that is used in the coagulation process.

DUBOSC'S AGREEMENT WITH BRINDEJONC

In my agreement with Brindejonc, I have confirmed by repeated experiment that once sticking commences in a rubber, no matter what the cause of the same may be—the action of light, the presence of acids or chlorides—the phenomenon continues and it is not possible to restrain its action.

If the rubber containing the substances causing sticking in the dark has not yet been attacked, then a prompt, vigorous, and thorough washing is the best way to prevent the action from setting in. If the phenomenon has set in, it is then impossible to stop it, as formaldehyde, bisulphite and all the other antiseptics are of no avail.

FALL MEETING OF AMERICAN CHEMICAL SOCIETY

The fall meeting of the American Chemical Society will be held with the New York Section, September 6-10, and will probably be the largest meeting that has yet been held. There are 2,500 members in the New York section alone, while thousands of other members are within a few hours' ride of the city. In addition to these a considerable number of British and Canadian members of the Society of Chemical Industry are expected, who will have held their annual meeting in Canada. They will be greeted at the border by the Governor of this state, and will arrive in New York, September 7. After being the guests of the American Section of the Society of Chemical Industry at luncheon September 7, they will then become guests of the American Chemical Society for the remainder of the week. Three or four hundred British and Canadian members will probably be present, as well as three or four thousand from the American Chemical Society.

Accommodations will be provided at the Waldorf-Astoria hotel, Fifth avenue and 33rd street, New York, the headquarters for the meeting. In addition Columbia University has offered the facilities of its dormitories. Rooms for men, rooms for women, and rooms for married couples have been reserved at the rate of $1.50 per day per person, with a maximum per person of $10 for the period September 6-16, for those wishing to stay for the Chemical Exposition. Applications, giving names of those in party, type of reservation desired, maximum price per day per person, time of arrival, expected departure, should be forwarded to Charles F. Lindsay, chairman of the Hotels Committee, care of United States Rubber Co., 1790 Broadway, New York. All members and their guests, including ladies, should register immediately upon arrival. The registration office will open at The Chemists' Club, 52 East Forty-first street, Tuesday morning, September 6. After Tuesday it will be at Columbia University.

The Council Meeting on September 6, will be held at The Chemists' Club. All general, divisional, and public meetings, will be held at Columbia University.

RUBBER DIVISION MEETINGS

The meeting of the Rubber Division will be held September 7-9, at Columbia University. The tentative program is as follows:

1. "The Tetra-Hydroxyphenyl Derivative of Rubber and its Tetra-Methyl Ether." Harry L. Fisher and Harold Gray.
2. "Mineral Rubber." C. O. North.
3. "The Determination of the Particle Size of Pigments." W. W. Vogt.
4. "The Action of Volatile Organic Solvents and Vulcanizing Agents on Organic Compounding Materials and Resinous Gums." Frederic Dannerth.
5. "Corrected Stress-Strain Curves for Rubber." J. W. Shields.

THE SEVENTH NATIONAL EXPOSITION OF CHEMICAL INDUSTRIES

The Seventh National Exposition of Chemical Industries, which will be held September 12-17, in the Eighth Coast Artillery Armory, New York, N. Y., will undoubtedly prove to be the biggest chemical event in the history of the country. The growth of the industry during the last seven years is plainly indicated by the extent of the exhibits, as more than 400 will be displayed on one floor.

The interest shown this year in the exposition by foreign countries is an important feature. Great Britain and Canada will undoubtedly be well represented in various ways, while many scientists and chemists who will attend the meetings of the American Chemical Society are expected to be present at the Exposition.

The Manufacture of Rubber Stamps

It is conservatively estimated that the rubber stamp manufacturers of the United States employ $15,000,000 capital in producing an output of rubber stamps variously estimated and ranging up to $5,000,000 annually.

Rubber stamps are almost as indispensable in business activities as the telephone. They are believed to be an American invention and are produced and used in the United States more extensively than in any other country. The average usefulness of a rubber stamp is placed at from two to three years. The amount of stamp rubber required to make the annual trade requirements would run into many tons.

The rubber stamp trade includes many devices other than rubber stamps and type, such as stencils, dies, checks, tags, presses and other time-savers useful for business purposes. Several interesting journals are especially devoted to the development of the stamp trade interests which are quite distinct from the field of rubber manufacturing in general.

MAKING RUBBER STAMPS

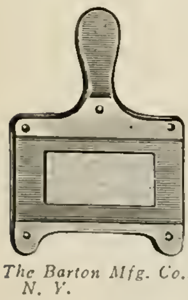
Rubber stamps may be made from ordinary printers' type-forms, wood-cuts, electrotypes, line cuts, etc. From any of these printing means a rubber printing stamp is made by first taking an impression of the form in a plastic medium that may subsequently be hardened and used as a mold in which to vulcanize the rubber. To form such a mold one may use a matrix composition or plastic mold-board.

MATRIX COMPOUND

The matrix composition is a quick, hard-setting mixture consisting of 8 parts of plaster of Paris, 8 parts of China clay, 3 parts of talc or French chalk, and enough Indian-red iron oxide to give the matrix a pink tint. Any mineral color may be substituted for Indian-red if desired. The mixed dry ingredients are brought to the consistency of soft putty by stirring up in a bowl with a hot water solution of dextrine in the proportion of 3 to 4 ounces of dextrine to one gallon of water. The function of the dextrine is important because it regulates the rapidity with which the plastic composition sets into a hard matrix, in other words its plasticity and toughness. The larger the proportion of dextrine the slower the setting effect.

MOUNTING COMPOUND FOR IMPRESSION

The soft composition is spread on a metal mold-plate, Fig. 1, with raised edges to regulate its depth when struck off with a metal straight edge with which the surface is smoothed and made level with the tops of the bearing edges. If much of the composition adheres to the scraper it is an indication that the composition is too soft and should be allowed to harden more before proceeding with the leveling. If much too soft, dry composition may be well worked into the mass and rescraped onto the mold-plate.



The Barton Mfg. Co., N. Y.

Fig. 1. Mold Plate

MAKING THE MATRIX

The type form is set in place on the bed of a hand-press. Its face is covered with a piece of fine muslin and overlaid with tough tissue paper of the same size. Some operators substitute a single thickness of dental rubber dam in place of muslin and tissue. Three impressions are necessary to properly form the matrix, according to the following directions:

First Impression. The mold-plate, on which the compound is smoothly spread, is laid face downward on the cloth and paper-covered type. The whole is pushed into a hand-press and light pressure applied for a moment. Releasing the pressure and removing the cloth and paper from the mold-plate reveals a rough outline of type form.

Second Impression. After allowing the compound to harden somewhat more, the face of the type is brushed with naphtha, making certain that each letter is well-oiled. This keeps the compound from adhering to the type. The mold-plate is placed again on the type in its previous position but without the muslin and paper covering. The second impression is taken with a little more pressure than the first. When the plate is removed a shallow but exact impression will be found molded by every letter.

Third Impression. The face of the type having been again brushed with naphtha, the mold-plate is again set in position and a third impression promptly taken, applying sufficient pressure to give the desired depth to the lettering. On removal of the mold the face of the impression should have a nicely polished appearance. If it does not present this condition and is still soft enough to be easily impressed by the finger, another impression may be taken. If, on removing the mold plate from the type form at any time, it is found that any of the compound attaches to the type, it indicates either that the compound was too hard or that too great pressure was used, thus making the mold too deep.

DRYING THE MOLD

After the last impression is made and the mold has set until it feels like wax, the surplus compound which has been forced up between the lines of the impressions is trimmed down with a long-bladed sharp knife. The rough particles that result from the trimming and overhang in the type impressions can be brushed out after the mold is thoroughly dried and hardened. A dry scrubbing brush is suitable for this purpose.

Another method for smoothing down the mold after it has thoroughly dried and hardened is to smooth down the ridges with a piece of medium sandpaper. The type impressions will fill up with the resultant dust, which is removed by turning the mold upside down and sharply tapping the corners of each end on a bench or other solid surface. The remaining dust is blown out with a bellows or by other means. Every particle of dust must be removed, or when vulcanizing, the rubber cannot completely fill the letters, periods, etc.

Dry the Mold Slowly. The mold can be dried by applying to it evenly a moderate heat, in any convenient way. It should be placed face up over a kerosene or alcohol burner, on a gas heater or an electric vulcanizing plate. The heat must be very moderate, especially at the beginning. If the mold is dried too rapidly it will crack around the edges of the letters or different parts of it may "pop" or burst out and spoil the entire mold.

After drying the mold at a low heat for about half an hour, much of the moisture will have escaped from the compound. More heat can then be gradually applied until the mold is absolutely dry.

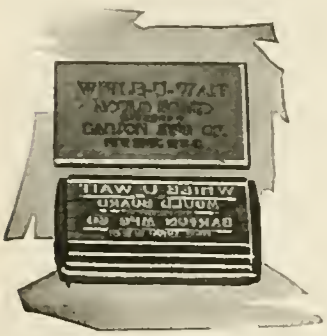
Should any moisture be left in the compound, the mold would be destroyed during vulcanization.

To Determine When the Mold is Dry, place a small, dry mirror, glass down, on the face of the mold for a few minutes. If there is any moisture present the face of the mirror will be steamed. Do not attempt to vulcanize when the mold is in this condition. Have it absolutely dry. In the end much time and expense will be saved. After the mold is absolutely dry, smoothed down and cleaned out, it is ready for vulcanizing.

MOLD-BOARD MOLDS

A very expeditious method of making vulcanizing molds for rubber stamps is by means of a plastic preparation mounted on a card board base. This combination mold-stock comes in sheets

of convenient size and is easily cut to suit the requirements of use. In practice the mold board is cut large enough to afford a liberal margin around the impression of the type-form to strengthen the mold. To make a mold, the mold-board mounted on an iron pallet, shown in Fig. 1, is dusted with talc and pressed face downward against the type-face, also dusted with talc. Under usual conditions the full depth mold can be obtained at the first impression in the hand-press. If a deep mold is required, the matrix compound is better than the mold-board. In damp weather the use of naphtha is used on the type-face to prevent the mold-board sticking. To free the mold from the type, tap the bottom of the pallet or type-form on the press-bed. An attempt to pull the mold from the type invariably results in breakage of the mold. Fig. 2 shows type and mold-board impression.



The Barton Mfg. Co., N. Y.

Fig. 2. Type Tie-up and Mold-Board

STAMP GUM

There are several varieties and qualities of stamp gum suited to rubber-stamp making. Unvulcanized sheet gum for rubber stamp work is calendered 1/16-inch thick and applied to holland cloth which preserves a high gloss surface on the gum and allows the material to be conveniently handled and cut to size. The usual cure for this gum is ten minutes at 60 pounds of steam (307 degrees F.).

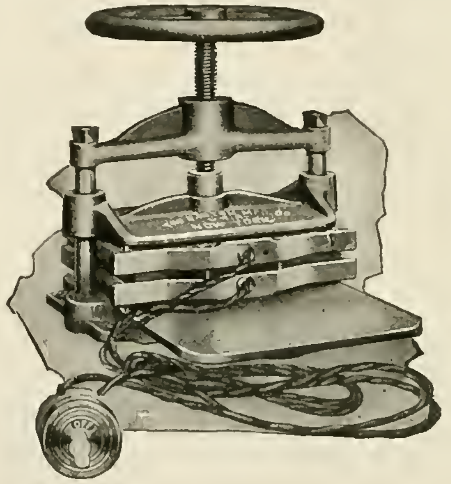
For the ordinary run of hand stamps a cheaper grade, put up in similar fashion, is furnished, curing in eight minutes at 80 pounds of steam (323 degrees F.). A hard curing gum, calendered 1/16-inch thick and applied to holland cloth, is made for making hard rubber stereotype printing plates. It cures in ten minutes at 80 pounds of steam (323 degrees F.).

Rubber type are made from semi-cured rubber 7/16-inch thick. It is inferior in grade to either of those mentioned above and cures in ten minutes at 60 pounds of steam (307 degrees F.).

Rubber stamps are frequently mounted on sponge rubber backing to secure good impressions on uneven printing surfaces. Backing stock of this sort is sold to the stamp manufacturer in cured slabs 20 by 20 inches in thickness of ⅛, 3/16 and ¼-inch.

CURING RUBBER STAMPS

The method of curing stamps in open-steam vulcanizers is superseded by curing in a press. The latest form of this method is by utilizing electricity for heating the press platens, and is shown in Fig. 3. Fitted on the interior of these press-plates are a number of thin metal electric resistance plates or space heaters. These distribute the heat by contact through the faces of the platens and supply the temperature for curing stamps. Owing to the ribbed construction of the upper side of the top vulcanizing plate and the under side of the lower plate, the press remains cool and can be used at all times for making molds.



The Barton Mfg. Co., N. Y.

Fig. 3. Electric Rubber Stamp Vulcanizing Press

Rubber-Set Fur, or "Artificial Fur"

A New Product Indicated by the Nowell Process

That both rubber and gutta percha are used in the manufacture of fine furs is well known. The use of the former is indicated when pointed furs are produced, that is, when the long hairs that give value to a skin are set into the shorter ones and kept in place by thin cemented cuts. The use of gutta percha in the form of tissue is for a backing when bits and scraps of fur are brought together to form whole skins.

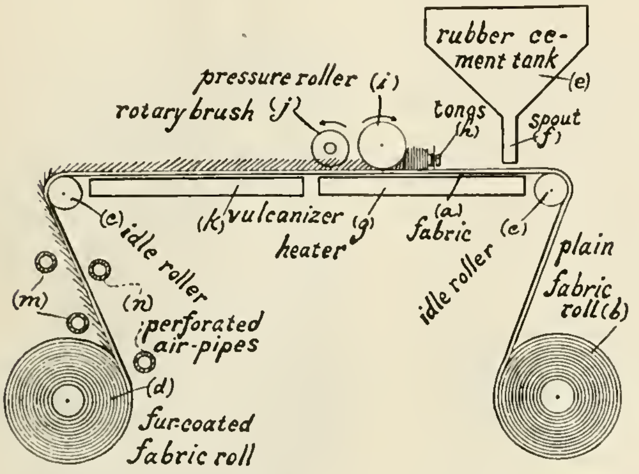
The manufacture of fur by the yard is, however, a long step ahead of the work mentioned. To begin with, fur is warm and of value chiefly because of the presence of two types of hair, the fur itself with hairs short, downy, and barbed longitudinally, and the over-hair, which is straight, long and stiff. The over-hair keeps the fur from matting and thus makes it of value for wear. A machine that can build up hairs, both fur and over-hair, and in its ultimate development copy any kind of fur, from squirrel to sable, is indicated by the Nowell invention. A description of the new machine and process follows:

The apparatus consists essentially of a stand supporting a heating device, using electric coils or steam—indicated as (*g*) in the accompanying diagram—and a vulcanizer marked (*k*), also using either of the forms of heat mentioned. Over both of these units passes a strip from a roll of duck or other sheet-form material (*b*) to be fur-coated and wound upon another roll (*d*). As the fabric passes over the first idle roller (*c*) it receives across its entire face through the flattened spout (*f*) a coating of creamy consistency of waterproof adhesive substance, as rubber-base cement, from the container (*e*).

With its coating kept in a plastic, semi-liquid condition with heat from the unit (*g*), the fabric (*a*) receives from tongs (*h*) set singly or in series across its surface a great number of upstanding hairs in spaced relation. The latter, stuck endwise into the binder, are pressed by a roller (*i*) into the binder so that the hairs will incline in one direction, and they are in turn combed with a rotary brush (*j*) to remove tangles and to give them a fur-like finish. The hair-coated strip is then carried over the vulcanizing unit (*k*) and the plastic rubber composition on the ends of the hair is vulcanized, firmly fastening the filaments to the base, after which the finished strip is coiled on a roll (*d*). If desired, the fur may be cooled with air blasts from perforated pipes (*m*) and (*n*).

As stated, the primary purpose of the inventor is to produce in a cheap and continuous manner a material suitable for use as a substitute for fur and which may be cut up into a great variety of sizes, but it is conceivable that with the further improvement of the apparatus and the process the products may closely approximate in utility, appearance, etc., some of the most valuable pelts. He would employ either natural hairs, such as may be a by-product in the making of leather from natural

skins, or manufactured filaments resembling the hair of mammals and made by squirting viscose or similar cellulose solution. The hair used or the cement in which it is embedded may be suitably colored if desired; and if an upright fur is sought it

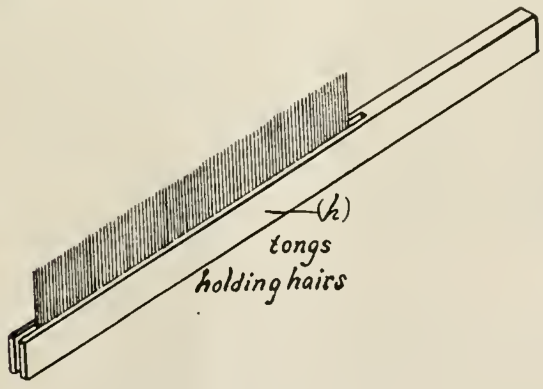


The Nowell Rubber-Set Fur-Making Machine

can be produced by omitting roll (*i*) and brush (*j*). Other effects may be obtained by reversing the motion of the brush. All or some of the hairs may also be placed in tufts, either in all-over pattern or combination of long and short hairs; or the ground may be of one color and tufts of another, as ermine, leopard, and other fur.

According to the inventor, the binder, or semi-liquid adhesive material used for sticking the hairs on the base-fabric must, after vulcanizing, be perfectly pliable and must have rubber as its chief non-volatile constituent, the rubber being held in solution and spread upon the base-fabric either with a spreader, as already referred to, or with rollers or brushes, or by spraying or atomizing.

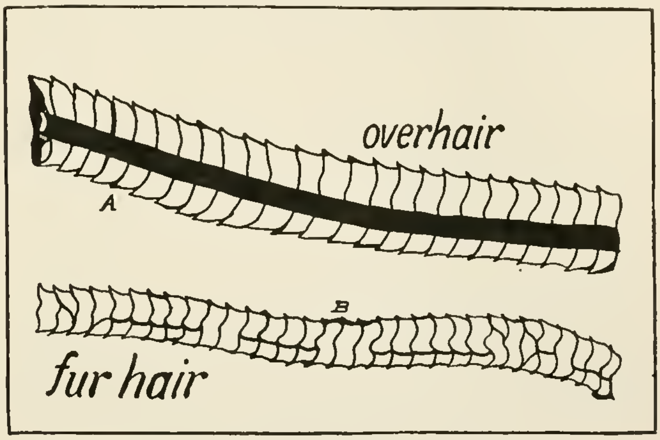
The microscope reveals the reason why hairs can be so well "rooted" in the rubber binding material in vulcanizing the latter. There is a great variety of animal hair, each kind as distinct as the species of animal from which it is taken, as experts know who make tests for spurious furs. Generally speaking, the outer coating of the hair of all mammals is made up of an infinite number of overlapping scales as shown in the accompanying illustration of one sort of wool hair, with a medullary or



Tongs for Holding Hairs

pithy center that is especially discernible on the overhairs. The sharp, tiny edges of the scales get a grip on the vulcanizing substance that can not be equalled by any rounded, smooth-surfaced natural or manufactured filament, which fact has to be borne in mind in the production of artificial fur or wool hair on a commercial scale, a development probably of the not distant future.

A condition favoring the making of rubber-set furs, and which may lead to a considerable broadening of the artificial fur industry is the increasing scarcity of natural furs. So high an authority on wild animal life as William T. Hornaday, director of the New York Zoological Park, remarks in a recent bulletin, "The Fur Trade and the Wild Animals," issued by the New York Zoological Society, that present fur fashions, including summer furs, and the overtrapping and collecting of immature skins, stimulated by present high prices for furs, will mean the extinction of most of the wild animals of the United States by 1950. Other parts of the world may help some in supplying the deficiency in furs, but the chances are that the supply will not



Alpaca Wool Hairs (Largely Magnified)

A, Over or Protection Hairs, Showing Medullary or Pith Section
B, Under or Fur Hairs, Showing Epidermal Scale Formation

keep pace with the growth of population and prices will be steadily advancing.

LINCOLN HIGHWAY TO HAVE AN "IDEAL SECTION"

The great transcontinental roadway known as the Lincoln Highway is to have an "Ideal Section," and detailed surveys for this purpose are being made. The location to be finally fixed upon will probably be at a point in Lake County, Indiana, between Dyer and Schererville.

J. N. Gunn, president of both the Lincoln Highway Association and the United States Tire Co., and vice-president of the United States Rubber Co., recently investigated this district, and was pleased with the tentative location. Funds for carrying forward the work of building this ideal section are being made available by the United States Rubber Co. When completed the undertaking will represent the finest and most adequate work possible and in accordance with the best methods of scientific road construction.

FACTS REGARDING CORD TIRES

A 30 by 3½ cord tire contains almost 9,000 feet of cord or over a mile and a half. A 35 by 5 has over 30,000 feet of cord or over five and a half miles. The cord, similar to medium-weight fishing-line, is made of long-fiber cotton, of far better grade than used in ordinary cotton goods. Each cord, insulated in rubber, is separated from the next by a layer of rubber insulating which gives additional strength. A standard make 5-inch cord tire has 20 to 26 cords per inch and a strength in fabric carcass alone in excess of 2,400 pounds to the square inch, irrespective of the strength given by other parts.—*Miller News Service.*

Circular Looms for Weaving Tubular Fabrics[1]

Circular or tubular weaving is a manufacturing process conducted in mechanical rubber goods factories as well as in those devoted to the manufacture of cotton and linen fire hose only. A hose protected by a heavy woven jacket is proof against heavier bursting pressure and more severe external abuse than one not so protected. The method of circular weaving is employed in the manufacture, in continuous lengths, not only of fire hose, but of steam, air, garden, and suction hose, and as an outer cover to reinforce heavy-duty hose for various purposes.

A circular loom is a very compact and ingenious mechanism and the process of weaving is interesting and fascinating. The installation usually constitutes a distinct department in a rubber plant, with looms and creels set either on the same floor level, as seen in Fig. 1, or with looms on a gallery or mezzanine floor above the creels.

Two sizes of circular looms are manufactured, the larger having a range of output extending from the smallest diameters of fabric hose jacket up to eight inches, while the smaller has a capacity up to two inches in diameter. Within the limit of its capacity, either loom will weave hose jackets of varying fineness of weave, depending upon the yarn used and the number of picks of weft per inch. In each machine is a spacious central tubular column through the weaving center of which such articles as steam or air hose, electric cables, etc., may be passed for insulating or covering purposes. In a similar manner the outer jacket of double-jacket fire hose may be woven over the inner one in continuous lengths, one jacket being woven right-hand, and the other left-hand, to prevent twisting of the hose under pressure.

DESCRIPTION OF LOOM AND PARTS

The plan of a circular loom, and arrangement of its principal parts is approximately circular. A side view shows a heavy iron base plate with upright columns supporting a series of four circular platforms or galleries. The lowest platform carries a cam-actuated mechanism for operating the heddles, the second and third platforms carry the shuttles and shuttle guides, while the top plate completes the framework, supporting the take-off bridge, and protecting the operator from contact with the moving parts. All of the mechanism is arranged compactly and as near the base as possible to give stability, make the shuttle and weaving pin readily accessible to the operator, and bring the whole weaving operation into full view.

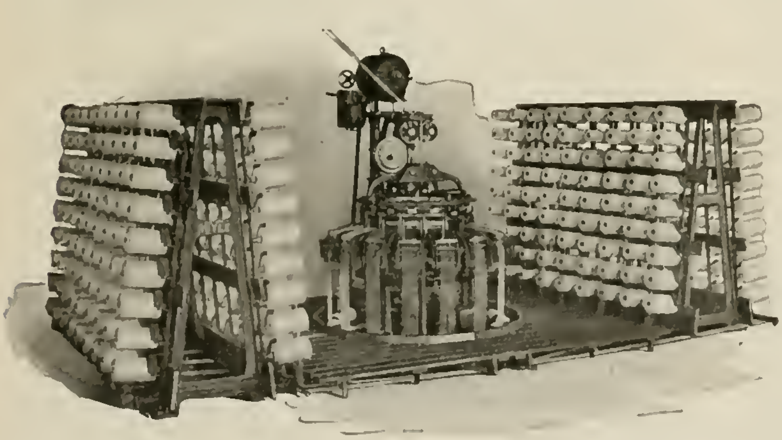


Fig. 1. Circular Loom Equipped with Creels, Motor-Drive, Take-Off Rolls and Production Indicator, for Weaving Small-Diameter Hose

CAM-OPERATED HEDDLE MOTION

The sheds of warp are reversed at each heddle section in precise conformity with the travel of the shuttles around their circular track, through mechanism controlled by the action of a large horizontal cam revolving about the central axis of the loom in unison with the travel of the shuttles. On the under side of this cam a smoothly-machined channel engages, at each heddle section, a hardened-steel roller. Each roller is attached to a rack-and-pinion unit, which in turn operates a rocking-arm mechanism imparting the up-and-down motion to the two frames of its heddle section.

A distinctive feature of the heddle motion is its gentleness in opening the warp sheds. The sheds move rapidly at the middle of their travel, but start and stop very slowly, thereby avoiding shock to working parts, and preserving the original tensile strength of the warp yarn.

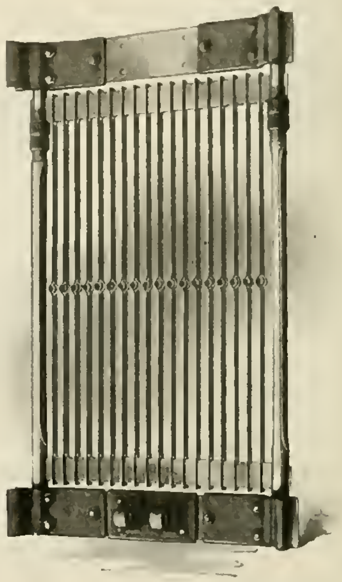


Fig. 2. Heddles in Frame

HEDDLES

Each warp thread enters the loom through the eye of a separate heddle and the number of warp threads that can be woven into a fabric jacket is limited by the number of heddles provided. Each heddle section comprises two rectangular metal frames, one inner and one outer—see Fig. 2—which are given an opposed up-and-down motion by the cam-operated mechanism described below. The warp is thus divided at each heddle section into two sheds which reverse their positions following the passage of one shuttle, and preceding the arrival of the other.

WARP TENSION EQUALIZER

The entire body of warp, after leaving the creels, is separated into 16 equal divisions corresponding to the number of heddle sections. At the base of the loom every thread is passed one or more times around a friction surfaced roll, one roll for each section of warp. These 16 rolls encircle the base of the machine and are suitably geared together to insure precise uniformity of rotation, thereby imparting even degree of tension and even rate of feed to all of the warp threads. A friction drum, geared to the train of rolls, permits the operator to control the tension of all the warp threads from a single adjusting device.

TAKE-UPS

After leaving the tension-equalizers the warp threads pass vertically upward through the take-up levers before entering the heddles. There is a take-up section for every heddle section, and each is a complete unit secured to the loom frame by a pivoted construction that permits its being dropped bodily downward from its normal position shown in Fig. 3, to that illustrated in Fig. 4. When a cop is to be renewed, two or more take-up sections are lowered, thereby slackening as many warp threads as may be necessary to permit easy withdrawal of the empty spindle, and insertion of the full cop.

[1]The information and illustrations used in this article were obtained from John Royle & Sons, Paterson, New Jersey.

After the new cop has been inserted the take-ups are reset to normal position, thereby restoring to the warp threads precisely the same degree of tension as before slackening. Each take-up section contains an equal number of spring-actuated levers, one for each warp thread, which compensate for the varying pull on the warp as the threads reverse and the shuttles pass between them.

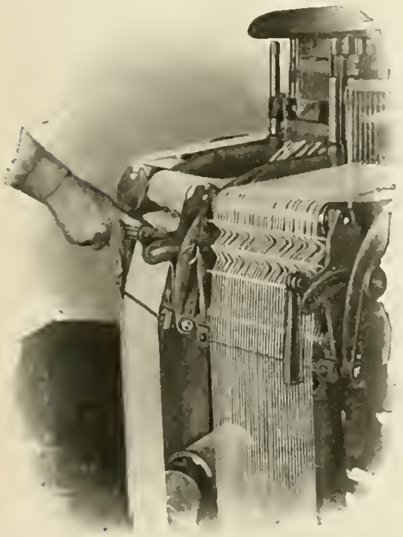


Fig. 3. Take-up Section About to Be Lowered

SHUTTLES

There are two shuttles in the machine, each of which carries and delivers weft. They are mounted upon wheels, and travel around a leathered circular track, just inside the heddle enclosure, at diametrically opposite points on its circumference. Here they pass successively between the sheds of warp, which reverse, as to their upper and lower positions, after the passage of one shuttle and before the arrival of the other. Each shuttle carries a large, closely-wound cop of filling yarn, which passes in unwinding through a spring compensating device for maintaining uniform tension in the filling, or weft, as it enters the weave. Every revolution of each shuttle adds one complete layer or "pick" of weft to the fabric jacket being formed. For delivering weft from these compensating devices to the weaving point two hook-shaped "weft-guides" are used, one for each shuttle, each at its delivery end fitted closely around one-half of the weaving pin, and having on its inner face a groove of approximately the same sectional area as that of the weft being used. From each of these weft-guide grooves a strand of weft is continuously delivered into the forming fabric as long as the loom continues in operation.

The weft-guide grooves are cut spirally so that each layer or "pick" of weft delivered is pushed against the previous layer from beneath, thus clearing room for itself in the weave. In this manner the fabric tube is continually forced upward as fast as it is formed at the weaving point.

The action of these spiral-grooved weft guides is to pinch or nip the warp threads immediately below the weft at the instant the latter is interlaid, thus drawing them tight, and laying in the weft with sufficient pressure to force the preceding layer up and out of the way of the incoming one.

The shuttles in their circular travel are guided by two stationary comb-like circular fences placed one above the other in the stationary structure of the loom. The warp threads as they converge toward the weaving point pass through the pickets of these guide fences. The motion of the shuttles is always positive, uniform, and in precise harmony with that of the heddles.

WEAVING POINT

At the center of the loom an upright pin or core is mounted, about which the weave is formed. The outside diameter of this pin determines the inside diameter of the fabric tube, and for every required diameter of hose a weaving pin of corresponding size must be used. The fabric jacket is formed tightly around this pin. The tightness of weave can be varied to a considerable degree by the extent to which the weaving pin is made to project upward into the finished jacket, thereby increasing the amount of upward pressure required to insert each layer of weft.

When it is desired to weave a covering around steam or air hose, electrical cable, etc., or to make double jacket fire-hose, a tubular weaving pin is used, which diminishes in thickness to a very thin rim toward the weaving point. The article to be covered is passed upward through the central column of the machine and through the tubular weaving pin which serves as a guide, bringing it precisely to the center of the weaving point. As the newly-formed fabric is pushed up and off the outer circumference of the guider, it encloses the article being covered with a variable degree of tightness depending chiefly upon the vertical adjustment of the guider.

TAKE-OFF MECHANISM

When moderate flattening of the product is required as a convenience in coiling or in the case of a very loosely woven jacket, consideration must be given to keeping it clear from the loom as it passes the weaving point. To meet these requirements a pair of plain frictioned rollers are provided. These are readily separable and held in contact with the fabric by adjustable spring tension. The speed of the rollers is regulated by a train of change gears to conform to any variations in the rate of weaving.

Grooved take-off rolls are required for work which must pass through the rolls in tubular form. In such cases a pair of flanged iron hubs are furnished to be filled out with rubber compound to conform with the sectional area of the product.

CREELS

The unwinding of the yarn at its source is the starting point of uniform tension, hence the importance of properly designed, well-constructed creels. Viewed endwise, each creel resembles a narrow letter A, connected by wooden rails. On the slanting sides thus formed are fastened iron bars set with iron pins for holding the spools.

WEAVING FIXTURES

Certain interchangeable fixtures are used at the center of the loom to form the fabric, and to govern its size and density. These fixtures divide into two sets: those which remain stationary during the weaving process, and those which belong to and revolve with the shuttle.

The stationary division comprises the weaving pin, and the circular weft-guide supporter within which it is adjustably mounted. The pin is slidable vertically within the supporter, which in turn is supported by a ring threaded to the shuttle-supporting platform of the loom. The threaded connection of the ring provides a little vertical adjustment of the weft-guide support to compensate for the use of different thicknesses of warp, and for any slight lowering of the shuttles that may result from wear on the leathered shuttle track. The outside diameter of the pin determines the inside diameter of the fabric tube, and is of corresponding size. Likewise the pin must be a sliding fit within the support, so that for every diameter of jacket woven there must be a separate set of stationary fixtures used.

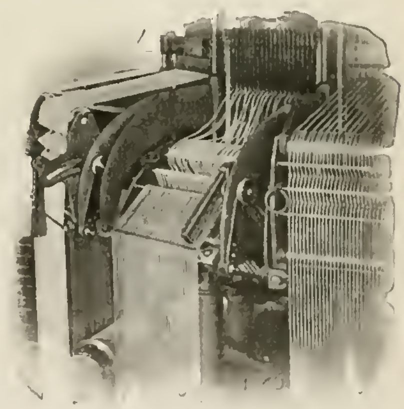


Fig. 4. Take-up Section Lowered to Slacken Tension of Warp Threads

The revolving division of fixtures comprises the spirally-channeled weft-guides which lay-in the weft threads, and the weft-guide holders which provide a connecting element between the weft-guides and the shuttles. Each shuttle requires one holder

and one weft-guide, and a different weft-guide is required for every change in the diameter of the fabric jacket, or in the number of picks (layers) of weft per inch of weave.

MOTOR-DRIVE

Standard motor-drive equipment is illustrated in Fig. 5 and comprises a motor and starter mounted upon a special elevated support which keeps them clear of dust and fluff. Pulleys are provided for the motor, and for the main driving shaft, together with a special endless belt. The motor is adjustable vertically upon its bracket through a sufficient range to provide for maintaining a suitable belt tension at all times. Experience has shown that for ordinary requirements, a five-horse-power motor affords ample power to operate the larger and a three horse-power motor to operate the smaller type of circular looms.

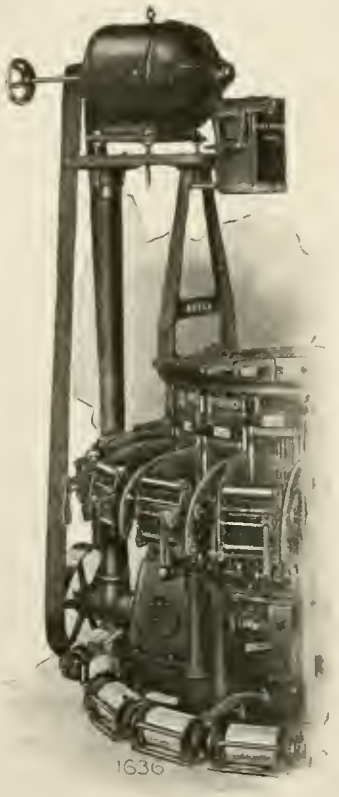


Fig. 5. Variable-Speed Motor-Drive

FRICTION CLUTCH AND BAND BRAKE

A friction clutch is contained within the main driving pulley for transmitting the power of the motor, and a band brake is attached to the vertical driving shaft of the loom just above its bevel gear connection. The same lever in its opposite motion releases the brake and throws in the clutch. The brake action will bring the loom instantly from full speed to a dead stop.

METHOD OF WEAVING

In a woven tubular fabric the "warp" constitutes the longitudinal element and the "weft" or "filling" the circular element. Fig. 1 shows the warp contained in the original spools or "cops" upon a supporting framework called the "creel." It is led from there to the "tension rolls" and "heddle" sections which encircle the outer edge of the loom. It is divided at the heddle sections into two "sheds" which converge toward the weaving point at the center of the loom.

The filling is delivered from two shuttles, each carrying a closely and specially wound cop of yarn. The two shuttles move at the same time around a circular track within the heddle structure, both traveling in the same direction at the same rate of speed, and at diametrically opposite points on the track. As the shuttles travel around their track, the two sheds of warp issuing from each heddle section are made to reverse their relative positions, vertically, during the interval between the passage of the shuttles. Thus there is continuous rising and falling of heddle sections, in succession, around the circumference of the loom and continuous circular travel of the shuttles as long as the loom is in operation.

The interlocking, or weaving, of the warp and weft into the form of a fabric tube takes place at the center of the loom, around a "weaving pin," or "guider" as the case may be, of diameter corresponding to the size of hose jacket required. As fast as it is woven the jacket is automatically delivered upward by the action of two semi-circular "weft guides," as they lay in the weft around the weaving pin. Final tensioning of the warp threads is concentrated at the weaving pin, and this is an important factor in securing a compact fabric.

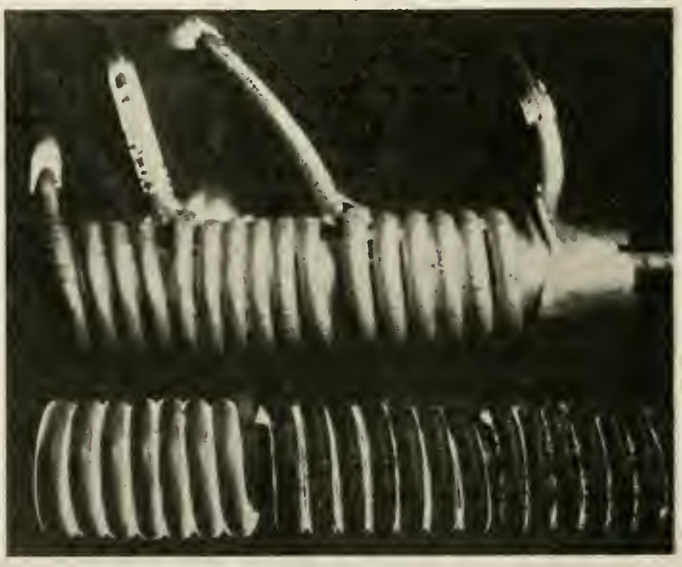
By using a tubular weaving pin or guider it is practicable to weave a fabric jacket around steam, air, or garden hose, flexible metallic tubing, electrical cable, etc., or to weave a second fabric jacket over one previously made with the usual type of solid weaving pin. The article to be covered is passed upward from beneath the loom, through the tubular central column, and the guider, and may be of unlimited length. The weaving operation is continuous so far as the length of product is concerned, but the loom must be stopped at intervals to replenish the supply of filling in the shuttles.

CRACKING OF RUBBER INSULATION ON IGNITION CABLES

In a recent issue of *Automotive Industries* the results are reported of an interesting series of experiments being conducted by the Bureau of Standards for the purpose of finding the causes of the cracking of rubber insulation of ignition cables.

It has been found that "the cracking at sharp bends, observed in the insulation of high tension ignition wires after service, is due to a chemical attack upon the rubber by the ozone of the electric discharge which takes place at the surface of the cable. This cracking does not occur if the insulating material is not under tension, or if the cable is surrounded by some medium other than air; but does occur even if the insulation is not subjected to electric stress, provided the atmosphere near the cable contains ozone. The extent of this cracking varies greatly with the insulating material used."

The conclusion reached is that the cracking can be materially reduced by using braided cable and by avoiding sharp bends.



Corona on Ignition Cables on 1-inch Arbor

Exposure to Corona Only Fifteen Minutes at 13,200 Volts A. C. and to Artificial Light 5 Seconds to Show Location of Discharge
Upper Mandrel from Left to Right: Kerite Bare, Mineral Rubber, Kerite Uncovered
Lower Mandrel from Left to Right: Kerite Bare, Kerite Covered, Mineral Rubber

The experiments referred to are fully described in Technical Note No. 32 of the National Advisory Committee for Aeronautics.

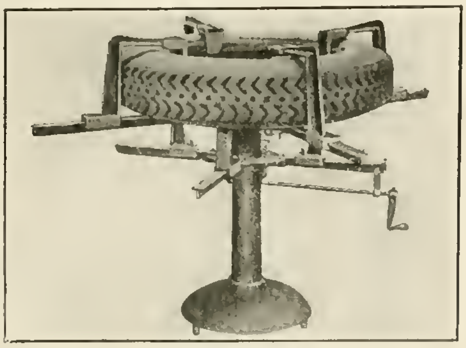
RUBBER BUTTONS FOR WASHABLE CLOTHING

H. Craven, manufacturers' agent, Southport, England, has patented a rubber button which is proving particularly satisfactory for underwear, pajamas, flannels, trousers, shirts and all other washable garments. It is made in all sizes and shapes—flat, round, domed, two and four-holes, shank, etc., of either stiff or soft rubber or rubber compound. These also are used as molds to be covered with fabric or other materials.

New Machines and Appliances

ADJUSTABLE TIRE SPREADER

A tire spreader of wide range of adjustability, built as a shop machine for the tire-renovating business, is shown in the illustration. It consists of a pedestal of convenient height, on which are mounted two sets of four horizontal guides or slides. The lower set of these is attached to a flanged collar around the pedestal and is movable vertically by means of a simple device operated by a handle as shown. Each set of guides carries slidable hooks for gripping the edges of the tire, four above and four below. With the hooks adjusted in the tire the spreader will quickly and easily spread open any automobile tire casing from the smallest to the largest size, permitting convenient inspection or repair.—Reichel & Drews, 452 North Ashland avenue, Chicago, Illinois.



The R. & D. Tire Spreader

LIFTING TRUCK WHICH TURNS IN OWN LENGTH

The truck shown in the illustration is made of steel; the head being solid steel always remains rigid, thereby keeping the truck in alinement. There is no torsion strain or shearing action. The king-pin, a part of the fork holding the front wheels, has an internal oiling chamber which automatically lubricates the swivel, making turning of the truck smooth and easy, no matter how heavy the load. The king-pin also absorbs all vibration and shock. The single pedal of steel connects the lifting-hook and lever, and also releases the hook from its raised position.

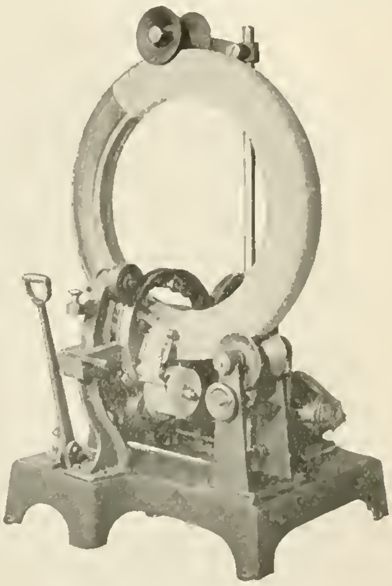
The swivel turns partially or completely around when the truck is in raised or lowered position. The wheels are machine-faced and revolve on large roller bearings. The two front wheels of the truck are two inches in diameter, while the two rear are three inches. This four-wheel construction gives stability and allows the carrying of heavy loads without injury to the floor. The elevating cylinder walls are bored and ground to a high-grade machined finish, and no soft materials are used in its construction.

Stuebing Lift Truck

The trucks have a carrying capacity of from 3,000 to 5,000 pounds, and take platforms from 25 by 22 inches minimum and 40 by 33 inches maximum for the smallest truck to 66 by 35 inches minimum and 86 by 44 inches maximum for the largest truck.—The Stuebing Truck Co., Cincinnati, Ohio.

SINGLE TIRE WRAPPING MACHINE

An ingenious device for paper wrapping individual tires has several unique features. Among these should be mentioned the fact that the following parts of this machine are made adjustable, in order to fit tires of varying sizes: shuttle for centering the different sizes of tires; feed rolls adjustable to any degree of overlap; paper folder to take in any width paper from 1½ to 3 inches; and adjustable tension.

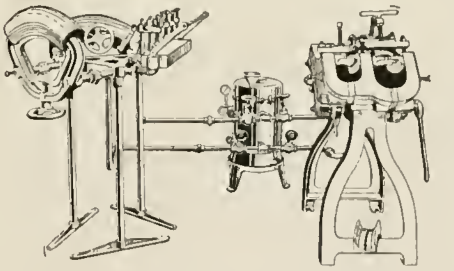


Paper Wrapping Machine

This machine, run by a one h.p. motor, is of simple construction, noiseless and compact, occupying a space only three feet square. It will fold any kind of paper, such as Kraft, crêped, asphaltum waterproof, and string-reinforced, while the guide-roll is so constructed that breakage of the paper is an impossibility. With a roll of paper 7½ inches outside diameter, and 1¼ inches core, 200 tires may be wrapped in an hour, or one tire in seven seconds.—Terkelsen Machine Co., 326 A street, Boston, Massachusetts.

NEW EXPANSIBLE TIRE REPAIR VULCANIZER

A specially designed equipment called by the makers a "super vulcanizer," is shown in the illustration. It consists, at the left, of a multiple tension inside vulcanizer for curing reliners or shoes inside of the casing, permitting application of heavy pressure and correct alinement and attachment to the casing. Next is shown the side wall and bead vulcanizer especially designed for air bag and hand-wheel pressure for curing side-wall and bead repairs of all passenger tires, both straight-side and clincher types. On the same stand there is a machined and polished tube plate which will cure repairs on four tubes at one time, each under pressure of an adjustable clamp.



"Western" Super Vulcanizer

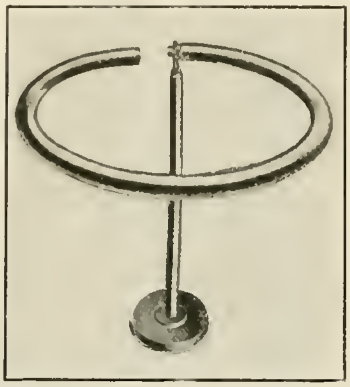
At the right of the illustration is shown a pair of sectional-casing vulcanizer mold cavities. These are built in split halves held together by bolts and nuts. This construction makes it easy to insert or remove casings. Spacers of quick heat-conducting metal of varying widths are inserted between the halves of the mold to expand or contract the cavities to fit any size of casing. Spacers of widths corresponding with those used be-

tween the halves of the mold are inserted between the bead plates to adjust them to the proper sizes. Long steel pressure bolts permit the use of a sand-bag and spring when curing spots on the tread and save the use of an air-bag for full sectional repairs.

The vulcanizers derive steam from a special high-power steel-riveted generator composed of 3/8 and 1/4-inch metal and numerous tubular flues. It is equipped with all safety devices necessary to pass inspection requirements anywhere in the United States.—Western Rubber Mold Co., 243 North Crawford avenue, Chicago, Illinois.

CIRCULAR MANDRELS

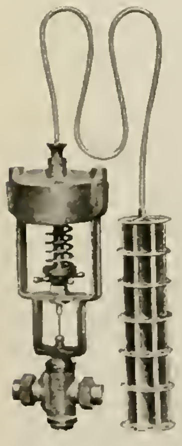
The advantage of circular mandrels for the manufacture of inner tubes is very evident from the fact that tubes so made fit the casing and are entirely free from buckling on the inner circumference, due to their annular form. The illustration pictures an inner-tube mandrel mounted on a holder or wrapping stand. The mandrel is made of 13-gage seamless drawn steel tubing, sherardized and highly polished as furnished ready for immediate use. Such tubes are made in regular sizes from 28 by 3 up to 37 by 5 and larger sizes to order.—Recessing Manufacturing Co., Sharpsburg Station, Pittsburgh, Pennsylvania.



Circular Mandrel and Stand

RELIABLE TEMPERATURE REGULATOR

The illustration shows a temperature regulator known as the "Sylphon" for the automatic regulation of liquid or air temperature and can be used in practically every case where steam is the heating medium as in dry heaters or open-steam vulcanizers. The regulator is entirely self-contained, automatic, sensitive and accurate in regulation to a degree, and depends only upon the power generated within itself for operation.



Sylphon Regulator

It comprises a heat-sensitive bulb, which is inserted into the space or medium to be heated; a flexible tubing for connection of the bulb to the regulator; a motor chamber for multiplying the force developed in the bulb and transmitting it to the valve in the steam line; and an adjustable mechanism for setting the regulator at the desired temperature. The instrument is made in both lever and spring type of construction.—The Fulton Co., Knoxville, Tennessee.

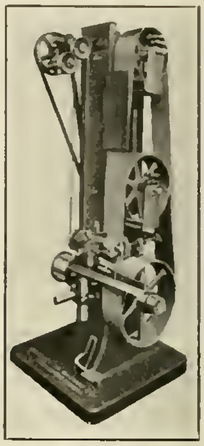
STAPLES FOR ELECTRIC WIRING

For quick and convenient attachment of telephone or bell wires in laboratory or factory, the insulated staples shown in the illustration are very desirable and useful. The fiber insulation effectually prevents troublesome short circuits and grounds.—Blake Signal & Manufacturing Co., Boston, Massachusetts.

Blake Insulated Staples

POLISHING AND FINISHING MACHINE

The illustration shows a duplex polishing and finishing machine adapted for finishing cylindrical objects in metal, fiber, rubber, wood, etc. The work in long or short lengths may be fed through the machine automatically by a power-feed attachment. Small articles of cylindrical form may be fed automatically through hopper fixtures.



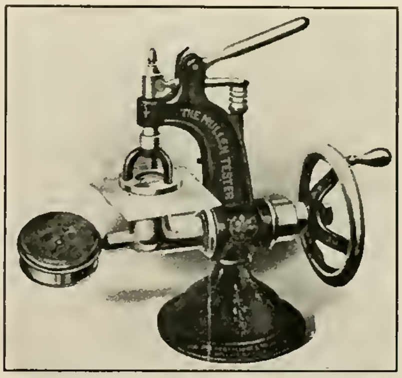
Machine for Polishing Inner-Tube Poles

The abrasive belt is 6 inches wide by 14 feet long, made endless, and is run over a cushion leather belt. It is this feature that gives the machine its remarkable efficiency as a light grinding, polishing, and finishing tool.

A machine of this sort should find an important place of usefulness as a means of keeping tube-poles clean and polished in a rubber tire factory where inner tubes are made.—Production Machine Co., Greenfield, Massachusetts.

TESTING TIRE-BUNDLING PAPER

The Mullen tester is designed for determining the strength of paper by applying a hydraulic bursting pressure. The instrument is standard among paper manufacturers and dealers, and with the United States and various foreign governments. Its use is required by the revised tire-bundling specifications that were published in The India Rubber World, April 1, 1921.



The Mullen Tester

The ordinary form of Mullen tester is shown in the illustration, and consists of a cylinder with a side opening over which the paper to be tested is clamped. By means of a hand-wheel hydraulic pressure is exerted upon the area exposed to test and the bursting pressure in pounds per square inch automatically indicated on a pressure gage. A rubber diaphragm is interposed between the paper under test and the liquid in the cylinder. The instrument is made in two sizes to cover a range of tests up to 1,000 pounds per square inch.—B. F. Perkins & Son, Inc., Holyoke, Massachusetts.

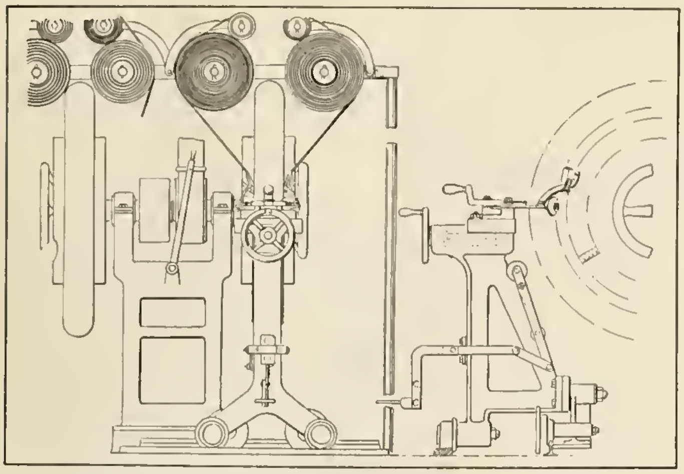
MACHINERY PATENTS

TIRE BUILDING MACHINE

A tire carcass is customarily built up by applying strips of rubberized fabric to the core, usually by hand. The invention shown in the accompanying illustrations eliminates unnecessary steps and effects the convenient and easy application of the chafing strips and side-walls.

The machine comprises a pedestal supporting a strip-applying device drawing material from rolls arranged on a frame above, and delivering it accurately positioned and rolled down on the carcass built on a revolving core. The strip-applying device is mounted on an independent support movable on wheels on a

track in front of the main structure, alternately serving either of two building cores.—The Goodyear Tire & Rubber Co., as-



Mechanical Tire Builder

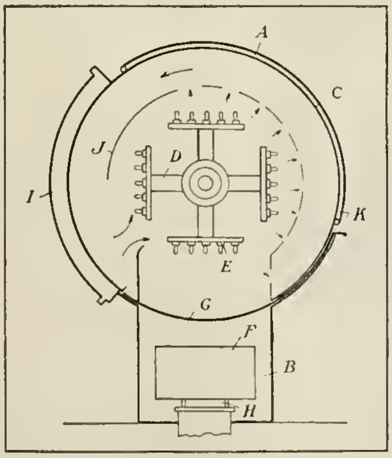
signee of William Bogart Harsel—both of Akron, Ohio. Canadian patent No. 210,429.

SPONGE RUBBER BALLS

Sponge rubber balls may be molded in two-part vented molds as follows: the rubber composition compounded to blow into a porous condition on heating is first formed in cylindrical shape by a tubing machine and cross-cut into sections of suitable length to reach across the diameter of the ball cavity. When so placed vertically, the mold is closed and vulcanizing heat applied, thus causing the cylindrical rubber stock to expand laterally. The air contained in the mold cavity escapes by the vents at either end of the cylinder of rubber and allows the latter to expand by becoming porous and filling out to the full spherical size of the cavity.—Charles F. Flemming, assignor to The Miller Rubber Co.—both of Akron, Ohio. United States patent No. 1,370,805.

MACHINE FOR DIPPING AND SOLVENT RECOVERY

In the dipping machine here illustrated, heating surfaces are arranged beside the cooling surfaces in the casing inclosing the mold carriers in such manner that the walls of the casing lying on the two sides of the mold carrier are given different degrees of temperature. There is thus obtained energetic circulation and intensive drying effect.



The Boecler Dipping Machine

The solvent recovering device A is arranged above the dipping device B. The former comprises a casing C through which the revolving mold carrier D is journaled. The molds E on which the rubber articles are formed is arranged in series on D as indicated. In the lower part of A is an opening for the admission of dipping tank F closed by a slide G operated either by hand or power attachment. The encased dipping device B consists of tank F for the rubber solution, mounted on a hydraulic plunger H.

The left side of casing A is formed as a cooling mantle I, piped for the circulation of water. A guide baffle-plate J is attached to the casing and bent to run concentrically around the mold carrier D, and perforated where shown by the arrows for the escape of solvent vapors. The casing C of the recovery device A is provided on part of its circumference with a serpentine heating appliance K.

In operation the slide G is opened and the tank F raised to the dipping height to permit immersion of the series of molds E in rotation. The solvent vapor escapes rapidly in the circulation of warm air indicated by the arrows and condenses freely by contact with the water-cooled section and may be drawn off through an outlet pipe.—Albert Boecler, Malmö, Sweden. United States patent No. 1,380,862.

OTHER MACHINERY PATENTS

THE UNITED STATES

No. 1,382,067 Collapsible tire core. T. Midgley, Sr., Worthington, O., assignor to The Fisk Rubber Co., Chicopee Falls, Mass.

1,382,035 Collapsible tire core. F. A. Watson, Springfield, O.

1,382,207 Apparatus for extruding, cooling, and cutting rubber. L. R. McGuire, assignor to the Firestone Tire & Rubber Co.—both of Akron, O.

1,382,471 Pneumatic-tire-building machine. J. L. Butler, Akron, O., assignor to The B. F. Goodrich Co., New York, N. Y.

1,382,642 Rubber-heel trimmer. T. B. Huestis, assignor to National India Rubber Co.—both of Bristol, R. I.

1,382,651 Machine for trimming flashed edges of forked rubber binding. W. J. Kent, New York, N. Y., assignor to The Mechanical Rubber Co., a New Jersey corporation.

1,382,948 Vulcanizing oven. C. J. Berthel, Akron, O.

1,383,857 Mold for making heels, lifts, soles, etc., from rubber. H. C. Rideut, Bournemouth, England.

1,383,951 Repair vulcanizing device. S. J. Hurwitz, Youngstown, O.

1,384,362 Expansible core. J. Traum, Coshocton, O.

1,384,419 Apparatus for loosening tires from cores. A. O. Abbott, Jr., assignor to Morgan & Wright—both of Detroit, Mich.

1,384,431 Control for tire-stripping machine. M. Davis, assignor to Morgan & Wright—both of Detroit, Mich.

1,384,463 Tire-supporting device for tire molds. A. H. Harris, Barberton, assignor to E. A. Armstrong, Akron—both in Ohio.

1,384,503 Repair vulcanizer. W. R. Younger, Alexandria, La.

THE DOMINION OF CANADA

212,301 Apparatus for solutioning tire beads. The Dunlop Tire & Rubber Goods Co., Limited, assignee of T. A. Burns—both of Toronto, Ont.

THE UNITED KINGDOM

163,580 Control device for adjusting rollers of rubber-mixing, grinding or washing machine. Iddon Brothers, Limited, and H. E. Iddon, Brookfield Iron Works, Leyland, Lancashire.

163,781 Apparatus for covering endless wires for use in edges of tire casings. W. & A. Bates, Limited, and J. Healey, St. Mary's Mills, Leicester, and F. Shaw & Co., Limited, Corbett Street Ironworks, Bradford, Manchester.

NEW ZEALAND

43,276 Apparatus for manufacturing pneumatic tires. T. Sloper, Southgate, Devizes, Wiltshire, Eng.

GERMANY

DESIGN PATENTS ISSUED, WITH DATES OF ISSUE

778,110 (April 13, 1921) Vulcanizing apparatus. Josef and Paul Elsig, Merheimerstrasse 114, Köln Nippes.

782,033 (May 28, 1921) Electrically heated vulcanizing apparatus. Apparatebaugesellschaft m. b. H., Baden-Oos.

783,498 (May 31, 1921) Tool for making tire covers. Lorenz Schäfer, Königswall 50, Dortmund.

783,907 (May 31, 1921) Tool for making tire covers. Lorenz Schäfer, Königswall 50, Dortmund.

PROCESS PATENTS

THE UNITED STATES

No. 1,382,208 Manufacture of articles of fabric and rubber. H. F. Maranville, assignor to the Firestone Tire & Rubber Co.—both of Akron, O.

1,382,367 Manufacture of tire carcasses. K. B. Kilborn, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O. (Original application divided.)

GERMANY

PATENTS ISSUED, WITH DATES OF ISSUE

339,810 (March 25, 1920) Method for improving pneumatic tires. Lucas Kinkel, Szeghegy-Bacska, Jugo-Slavia; represented by R. Fischer, Berlin, S. W.

339,811 (April 17, 1920) Attaching exchangeable rubber heels. Gustav Milse, a. d. Häfen 69, Bremen.

340,663 (November 14, 1920) Process for making treads. Walter Einert, Wolffstrasse 23, Hanover.

DESIGN PATENTS ISSUED WITH DATES OF ISSUE

782,458 (April 11, 1921) Attaching exchangeable rubber heels. Ludwig Stadler, Werfstrasse 5, Regensburg-Unterer Wöhrd.

782,887 (June 3, 1921) Process for obtaining non-slipping rubber heels. Ernst Wleck, Seumestrasse 83, Leipzig-Schleussig.

783,471 (September 20, 1920) Splicing tube ends for bicycles, automobiles, etc. Peter Müller, Fraulautern, Saar.

783,680 (June 10, 1921) Inflating tires. Oskar Klemm, Sternplatz 6, Berlin-Johannisthal.

783,763 (June 11, 1921) Coupling and uncoupling belting. Anton Stehlik, Vienna; represented by A. Elliot, Berlin, S. W. 48.

783,771 (June 13, 1921) Attaching rubber heels. Wilhelm Hayer, Schkeuditzerstrasse 22, Leipzig-Gohlis.

EFFECT OF LIMITED HOURS FOR WOMEN RUBBER WORKERS

Labor laws regulating the employment of women in industry are becoming more general in the United States. Only five States—Iowa, New Mexico, Alabama, Florida, and West Virginia—do not regulate in any way the hours which women may work, while the 8-hour day is required for women in some or all branches of industry in eight states, one territory, and the District of Columbia. Whether the reduction in women's working hours means a corresponding decrease in production, an increase in cost of the finished article, or both, is the subject of a report lately submitted by the Women's Bureau of the United States Department of Labor.[1] The bureau made a survey of the conditions in rubber and other industries in New Jersey and Massachusetts and found that the factories had been keeping pace with the general trend throughout the United States to curtail the working time of women and advance their wages. Many factories have increased pay and decreased working time without waiting for legislative compulsion.

To offset reduced working time with the same or increased pay, enterprising factory managers have installed various labor-saving devices and have taken greater pains in eliminating waste and promoting efficiency. The manager of one rubber concern reported that in the 47-hour week, although the piece rates had not been increased, the piece workers earned as much as in the former 51-hour week, and the general output was better. A rubber hose manufacturer cited his experience where increased output followed fewer hours with a 10-minute rest period in every hour. Six girls on six machines were turning out on an average of 3,000 feet of hose a week, when it became necessary to turn out 25,000 feet a week. A night shift of men on the same machines failed as the men produced an inferior article. Two 8-hour shifts of women were then tried, with seven women to attend the six machines, instead of six who had worked 10 hours a day. The extra woman relieved each of the others during the 10-minute rest period at the end of each hour. The result was the surprising weekly average production of 32.000 feet of hose. Even though the machinery's speed had been increased from 40 to 74 revolutions a minute, it was figured that there was still a large gain to be credited to shorter shifts and the relief periods.

A Massachusetts belting manufacturer stated that in 1918 he had employed 28 women 52½ hours a week, paying them $8.87 a week. In October, 1919, he had 8 women 48 hours a week, paying them $14.12, and was actually doing more business than in 1918, and with fewer employes and women working shorter hours. One manufacturer frankly stated that on the lighter lines of work women not only produced a better article, but were steadier and more dependable, and that it paid to hire them even though their hours of work were more limited than those of men.

As relating to the proportionate number of women employed in rubber industries, a table is given showing the count made in fifteen factories in New Jersey in April and October, 1919. The total number of men employed in April was 6,771 and in October, 7,493. For the women in the same months the figures were 1,570 and 1,583. For the same months fifteen rubber establishments in Massachusetts give these figures: men, 14,670 and 16,008; women, 6,765 and 7,131; relative percentage of women for April, 31.6, and for October, 30.8. A great difference in the products of the two states, explains why the women in the rubber industry in Massachusetts number nearly one-third the total number of employes, while in New Jersey they are less than one-fifth. In the former state large quantities of light goods, such as rubber shoes, are produced; while in the latter state the rubber products are largely heavier articles, such as tires, hose, belting, etc., which can better be handled by men.

[1]Bulletin No. 15, of the Women's Bureau, U. S. Department of Labor, Washington, D. C.

The investigators say they found no desire on the part of employes or employers to revert to former conditions, one of the latter being quoted as saying that no manufacturer in his state would be willing to go back to the 54-hour week, and workers would rather take less pay.

WAGES PAID IN THE RUBBER INDUSTRY

Statistics regarding wages paid to rubber factory employes in the United States have been recently compiled for the use of the Committee on Ways and Means, House of Representatives. Average weekly earnings of workers in New York State rubber factories during the month of October, for the year 1914, 1916, and 1918-1920 were, respectively, $10.63, $12.92, $18.19, $21.68, and $26.22.

From an industrial survey, conducted by the Labor Department, and covering 45 rubber establishments in the United States, employing both men and women, the following statistics regarding average hours and earnings per week, for the year 1919, were taken:

Occupation	Average Hours per Week	Average Earnings per Week
Tires and tubes		
Bead makers	48.6	$30.87
Bias-cutter operators	52.8	32.32
Builders or makers, hand	46.8	35.27
Builders or makers, machine	44.4	34.00
Operators, tubing machine (jacket and cover)	49.8	29.93
Ply cutters, tread cutters, and splicer preparers	47.4	29.14
Tube rollers, wrappers, and strippers	45.0	31.81
Vulcanizers	48.0	34.00
Wrappers, machine	57.6	38.18
Females		
Bead makers	49.2	18.58
Bias-cutter operators	50.4	23.57
Builders or makers, hand	47.4	24.90
Laborers and helpers	46.8	17.78
Tube rollers, wrappers, and strippers	44.4	20.31
Mechanical goods		
Belt makers	49.2	24.07
Laborers and belpers	52.8	21.09
Lathe men, buffers, and cutters	49.8	23.01
Makers, hand	48.0	24.97
Tube rollers, wrappers, and strippers	53.4	27.73
Wrappers, machine	46.2	24.07

TUFFITE AND TUFFINE NEW RUBBER MATERIALS

Tuffite is the pulverized product of tufa rock, first quarried at Mt. Angel, Oregon, for building purposes, but more recently found to be a useful filler for rubber compounds. The material is of volcanic origin and is a tuffaceous breccia, more commonly and properly called tuff. It is not a lava, but an ash of fragmentary composition, having been thrown up in some gigantic upheaval, falling like snow and in cooling and aging has solidified.

Nails Driven Into Tuffite Hold Firmly

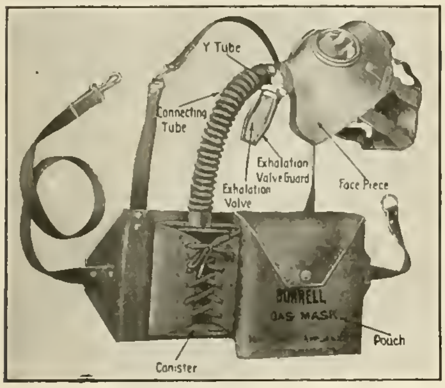
The rock is remarkably light, weighing only 80 pounds to the cubic foot. When pulverized it is soft and velvety and its specific gravity is 2.25. It is said to compound readily with rubber, producing a finished article that is tough, velvety, high heat resisting, light in weight and possessing a non-slip and non-skid value. It requires 3,100 degrees F. to melt the material and therefore has been found excellent as a rubber insulating material.

An accelerator marketed under the trade name "Tuffine," is being produced from the same material calcined and treated. Both Tuffite and Tuffine, it is said, are being used by several rubber companies on the Pacific Coast in the manufacture of tire treads and mechanical goods.

New Goods and Specialties

BUREAU OF MINES APPROVES GAS-MASK FOR AMMONIA FUMES

The Burrell gas-mark, described in The India Rubber World, September 1, 1919, has been officially approved by the United States Bureau of Mines as an industrial gas mask suitable for the protection of those whose work in an atmosphere containing ammonia fumes makes necessary the wearing of a mask of this kind.



Burrell Mask for Ammonia Fumes

The face-piece and connecting tube are made of rubber covered with stockinette, and the exhalation valve and the deflector on the inside of the face-piece are also made of rubber. The head-bands and the bands used in assembling the different parts of the mask are rubber elastic. The accompanying illustration gives a good idea of the appearance of this mask and its accessories.—Mine Safety Appliances Co., 908 Chamber of Commerce Building, Pittsburgh, Pennsylvania.

NASAL SYPHON

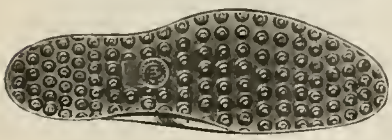
The accompanying illustration shows the method of using the new Nichols nasal syphon which is designed to benefit sufferers from all inflammatory conditions of the nose, and to be used as a preventive sanitary device rather than as a curative means.

"Nichols" Syphon

All parts of this syphon are made of rubber; the tubing and water-bag of soft rubber and the slide and nose-pieces of hard. The device operates by means of the suction force supplied by the outlet tube, which is in direct proportion to the perpendicular drop of the tube. This suction is induced by the creation of a partial vacuum in the head when both nostrils are stopped with the hard rubber perforated plugs.—Herbert B. Nichols, 145 East 35th street, New York, N. Y.

UNIQUE SUCTION-CUP SOLE

A new variation of the familiar suction-cup sole is found in the sole and heel of this rugged bal intended to withstand the hard wear and tear a strenuous boy will be likely to give it.



"Camco Duplex" Sole

The particular feature of this shoe is the "Duplex" suction sole which is studded all over with double suction cups. The toe-cap, upper edge of vamp, eyelet pieces, and ankle patch are made of leather and serve to reinforce those parts of the shoe.—Cambridge Rubber Co., Cambridge, Massachusetts.

WINDSHIELD WIPER OF RUBBER AND FELT

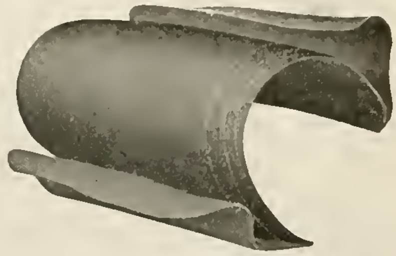
The stamp of approval of the Underwriters' Laboratories on a manufacturer's product carries with it to the public mind a certain weight of confidence. Among such products is the "Auto Scope" windshield wiper, shown herewith. It is of the sliding type that is adjusted on the top of the windshield and consists of a double squeegee rubber wiper for the exterior of the glass and a single felt wiper for the interior. This windshield wiper is considered standard by the Underwriters' Laboratories when installed on windshields adapted for its use.—White Products Co., 2204 Michigan avenue, Chicago, Illinois.

"Auto Scope" Windshield Wiper

TWO NEW BLOWOUT PATCHES

The up-to-date automobilist may now choose between the colors of his blowout patches to go on either white or black tires. The one shown in the picture is intended for use on a black tire but its running mate is white, to harmonize with tires of white rubber, both patches being otherwise similar.

The new patch is made of high-grade fabric woven from long-staple combed cotton, saturated with pure rubber and not merely filled. The new feature of the patch is the red rubber tip designed with a feather edge to insure it remaining snugly against the casing without friction or creeping, and make the thickness less near the bead of the tire. All sizes of these patches except the three-inch have seven plies of fabric; the three-inch has six. — Firestone Tire & Rubber Co., Akron, Ohio.



Firestone Blowout Patch

RUBBER OVERSHOE FOR CHILDREN'S "NATURE"-LAST SHOE

The production of shoes of special type and shape always makes necessary the manufacture of a similar shape of rubber overshoe, especially when the shoe is intended for children. What is said to be the only rubber overshoe manufactured in Canada for wear with the "Nature"-last shoe is shown in the accompanying picture, together with one of the shoes with which it is intended to be worn. It is heelless, of excellent-quality rubber.—Ames Holden McCready Limited, Montreal, Quebec, Canada.

"Nature"-Last Overshoe and Shoe

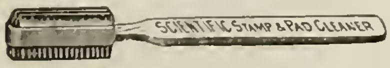
DO YOU WEAR A COLLAR WHEN YOU SWIM?

It may sound as if more clothes were to be the fashion for swimmers when a collar for them is mentioned, but it is only a device to keep the hair dry and at the same time buoy up the head and assist the timid bather. The swimming collar is shaped like a round box, with side part of celluloid and the top and bottom of rubberized fabric and elastic. The top has half a dozen small openings to admit air but does not easily admit water. The opening in the bottom just fits the neck and makes it watertight at that point. The entire weight is seven ounces, but the buoyancy power is ten pounds. A case of navy-blue fabric is provided for carrying the swimming collar to the beach, and the collar may also contain the bathing suit.—Swimming Collar Co., Inc., 2036 Ritner street, Philadelphia, Pennsylvania.

Swimming Collar in Use

CLEANER FOR RUBBER STAMPS AND PADS

Anybody who has ever used rubber stamps knows how easily the type become clogged with a combination of ink and dust and also how soon the ink-pad becomes gummy and unsatisfactory for use. To remedy this condition, the "Scientific" stamp and pad cleaner combines in one a two-sided rubber brush inserted in a wooden handle. The toothed side cleans rubber type and the ribbed side removes the gummy deposit from stamp-pads.—H. S. Folger Estate, 409 South Clinton street, Chicago, Illinois.

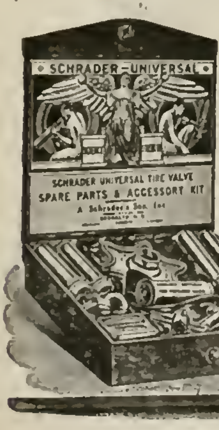


Rubber to Clean Rubber

KIT-BOX FOR MOTORISTS

For the convenience of the motorist who needs to make small repairs there has been placed on the market, with the intention of eliminating tire trouble entirely, a kit-box which contains every accessory needed in connection with a tire-valve.

In addition to a box containing tire-valve inside parts, there is a set of "Kwik-On-An-Off" dust caps, a set of rim-nut bushings, five valve-caps, a valve-repair tool, a pump connection to permit testing the tire inflation without disconnecting the pump from the tire, a wrench for tightening hexagon nuts at the base of the valve-stem, and a "Schrader Universal" tire-pressure gage.



Tire-Valve Kit-Box

The small box containing this kit is covered in imitation leather and makes a suitable gift for any motorist.—A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, New York.

A DOLL THAT WEEPS

A doll so human that it weeps at the whim of its owner will be sure to attract juvenile attention wherever this patented toy is displayed. Some moving-picture producer should also see the possibilities of this toy when used in juvenile films. If, for any reason, the weeping device no longer weeps, the outward appearance of the doll is not damaged in the least, contrary to the usual effect of tears.

The toy consists of a doll's head of celluloid, attachable to any body. The water reservoir within the head is fitted at the neck with a rubber stopper pierced by a rubber tube, as illustrated. The inner end extends slightly within the water reservoir. The outer end hangs down the doll's back and is closed with a stopper. The eyes have small holes at the inner corners, connecting with tiny water passages ending near the nose. Light pressure on the tube sends water up these passages and out of the eyes in tear-like drops.—George J. Hoefler, inventor; assigned to Mrs. K. Hoefler, 649 Van Duzer street, Stapleton, Staten Island, New York.

Popular Science Monthly

The "Weeping" Doll

SLICKER BOOT AND RUBBER CONTAINER

The good-looking slicker boot shown here, with its convenient rubber container, adds an item to the man's outfit that should be found practical for motorcyclists, automobilists, or suburbanites. It is made with flexible black leg, reaching just below the knee, and a plain-edged sole. It fits over leather shoes and there is no heel. Only the style for men, made on one last, in one width

"Excel Bullseye" Slicker Boot and Rubber Container

in the various sizes, is provided with the neat rubber container.

This boot is also made for misses, growing girls, and children, and is light in weight, fits well, and wears a long time.—Hood Rubber Products Co., Inc., Watertown, Massachusetts.

FOOTBALL SHOE WITH RUBBER SOLE AND CALKS

Now that the season for football contests is approaching, those who are interested in this game will appreciate the novel features of the football shoe illustrated here. It is not only practical but good-looking as well and should please the most fastidious player on the score of appearance.

Rubber-Soled Football Shoe

The sole of this shoe is made of a composition containing rubber, which makes it impervious to water, no matter how wet the gridiron may be, while it will not soften or lose its shape when the ground is hard. The sole and cleats are molded in one piece by a patented process, so that the soles are pliable, but the cleats are harder and firmer than leather and have the added advantage of being integrally fastened to the sole. When worn down, however, they can be easily replaced. These soles are stitched on so there are no nails to hurt the feet.—Whitchell-Sheill Co., Brooklyn avenue and La Brosse street, Detroit, Michigan.

SUGAR-SERVER WITH RUBBER FOOT

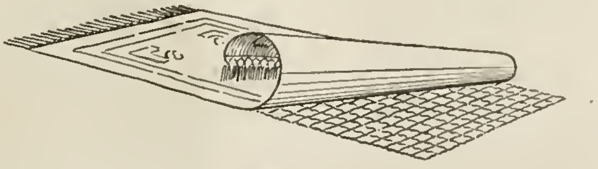
The "Spenlo" sugar-server is doubtless one of the economical devices evolved during those conservation days of war when public restaurants as well as private individuals were allowed to serve "only one teaspoonful of sugar per cup per meal," for it dispenses a teaspoonful at a tip. It is made of crystal glass with fluted sides, and has a top of heavily-nickeled copper. There is an automatic seal in the form of a ball-stopper which makes it entirely sanitary but does not in any way interfere with dispensing.

"Spenlo" Sugar-Server

Lest it break or chip when it comes in contact with "Spotless Town" stoneware tables, or lest it scratch Madame's polished mahogany, there is provided a rubber foot, not shown in the picture.—Spengler-Loomis Manufacturing Co., 58 East Washington street, Chicago, Illinois.

USE RUG-LINER AND SLIP NO MORE

The man or woman who is fond of polished floors and handsome rugs and is expertly wary of their slipperiness will be glad to know about the patented "Worcester" non-slip rug-liner illustrated here. It is made of a net-like fabric, coated with pure rubber, and is fastened to the under side of the rug where it frictionally clings to the floor under pressure of the foot, thus



"Worcester" Non-Slip Rug Liner

preventing slipping and providing a safe, unyielding surface on which to walk. It does not in any way change the appearance of the rug nor interfere with brushing or dusting.—Worcester Rubber Textile Co., 312 Park Building, Worcester, Massachusetts.

WOODEN PONY WITH RUBBER-CAPPED TAIL

Another use of rubber on the part of the toymakers is a rubber-tipped tail to a combined "teeter" and hobbyhorse. When the tail with the rubber tip is placed on the floor it is converted into a pony. As the child straddles it, and when the tail is in an upright position, the body slips forward in the seat and the toy moves along; then the tail falls into its original position again. This gives the same exciting sensation as though actually horseback riding.

The "Rockey Roller"

Firmly fastening the tail to the rear axle with a chain results in a kiddie car, coaster or a scooter. Or the tail can be used as a handle to push the toy about, thus affording an unlimited amount of fun.

This combination toy is of hard wood, with solid wheels highly varnished and decorated a brilliant red. The spring seat instantly adjusts itself to the child's height and protects the tender little body from shocks. The steering drive is of indestructible metal and the rear axle is strong enough to support the weight of two children.—Ames-VanAken Manufacturing Company, Inc., Rome, New York.

HOPE FOR FAT ANKLES IN "PILLOW-WELT" BOOT

That "fashion is so much kinder to some women than to others," as a recent copy of a humorous publication indicated by a clever picture, is to be taken under advisement when it becomes a question of boots for women with fat ankles. This woman may now appear as carefully and smartly booted as her more-favored sister, while at the same time she is perfectly comfortable and can be assured that her boots are designed with special consideration for her particular needs.

"Lady Dongola" Fat-Ankle Boot with Rubber Heel

A Canadian manufacturer has produced the "Lady Dongola Pillow-Welt" fat-ankle boot, made with good quality dongola leather uppers, soles of 8 and 10-iron oak leather, fitted with special felt pillow cushions and high-grade rubber heels made by Gutta Percha & Rubber Limited, 357 St. James street, Montreal, Quebec. This boot is made in E, double EE, or triple EEE width, in Blucher, bal or button styles, with plain toe or tip, and either six or seven inches high.—Globe Shoe Limited, Terrebonne, Quebec, Canada.

The Plantation Rubber Crisis

The world-wide industrial depression has brought about a most critical situation in the plantation rubber industry. The Rubber Growers' Association, London, and the International Association for Rubber Cultivation in the Netherlands Indies, The Hague, are endeavoring to make effective a plan to temporarily reduce production by 50 per cent. regulate the quantities, time and price of sales, and assist producers with loans.

PRODUCTION AND CONSUMPTION

Approximately 70 per cent of all rubber consumed in recent years has gone into tires. War requirements accelerated the development of motor transportation, and the post-war boom led everyone to believe that the peace requirements of the world were greater than has proved to be the case, partly because of the greater economy of peace over war uses, and also by the development of the cord tire, from which a much greater mileage is obtained than from the ordinary fabric tire. The new uses to which rubber is being put do not promise to increase materially the consumption in the immediate future. The stabilizing of the price of rubber would undoubtedly be beneficial in expediting manufacturing developments.

In 1914 the total rubber production of the world was 126,000 tons, of which 77,000 tons were plantation and 49,000 tons wild rubber. Unrestricted production in 1921 would amount to 360,000 tons of plantation and 30,000 tons of wild rubber. Existing plantations are capable of yielding at the rate of 500,000 tons per annum within a comparatively short time. Notwithstanding the voluntary restriction of output agreed to last fall, stocks of raw rubber in London and Liverpool have increased from 56,000 tons January 1, 1921, to 79,000 tons at the end of June, 1921.

The present world stocks of rubber are estimated to be about 300,000 tons, which figure includes all rubber on estates, in transit at port of shipment, afloat, in warehouses at ports of arrival in consuming countries, and in the hands of manufacturers. The stocks necessary for the normal working of the industry may be taken as seven months' consumption. At the present rate of consumption, 20,000 tons a month, such stocks would amount to about 150,000 tons. There would thus appear to be 150,000 tons of surplus rubber in existence.

PRINCIPAL FACTORS

With regard to the whole question of combination and control, the principal factors to keep in mind are: (1) the existing world stocks of 300,000 tons; (2) the potential 1922 output of over 400,000 tons; (3) the potential 1922 consumption, which is unlikely to exceed 250,000 tons; (4) the labor situation in the producing countries; (5) the vitality of the rubber tree which, after reaching maturity, remains a potential source of rubber, even though upkeep is entirely neglected.

As stated by the Dutch Commission appointed by the International Association for Rubber Cultivation, the huge supply of crude rubber hanging over the market, and the necessity, in which many producers are placed, of realizing on their product at any price, have depressed the prices of rubber to such a low level that practically every company is working at a loss. As a result producers who have not at their disposal the necessary financial resources are doomed to speedy ruin and their estates will gradually come into the hands of financially powerful groups for mere trifles. Continuation of the existing situation will entail considerable immediate money loss for shareholders and the industry will become entirely disorganized. Improvement in the price of rubber within a reasonable time is highly improbable, even with an improvement of the general economic situation. By means of drastic curtailment of production, a gradual diminishing of stocks will be effected.

SUCCESS DEPENDS ON COOPERATION

The plan outlined is believed to be a practicable method of achieving the desired rehabilitation of this great industry, but the task of securing the adhesion of 2,200,000 acres, about two-thirds of the existing planted area, the minimum deemed necessary to make the scheme effective, can be accomplished only by a spirit of cooperation. In arriving at this figure it is anticipated that no substantial acreage of native holdings can be brought into the proposed corporation. Owing to excessive tapping in the past the major portion of these holdings acre for acre is inferior in yielding power to the European owned estates, while their product is primitively prepared and not of standard quality. Only about one-half of the 2,200,000 acres is controlled in the United Kingdom, and the cooperation of the Dutch interests and of the principal local producers in the various Eastern countries is essential.

THE RUBBER PRODUCERS' CORPORATION, LIMITED

The plan proposed by the Rubber Growers' Association, London, is designed to combine the interests of all plantation rubber producers for the accomplishment of the following objects:

OBJECTS

The primary objects of the corporation are: (1) control of the rubber output of its members; (2) fix the selling price and regulate the sale of rubber produced by its members; (3) regulate the opening of further lands by its members; (4) purchase or make advances on the rubber harvested or to be harvested by its members; (5) if demand desirable, to make advances on security and on terms to be agreed upon to approved rubber estates belonging to its members.

The corporation will not exercise any functions in regard to the management or control of estates belonging to its members except in regard to the matters above mentioned.

CAPITAL

The nominal capital is placed at £2,000,000, in 2,000,000 shares of £1 each, with provision for borrowing up to £8,000,000, either by debentures or otherwise, of which a minimum of £3,000,000 is to be raised at once. The ordinary shares are to be allotted to members in the ratio of one share for each planted acre of rubber they possess.

MANAGEMENT

Control of the Corporation's affairs is to be in the hands of a court of directors, approximately one director for each 100,000 acres, a total of 21, of whom 18 represent estates and three the debenture holders. The executive board for carrying out the instructions of the court of directors will consist of four directors together with a manager and a secretary.

OUTPUT AND SALES

1. The output of rubber by members, including provision for young areas on their reaching maturity, will be regulated equitably by the court of directors and may be varied from time to time to meet market conditions.

2. The court of directors shall fix from time to time the prices at which the rubber controlled by the Corporation may be sold.

3. On all sales of rubber controlled by the Corporation there shall be paid to the Corporation a sum per pound to be fixed by the court of directors, which must be sufficient to enable the Corporation to pay the expenses of management, debenture interest and sinking fund, and accumulate funds at the credit of its several members as surety for the due fulfilment of their obligations to the Corporation. It is estimated that one penny per pound, together with interest on advances, will yield sufficient annual income for these purposes.

4. All rubber harvested by members will be consigned as at present and sold as authorized by the court of directors through the usual channels, the brokers being responsible for passing directly to the Corporation the charge referred to.

DIFFICULTIES AND OBJECTIONS

The statement is officially made that unless two-thirds of the planted area agree to come into the corporation, the latter will not be brought into existence. If the corporation does not eventuate and matters are allowed to take their course unguided, it seems clear that a large acreage of rubber will have to be abandoned or sold to the highest bidder. The object is to save the industry collectively, not to inflate the price of rubber in an unsound way.

The plan is opposed on the part of both British and Dutch interests on the ground that it will prove ineffective and temporary and that the universal law of supply and demand cannot be evaded by artificial means, one objector claiming the fatal defect of the scheme to be that the combine cannot effectually control supplies of crude rubber and its competitive substitutes (meaning rubber from estates not in the combine, wild rubber, reclaimed rubber, fillers and rubber substitutes), and, so far as it succeeds in raising prices it must stimulate all outside producers and competitors to greater production.

THE RUBBER CRISIS IN MALAYA

BANKRUPTCY IN SIGHT

The danger that threatens the rank and file of the rubber planters in the Far East is very real and of vital interest to all users of rubber the world over. Cessation of tapping on the part of at least 25 per cent of the English, and all of the native plantations, spells a very general disaster. Nor is the way out at all plain at present. This is pictured to a degree in the following letter from an American resident in the Federated Malay States:

Things are in a terrible condition here as all movements of up-country rubber have ceased, destroying all business. We had the failure of 20 organized companies last year and many more private firms and failures have continued along steadily all this year, and the future looks much worse than anything we have had as yet.

It seems that the first requests for assistance to the Home Government by the Colonial Government were refused by Lord Churchill. We think that those requests were not properly arranged or worded and that the Government was ill advised, and possibly by certain strong financial interests who are looking forward to buying up all bankrupt properties in another nine months or a year. It would be a shame to make a monopoly of the several hundred plantation properties here. I very much fear that will be the outcome unless something is done at once. It is not for the interest of our rubber mills and importing firms to have all this rubber go into a monopoly controlled in London.

Along the same lines are the words of the correspondent of the *Financial Times*, London, cabled from Kuala Lumpur.

A year ago a man who had 50 acres of rubber in bearing was a rich man; today he is a pauper discarded by his bank and harassed by his creditors. Big firms which held stocks worth millions are still holding those stocks, now worth a fraction of their original price, and are tottering on the brink of bankruptcy. The Federated Malay States, which twelve months ago boasted of a surplus of over $100,000,000, has now been obliged to seek a loan of $15,000,000 from the Straits Settlements in order to carry out urgent public works. Those are the circumstances in which we now live, and until companies can be reconstructed to fit in with the altered conditions I cannot see any hope in the situation.

There are alleged to be in this country 1,250,000 acres of rubber in bearing, yielding something near 160,000 tons a year. No one can be dogmatic about these figures, because no one knows what the figures are. Fancy a country possessing such an important industry being ignorant of the most elementary statistics pertaining to it. That is only by the way. Theoretically the market price of rubber here is between 30 and 32 cents a pound, but even at that figure very few transactions take place. Formerly the average Malay villager tapped his dozen trees in the morning, brought the produce to the bazaar and got his dollar and his provisions for the day. Today his rubber can find no market, and he has no other means of subsistence, because long ago he had forsaken his natural avocation of agriculture for the more alluring prospects of rubber.

The planters here tried to bring home to their employers at home the seriousness of the position, and put forward a scheme the success of which depended a great deal on the assistance which the Home Government was prepared to give in its hour of need. But Mr. Winston Churchill, returning fresh from his pourparlers in the Mid East, turned down the scheme of compulsory restriction on grounds which, to my mind, appear to be rather weak and unreal; but, since Mr. Churchill's decision was communicated to this country, the rubber growers have been busy putting forward other schemes. There are six of these at present, including a new scheme which, I hear confidentially, the Rubber Growers' Association in London is now considering. The local schemes may be summarized as follows:

The Physick scheme proposed compulsory restriction to the extent of 50 per cent, and the method for the raising of the money required was by the industry subscribing one-half, the Government being asked to subscribe the other. The fund so raised was to be administered by a local body having powers conferred on it by the Government.

The Carey scheme, the main feature of which was to impose a tax on all rubber produced, the money so raised to be regarded as a loan from contributors which would bear appropriate interest and be loaned out to producers at a higher rate of interest. The scheme involves a measure of compulsory restriction, but it can be worked with that measure eliminated.

The Kelly-Smith scheme, aimed at restricting output by 50 per cent by imposing a heavy export duty on all excess over 50 per cent of the normal output, the duty not to exceed 10 per cent ad valorem, or 5 cents a pound of rubber. The scheme suggested that the Government should allow the free export of a certain proportion of the restricted output and impose taxes on any excess of that amount. Taking the present output of rubber at 160,000 tons a year, the Government revenue at present is next to nothing. If under this scheme the Government were to allow the export of 100,000 tons free of any duty, the balance of 60,000, at the rate of even 5 per cent, with the price at 30 cents a pound, would secure to the Government a revenue of $2,016,000. If the maximum price suggested was $1 a pound the revenue would be $6,720,000. But $1 is too high a price to calculate on. Taking the price at 80 cents, the revenue would be $5,500,000. The scheme, therefore, is more or less of a sporting nature.

The Straits Times scheme is fundamentally not very different from the Duncan Committee's scheme for compulsory restriction, which has been turned down, and I do not think that the Government will agree to it.

The main features of the Braddon scheme are: (1) the regulation of supplies; (2) the creation of an international rubber assurance association; (3) the election of a board to control the association by the rubber-growing industry in different countries of the world; (4) the association is to be a combine, but its methods of operations shall be above board; (5) to assure the success of the association a membership of 70 per cent of the total rubber area is considered sufficient; the association being designed primarily to protect the vested interests only of existing producers, its management and control will be entirely in their hands, but the cooperation of others is to be invited, especially those dependent on the industry—namely, present licensed local dealers in rubber, buyers on commission and buyers for consumption, who should be admitted as non-proprietary members; (6) the membership to be confined in the case of producers exporting their own rubber to those whose output is 10 tons or more annually, and among dealers to those whose dealings amount to the same quantity; (7) the conditions of membership are to be (a) to restrict output wholly or partially, as may be required by the association from time to time, (b) not to sell below the minimum price fixed by the committee, (c) not to sell to (or through) parties not belonging to the association, and (d) in the case of dealers, not to deal outside the association.

At present compulsory restriction of crop is the bugbear of the planting community, because it is feared that any scheme which contains even a touch of compulsion in it will not find favor.

According to the catalog issued by The O'Neil Tire & Rubber Co., 350-354 Bowery street, Akron, Ohio, a complete line of the following products is carried by the company: vulcanizers; tire-repair equipment units; buffing stands; steam generators; air tanks and compressors; and repairmen's tools.

Chairman of the United States Rubber Co.

Colonel Samuel Pomeroy Colt, chairman of the board of directors and of the executive committee of the United States Rubber Co., New York, N. Y., died August 13 at his summer home, "Linden Place," Bristol, Rhode Island, aged 69, his death following a severe paralytic shock which he suffered eight days previously.

Lawyer, statesman, financier and manufacturer, Colonel Colt came of two of the most distinguished families of Connecticut and Rhode Island, and his own remarkable career upheld their best traditions. Not only was he socially prominent in New England, one of the captains of American industry and the outstanding figure of the rubber business, but he had been active in Rhode Island politics.

Colonel Samuel Pomeroy Colt

Born in Paterson, New Jersey, on January 10, 1852, he was the son of Christopher and Theodora De Wolf Colt, and the nephew and namesake of Samuel Colt, the inventor of Colt revolvers and founder of Colt's Patent Fire Arms Manufacturing Co., Hartford, Connecticut, the Colt family being among the early settlers of the latter city.

On the maternal side, he was the grandson of General George De Wolf and the grand-nephew of James De Wolf, who was United States Senator from Rhode Island in 1821. The De Wolfs were extensively engaged in the East and West Indies trade and in privateering during the early part of the last century and amassed a fortune. "Linden Place," a handsome old Colonial mansion on a great estate at Bristol, Rhode Island, erected in 1810 by General George De Wolf, was occupied as a summer home by Colonel Colt. There was preserved the old coach in which his great uncle, Senator James De Wolf, drove from Bristol to Washington, District of Columbia.

Another great-uncle, Henry Goodwin, of Newport, was Attorney General of Rhode Island from 1787 to 1789, while Colonel Colt's great-grandfather, William Bradford, was the sixth descendant of Governor William Bradford, second governor of the Plymouth Colony, Massachusetts, who came over in the "Mayflower."

Most of Colonel Colt's boyhood was spent in Hartford, Connecticut, where he received his early education, followed by a course in Anthon's Grammar School, New York, N. Y. Owing to his marked aptitude for business and taste for industrial pursuits he was sent to the Massachusetts Institute of Technology, Boston, Massachusetts, from which he was graduated in 1873. After a year of travel and study in Europe he entered Columbia Law School, New York, N. Y., graduating with distinction in 1876 and being admitted to the New York bar. The following year he began the practice of law in Providence, Rhode Island, where he soon had a lucrative clientele, including several large rubber companies.

Even before he became a lawyer Colonel Colt was interested in politics. In 1875 he was appointed aide-de-camp with the rank of colonel on the staff of Governor Henry Lippitt, of Rhode Island. In 1876 he was elected to a seat in the General Assembly, which he occupied for three years. From 1879 to 1881 he served as assistant attorney general and ably filled the office of attorney general from 1882 to 1885. He was also a member of the committee of fifteen appointed to revise the Rhode Island Constitution.

In 1887 he founded and was elected president of the Industrial Trust Co., of Providence, Rhode Island, now the second largest trust company in New England. Owing to serious illness in 1908 he resigned the presidency but continued with the institution as chairman of its board of directors.

It was also in 1887 that Colonel Colt entered, as a legal adviser and reorganizer, the field of rubber goods manufacture, of which he was to become the leading executive. The National India Rubber Co., Bristol, Rhode Island, was in bankruptcy, the factory had been closed and Colonel Colt was made president and treasurer. With a large plant, a past record of unfortunate business methods and owing its operatives ten month's wages, the company's future was not bright, and it was fully prophesied that the new president would gain experience but lose money in the venture. He took hold, however, with characteristic vigor and resource. While claiming no technical knowledge of rubber goods manufacture, he was in a financial sense fully at home in the management. Plant operations were begun again in April, 1888, and under his direction the business was soon put on a paying basis, regular dividends were declared, the stock was largely increased and a goodly surplus was accumulated.

Appreciating fully the opportunity presented when the formation of the United States Rubber Co. was projected, Colonel Colt was one of the first to throw his influence in favor of the plan of consolidation. Since the organization of that company in 1892 he has constantly been a member of the board of directors and executive committee, and he was its first legal adviser. Retaining the presidency of the National India Rubber Co., he later became head of various other constituent concerns, notably the Woonsocket Rubber Co., Goodyear's Metallic Rubber Shoe Co., and was later chairman of the board of directors of the Rubber Goods Manufacturing Co. and the United States Tire Co. He was also a director in numerous subsidiaries and important rubber companies affiliated with the United States Rubber Co., including the General Rubber Co., New York, N. Y.; Canadian Consolidated Rubber Co., Limited, Montreal, Canada; Holland-American Plantations Co., Netherlands-Langkat Rubber Co., and United States Rubber Plantations, Inc. In all, he was a director in some forty corporations, including banks, railroads, steamship and manufacturing companies, most of them, however, directly or indirectly connected with the rubber industry.

In 1896 he was elected secretary of the United States Rubber Co., which position he held until 1901, when he was elected president, succeeding Frederick M. Shepard of East Orange, New Jersey. From then until his death he was the guiding genius of the world's greatest rubber company. He built up a strong organization over which he exercised remarkable harmonizing influence, but which he did not dominate to the extent of abrogating to himself powers and prerogatives belonging to his officers. He gave them wide scope in the management of their departments.

Under his able leadership the combine grew and prospered. From a $50,000,000 company doing an annual business of only $25,000,000 the business was so expanded that the last annual report showed a total capital stock of $146,277,200; assets and liabilities, $389,252,696; business for the year 1920, $256,150,130. Meanwhile the operations of the company had embraced, in addition to the manufacture of rubber goods, the growing of crude rubber, reclaiming of scrap rubber, weaving of cotton fabrics and the supply of other allied materials, while the product of its forty-seven factories and numerous subsidiaries in many states and employing more than 20,000 persons, had been extended to include nearly everything made of rubber, and was marketed by branches throughout the world.

For nearly eighteen years Colonel Colt continued in the presidency, until in 1918, in order to relieve him somewhat from many onerous duties, and that he might devote himself exclusively to direction of the firm's financial policy and to special work for the benefit of the company, he was elected chairman of the board of directors, Charles B. Seger succeeding him as president.

Throughout this period his duties as active head of the greatest rubber concern in the world left him little time for outside interests, although in 1903, against his wish, he was persuaded to accept the Republican nomination for governor of Rhode Island, but was defeated, Governor Garvin being reelected by a majority of only 1587 votes. Again in 1908 his name was placed in nomination before the Rhode Island Legislature for United States senator, but he withdrew his candidacy.

Colonel Colt's ample personal fortune permitted him to indulge in many generous acts. Bristol, Rhode Island, wanted a high school and he presented to the town the Colt Memorial, a handsome white marble structure, as a free gift, a memorial to his mother, which, with the site, entailed a cost of about $150,000. He acquired the 300-acre farm on Popasquash Neck, a peninsula jutting out into Narragansett Bay, which he converted into a beautiful park, placed in it valuable works of art in marble and bronze, erected a big tower as a free observatory, and threw it open to the public.

When President Faunce of Brown University, Providence, Rhode Island, announced his desire for a memorial library to John Hay, the distinguished alumnus of that college, Colonel Colt immediately sent a contribution of $10,000 to start the fund. He also purchased a large part of Mt. Hope, overlooking Mt. Hope Bay and Fall River, one of the historic spots of Rhode Island in connection with the Indian War, with the intention of making it a public park. His donations to the Actors' Fund of America and numerous other charities were generous and unheralded.

Colonel Colt was married in 1881 to Elizabeth M. Bullock, of Bristol, Rhode Island, daughter of J. Russell Bullock, former judge of the Supreme and the United States District courts of Rhode Island. She survives him, as do his two sons, Russell Griswold Colt, of H. L. Horton & Co., stock brokers, New York, N. Y., who married Ethel Barrymore, the actress, in 1909, and Roswell Christopher Colt, assistant secretary and director of the Canadian Consolidated Rubber Co., Limited, Montreal, Canada; also his brother, United States Senator Le Baron Bradford Colt, formerly judge of the United States Circuit Court.

He was a member of the Metropolitan, Athletic, Republican, Lawyer's and East Indian clubs of New York, N. Y., and of the Squantum, Hope, University and Country clubs of Providence, Rhode Island; also of the Rubber Association of America and the National Foreign Council.

The funeral was held from "Linden Place," Bristol, Rhode Island, August 16. In attendance were executive officials of the United States Rubber Co. in a body, representatives of the rubber industry and trade organizations, and many friends prominent in public life. Out of respect to his memory the general offices of the United States Rubber Co. were closed all day, and all branches at 3 o'clock.

In the passing of Colonel Colt his associates have individually lost a good friend, his company an able and conscientious executive, and the rubber industry its most distinguished leader. Personally an exceedingly pleasant man to meet, very popular socially, carrying his honors easily, having the rare faculty of combining unvarying courtesy with commercial dispatch, and manifesting unfailing kindness toward those around him, he held the respect, trust and esteem of his business associates and the warm friendship of many men in all walks of life here and abroad.

THE EDITOR'S BOOK TABLE

"The Diseases and Pests of the Rubber Tree." By T. Petch, botanist and mycologist to the Government of Ceylon. Macmillan & Co., Limited, St. Martin's street, London, England. Cloth, 278 pages, 6 by 9 inches.

Since the publication, in 1911, of the author's former volume, "The Physiology and Diseases of Hevea Brasiliensis," the investigations since made, warrant the publication of certain data. Tree surgery, for instance, has received much attention in very recent years, and has made wonderful advances in its particular province. Recent developments in this science have been studied by the rubber planter with encouraging results. Preventive measures generally instead of remedial, and various new ideas in regard to sanitation, have not been neglected. Some of the results of such studies have been embodied in the present volume.

Its value has been also enhanced by many excellent illustrations, while a brief summary of the diseases described, with references to these illustrations, has been added to each of the principal chapters. An extended bibliography, which includes the more important papers which have been published on the subject since the beginning of the plantation rubber industry, concludes the volume.

"Brown Bast—An Investigation into its Causes and Methods of Treatment." By A. R. Sanderson, F. L. S., and H. Sutcliffe, A.R.C.Sc., F.R.M.S., mycologists to the Rubber Growers' Association (Malaya Research Branch). Rubber Growers' Association, Inc., 38 Eastcheap, London, E. C. 3,, England. 1921. Cloth, 71 pages, 6 by 10 inches.

In the volume under consideration the authors hold, as do other investigators, that the disease of brown bast is physiological, and is due to the operation of tapping. The frequency of tapping, the age of the tree, and its susceptibility to disease, must all be considered in outlining any course of treatment. The authors describe a number of cases where brown bast has occurred, and illustrate their subject with many photographs. Their field observations have covered many parts of the Malay Peninsula, Ceylon, and India

The conclusion reached is that stripping, properly carried out, is both the easiest, most effective, and least expensive of remedies. There is need of good judgment, however, in entering upon this procedure, which, although drastic, is the only form of treatment that is likely to be generally effective.

The book contains an appendix dealing with the subject of "dry" trees, in which the details and significance of the incidence of this symptom are considered.

"Chemical Technology and Analysis of Oils, Fats, and Waxes." By Dr. J. Lewkowitsch, late consulting and analytical chemist. Macmillan & Co., Limited, St. Martin's street, London, England. 1921. Three volumes. Sixth edition, Volume 1, cloth, 682 pages, 6 by 9 inches.

The first volume of the sixth edition of a work, originally published, in 1895, in three volumes, has recently appeared. "Chemical Technology and Analysis of Oils, Fats, and Waxes" by Dr. Lewkowitsch, is a standard publication, exhaustive in treatment, and broad in its scope. This sixth edition, published since the death of the author, has been carefully edited, rewritten and enlarged by George H. Warburton, who was long associated with Dr. Lewkowitsch in his analytical practice. Mr. Warburton notes the progress made by scientific investigators in their studies of

oils and fats since the publications of former editions of this well-known work. He calls attention to the world's shortage of animal fats, and writes in his preface that the discoveries made along these lines are naturally regarded as valuable secrets, and are, therefore, unfortunately not published. "Statistics of production, imports, and exports under the heading of individual oils and fats are presented in as complete a fashion as possible, but it should be borne in mind that since 1914 the position has been abnormal and the figures given cannot, therefore, be accepted as indicative of what the outlook will be in the near future."

The two remaining volumes of "Chemical Technology and Analysis of Oils, Fats and Waxes" will be published during the year

"DEVELOPMENTS IN INDUSTRIAL TECHNOLOGY." McGraw-Hill Co., Inc., New York, N. Y., 1921. Paper covers, 124 pages.

This is a reprint of 29 papers selected from *Chemical & Metallurgical Engineering*, in which the authors ably discuss many interesting phases of industrial technology. The only paper on a rubber topic is that by G. D. Kratz and A. H. Flower, entitled, "Effect of Certain Accelerators Upon the Properties of Vulcanized Rubber," and was read before the New Jersey Chemical Society, January 13, 1919.

"STANDARD COTTON MILL PRACTICE AND EQUIPMENT." Compiled and edited by Alston Hill Garside, Statistician of the National Association of Cotton Manufacturers. Boston, Massachusetts. Cloth, 177 pages, 6 by 9 inches.

Through the publication of this volume, the 1921 year-book of the National Association of Cotton Manufacturers, certain statistics are collected which are of value to the cotton industry. By means of tables, charts, and diagrams, conditions prevailing in the cotton trade generally during recent years, not only in the United States, but also in England, India, China, and Japan, are clearly indicated. An attached leaflet states that on account of the broadened scope of the publication, the name will be changed, beginning next year, to "Cotton Manufacturers' Manual."

INTERESTING LETTERS FROM OUR READERS

FROM A EUROPEAN BUSINESS MAN

To the Editor:

Dear Sir: You will perhaps remember that I had the pleasure of calling on you several months ago when you were good enough to be of considerable assistance to me.

What I want to point out at this time is, that although American rubber manufacturers are understood to be anxious to develop foreign markets, we still find ourselves in a position of inquiry, and they seem to have little interest in offering their goods to ready buyers.

Although the writer makes a yearly trip to America, and is contemplating further trips in the near future, he is amazed at the difficulty of finding the most suitable makers for any given line, and it always seems that in spite of considerable activity on your side, more remains to be done on return than during a buying visit.

London, England. English Buyer.

TIRE DEALERS ASSOCIATION OF PHILADELPHIA

In an endeavor to advance the interests of the rubber tire industry several Pennsylvania firms united last May in the formation of the Tire Dealers Association of Philadelphia. At the present time the association numbers sixteen well-known Philadelphia dealers, but it is hoped that the membership will be greatly increased in the near future. The officers are: president, J. J. Bradburn, Atlantic Tire & Rubber Co.; vice-president, Herbert Buxbaum, Paramount Double Tire Co.; treasurer, S. Levy, Philadelphia Rubber Tire Co.; secretary, Albert W. Stellwag, 716 North Broad street, Philadelphia, Pennsylvania.

RUBBER TRADE INQUIRIES

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

(902) A correspondent desires the addresses of foreign rubber-bulb manufacturers.

(903) An English correspondent desires to purchase glazed hollands.

(904) A manufacturer desires to purchase printing ink and coloring for stamping toy balloons.

(905) We are asked where to obtain "Arestic," a very bright red coloring material.

(906) Inquiry is made for information concerning caoutchouc oil.

(907) A correspondent desires to secure the agency for the best cellular or sponge rubber substitute for inner tubes.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS

Addresses may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or from the following district or cooperative offices. Requests for each address should be on a separate sheet and state number.

District Offices.	Cooperative Offices.
New York: 734 Customhouse.	Cleveland: Chamber of Commerce.
Boston: 1801 Customhouse.	Cincinnati: Chamber of Commerce; General Freight Agent, Southern Railway, 96 Ingalls Building.
Chicago: 504 Federal Building	Dayton, Ohio: Dayton Chamber of Commerce.
St. Louis: 402 Third National Bank Building.	Los Angeles: Chamber of Commerce.
New Orleans: 1020 Hibernia Bank Building.	Philadelphia: Chamber of Commerce.
San Francisco: 307 Customhouse.	Portland, Oregon: Chamber of Commerce.
Seattle: 848 Henry Building.	

(35,159) A merchant in Germany desires to represent American manufacturers for the sale of colors, asbestos, bicycle and automobile accessories, etc.

(35,163) An engineering company in Palestine desires to purchase and secure an agency for the sale of automobile, motorcycle, and bicycle tires, tubes and accessories. Quote c. i. f. Palestine port. Payment against documents.

(35,236) A mercantile firm in South Africa desires to purchase retread bands, cushion gum, tread gum, building fabric, bead fabric, and breaker canvas, for monthly shipment. Catalogs, export prices, and samples requested.

(35,247) A county engineer of a municipality in Norway desires to purchase a complete equipment for sand and gravel pits, especially conveyors and conveyor belting. Quote c. i. f. Norwegian port, or f. o. b. Atlantic port.

(35,261) A manufacturer's agent in Ireland desires the agency for the sale of rubber surgical goods and druggists' sundries. Quote c. i. f. Irish port.

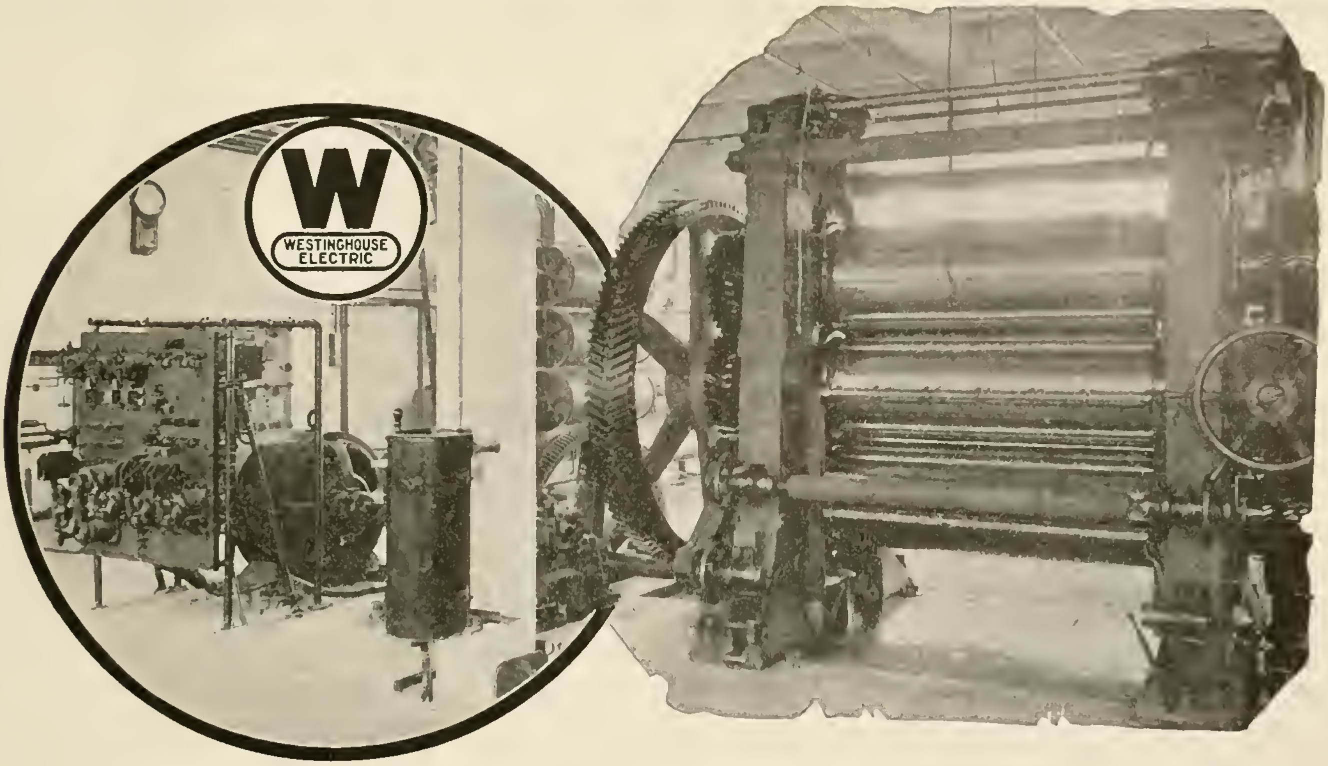
(35,279) A firm in Ceylon desires to have manufactured in the United States rubber-tapping knives like samples to be furnished. Quote c. i. f. Ceylon port. Payment against documents, through bank.

(35,289) A mercantile firm in Denmark desires the agency, on commission basis, for the sale of medical rubber goods and American novelties of all kinds. Quote c. i. f. Danish port or f. o. b. New York. Payment on arrival of goods in Denmark.

(35,323) A manufacturing company in Ireland desires to purchase, in wholesale quantities, first-class rubber matting and tires for coaches. Quote c. i. f. Waterford.

(35,316) A firm in England desires to communicate with manufacturers of chemicals and machinery used by rubber manufacturers.

(35,324) An importing firm in Sweden desires to secure representation of a manufacturer of automobile tires.



75 hp. Westinghouse calender equipment driving 66-inch Birmingham calendar.

Reliable Calender Drives

A wide range of speed is necessary to obtain successful operation from rubber calenders. Also, the regulation of all speeds must be close to get a perfect product.

The Westinghouse type SK calender motor is designed to fulfill these requirements. This type of motor can be furnished either in single voltage (230 volts) circuits or in two voltage (115/230 volts) circuits. It is substantial in construction and reliable and efficient in operation.

Westinghouse Control

Westinghouse control for calender drives assures maximum production, because all its operations are simply and conveniently obtained, permitting the operator to devote his entire attention to the product. Westinghouse control includes all the desirable safety features that minimize the liability of danger.

Write for Leaflet 1907

Westinghouse Electric & Manufacturing Co.

East Pittsburgh, Pa.

Offices in all Principal American Cities

Westinghouse

News of the American Rubber Industry

FINANCIAL NOTES

THE FISK, FEDERAL AND NINIGRET MERGER PROPOSES IMPORTANT CHANGES

A proposed readjustment in its capital stock, and the acquisition of the properties of the Federal Rubber Co., and the Ninigret Co., are being considered by The Fisk Rubber Co. Because of the decline in the market values of rubber and cotton fabric which meant that finished stock was written down to a new basis of twenty cents a pound for rubber and a corresponding basis for fabric, the balance sheets of Fisk and Federal show a deficit instead of a surplus. Costs, however, are now being figured on the new basis whereby the companies can readily meet competition based on present market values. In fact, on this basis the business is showing normal profits during the current quarter. Orders and sales of Fisk tires are close to the maximum level, while production is nearing capacity. The Federal is also showing greater activity, while the prospects of a continuance of business are most encouraging. It has been considered desirable for the Fisk company to acquire the assets of both the Federal and Ninigret companies, thus enabling a direct mortgage to be given on all properties.

The Fisk company proposes to issue $10,000,000 20-year mortgage bonds and to increase the authorized amount of the first and second preferred stocks and the common stock as decided by the proxy committees. An option may be given for 10 years on 50,000 shares of common stock at $5 a share to facilitate the sale of the bonds or second preferred stock or common stock, or both may be otherwise sold or disposed of on option given at such prices and on such terms as the proxy committees shall approve.

First preferred Federal shareholders will receive Fisk first preferred share for share and 58⅓ cents a share as a dividend adjustment, dividends on the Fisk stock to cumulate from May 1, 1921. A similar exchange is offered for the Fisk second preferred, with the Fisk dividend to cumulate from June 1. Federal common stockholders are to receive share for share of Fisk common. Ninigret common shareholders are to receive Fisk common stock as Fisk directors decide.

REPUBLIC PROTECTIVE COMMITTEES

The protective committee for the first preferred stock of the Republic Rubber Corporation, Youngstown, Ohio, consists of H. M. Geiger, The Geiger-Jones Co., Canton, Ohio; Fred S. Borton, Borton & Borton, Cleveland, Ohio; Wilford P. Arms, The Realty Guarantee & Trust Co., Youngstown, Ohio; and Richard Brown, secretary, The Realty Guarantee & Trust Co. The protective committee for the second preferred and common stock consists of W. S. Banks, D. W. Myers and Phillip H. Schaff. C. W. Ullman, Dollar Savings & Trust Co., Youngstown, Ohio, is secretary.

GOODYEAR TIRE & RUBBER CO. OF CANADA, LIMITED

Encouraging indications of present and continued prosperity are evidenced by the recent report of the Goodyear Tire & Rubber Co. of Canada, Limited. The debt of $2,826,000 to the parent company, The Goodyear Tire & Rubber Co., Akron, Ohio, has been liquidated by allotting it at par 28,260 shares of 6 per cent prior preference stock, while satisfactory arrangements have also been made with fabric and rubber commitment creditors.

The Canadian company's surplus now amounts to $2,833,458.28, which will be held available, and is more than ample to meet the excess cost of all materials contracted for but undelivered. June operations showed a net profit of $92,253.39.

At the special general meeting of the shareholders of the company, held July 18, 1921, the following officers were elected: E. G. Wilmer, president; C. H. Carlisle, vice-president and general manager; J. G. Lane, treasurer; H. N. Barry, secretary; R. P. D. Graham, assistant treasurer; R. C. Berkinshaw, assistant secretary; H. C. Lower, general sales manager; E. H. Koken, factory superintendent.

The newly-elected board of directors includes the following: E. G. Wilmer, C. H. Carlisle, G. M. Stadelman, P. W. Litchfield, J. E. McAllister, P. A. Thomson, J. G. Lane.

DIVIDENDS DECLARED

The Firestone Tire & Rubber Co., Akron, Ohio, declared its regular quarterly dividend of one and three-quarters per cent on preferred stock of record August 1, payable August 15, 1921.

The B. F. Goodrich Co., Akron, Ohio, has declared the regular quarterly dividend of one and three-quarters per cent on preferred stock of record September 21, payable October 1, 1921.

The Hood Rubber Co., Watertown, Massachusetts, has declared its regular quarterly dividend of one and three-quarters per cent on preferred stock of record August 2, payable September 1, 1921.

The Lee Rubber & Tire Corporation, Conshohocken, Pennsylvania, has declared its quarterly dividend of fifty cents a share on common stock of record August 15, payable September 1, 1921.

NEW YORK STOCK EXCHANGE QUOTATIONS

August 22, 1921

	High	Low	Last
Fisk Rubber Co., The	9	9	9
B. F. Goodrich Co., The	30½	29¾	29¾
Kelly-Springfield Tire Co.	36½	35¼	35½
Keystone T. & R. Co., Inc., The	12¾	12	12
Lee R. & T. Corporation	24⅝	24¼	24¼
United States Rubber Co.	46⅛	45⅛	45⅛
United States Rubber Co., 1st pfd.	86	85¾	85¾

AKRON RUBBER STOCK QUOTATIONS

The following are closing quotations of August 17, supplied by The App-Hillman Co., Second National Building, Akron, Ohio:

	Bid	Asked
American R. & T. Co., com	30	40
Amazon Rubber Co., The	..	15
Firestone T. & R. Co., com	60	62
Firestone T. & R. Co., 6% pfd	80	85
Firestone T. & R. Co., 7% pfd	70	71
General T. & R. Co., The, com	..	200
General T. & R. Co., The, 7% pfd	75	78
Goodrich, B. F., Co., The, com	30	31
Goodrich, B. F., Co., The, pfd	70	75
Goodrich, B. F., Co., The 5-yr. 7% notes	90	91
Goodyear T. & R. Co., The, com	11	11¼
Goodyear T. & R. Co., The, 7% pfd	27½	28
India T. & R. Co., com	..	70
India T. & R. Co., 7% pfd	60	70
Mason T. & R. Co., The, com	9¼	11
Mason T. & R. Co., The, 7% pfd	50	56
Marathon T. & R. Co., com	2½	3½
Miller Rubber Co., The, com	55	60
Miller Rubber Co., The, 8% pfd	62	65
Mohawk Rubber Co., The	..	80
Phoenix Rubber Co., com	..	15
Phoenix Rubber Co., pfd	..	80
Portage Rubber Co., The, com	2	4
Portage Rubber Co., The, 7% pfd	4	5
Republic Rubber Corporation, com	¼	½
Republic Rubber Corporation, 7% pfd	7	9
Republic Rubber Corporation, 8% pfd	2	4
Rubber Products Co., The	..	50
Standard Tire Co., com	..	80
Standard Tire Co., pfd	..	80
Star Rubber Co., com	..	90
Star Rubber Co., 8% pfd	..	100
Swinehart T. & R. Co., com	..	40
Swinehart T. & R. Co., 7% pfd	..	70

NEW INCORPORATIONS

Armorclad Manufacturing Co., Inc., August 2 (New Jersey), $100,000. F. Bender, Paterson; A. Finkensieper, Clifton; L. Auerbach, Passaic—all in New Jersey. Principal office, 37 South Fourth street, Clifton, New Jersey. Agent in charge, A. Finkensieper. To buy, sell, and deal in automobile accessories, tires, tubes, etc.

B. & B. Tire Co., August 11 (Delaware), $50,000. J. Williams; R. O. Blakely; F. Bradour. Delaware Agent, Capital Trust Co. of Delaware, Wilmington, Delaware. To deal in automobile tires

Bates & Co., Inc., J. E., August 12 (New York), $600. J. E. Bates, 374 Washington avenue; L. W. Bates, 85 Lefferts Place, both of Brooklyn; H. Clarke, 17 Ridgeview avenue, White Plains—both in New York. To manufacture leather and rubber boots and shoes.

Bogdan Cushion Wheel Hub Co., August 4 (Delaware), $1,200,000. A. B. Magee, Dover, Delaware. To manufacture cushion wheels for motors.

Boston Auto Tire Exchange, Inc., July 13 (Massachusetts), $25,000. J. Rosenfield, 89 Harrishof street, Roxbury; I. L. Rosenfield, 49 Clarkwood street, Dorchester; T. Rosenfield, 86 Elm street, Chelsea—all in Massachusetts. Principal office, Boston, Massachusetts. To manufacture rubber tires, inner tubes, etc.

Brighton Tire & Rubber Co., Inc., August 5 (New York), $10,000. R. Vagt; H. J. Hurn, both of Amityville; A. C. Rollin, 1090 Bedford avenue, Brooklyn—both in New York. Principal office, Brooklyn, New York. To manufacture tires, etc.

Broadfield Toy Co., Inc., July 18 (New York), $20,000. J. B. Billings, president and treasurer; T. B. Lavelle, vice-president and secretary. Principal office, 112 Greve street, Hempstead, New York. To manufacture toy airplanes.

Brooklyn Record Syringe Manufacturing Co., Inc., July 23 (New York), $10,000 E. Golka, president, 319 20th street; M. Golka, vice-president, 274 21st street; A. Golka, secretary and treasurer, 5807 Fifth avenue—all in Brooklyn, New York. Principal office, 310 Sixtieth street, Brooklyn, New York. To manufacture and deal in surgical instruments, etc.

Brown Puncture-Proof Tube Co., The, July 12 (Pennsylvania), $25,000. F. R. Carruth, president; R. D. Moore, vice-president; C. E. Johnson, secretary and treasurer. Principal office, 4006 Jenkins Arcade Building, Pittsburgh, Pennsylvania. To manufacture a patented puncture-proof inner tube for automobile tires.

Campbell, Inc., Charles E., July 22 (New York), $50,000. C. E. Campbell; K. K. Hillabrant, both of 44 North Drive, Great Neck; I. G. Wolf, 1270 Broadway, New York—both in New York. Principal office, Elmhurst, Long Island, New York. To manufacture rubber goods.

Carmen Tire & Rubber Co., Inc., July 28 (New York), $50,000. W. A. Marsh, 511 West 130th street; W. N. Callahan, 106 Central Park West, both in New York; F. G. Marsh, 229 Franklin avenue, Garden City—both in New York. To manufacture tires, etc.

Colombi Tire Corporation, July 13 (Massachusetts), $100,000. U. Colombi, 2 Lathrop Place, Boston; F. Pettine, 218 East Eagle street, East Boston; R. Zenoni, 2 Spruce street, Fitchburg—all in Massachusetts. Principal office, Boston, Massachusetts. To deal in and manufacture automobile tires, etc.

Corrugated Rubber Corporation, August 15 (Delaware), $1,500,000. Delaware agent, Corporation Trust Co. of America, Wilmington, Delaware. To deal in rubber.

Fibre Tire & Rubber Co., Inc., August 18 (New York), $100,000. E. E. Stoeckle, Wilson avenue; E. F. File, Bellmore avenue—both of Bellmore, Long Island, New York. M. N. Salamon, 70 Quincy street, Passaic, New Jersey. To manufacture tires, etc.

Found Tire Service, Inc., July 25 (New York), $10,000. W. H. Katz, 45 Tiemann Place, New York; C. J. Cochran, 1137 Dean street, Brooklyn; B. Zwilling, 925 Jackson avenue, Bronx—all in New York. Principal office, Brooklyn, New York. To manufacture tires.

Fur-Ever Footwear Corporation, July 29 (New York), $10,000. A. J. Geist, president; S. Alexandre, vice-president; C. J. Gordon, treasurer; J. H. Herbst, secretary. Principal office, Garden City, Long Island, New York. To manufacture rubber-lined shoes.

Genuine Rubber Co., July 18 (Massachusetts), $50,000. G. E. Dahlen, president; E. L. Castle, vice-president; P. V. Lindstrom, treasurer. Principal office, Saugus, Massachusetts. To manufacture rubber specialties.

Hudson Garter Co., July 15 (New Jersey), $100,000. Jacob Shulman, 226 Cleveland avenue; I. Hantman, 756 Harrison avenue, both of Harrison; Joseph Shulman, 17-19 Little street, Newark—both in New Jersey; M. H. Cooper, 322 East 92nd street, New York City. Principal office, 790 Broad street, Newark, New Jersey. Agent in charge, B. Newman. To manufacture garters, elastic, and rubber goods.

Lee Tire & Service Co., July 5 (Texas), $9,000. N. B., G. C., and R. J. Beard—all of Fort Worth, Texas. Principal office, Fort Worth, Texas. To buy and sell tires and accessories.

Lehr Auto Supply Co., Inc., August 18 (New York), $50,000. B. and H. Lehr, both of 9 East 109th street, New York City; J. Lehr, 652 Willoughby avenue, Brooklyn—both in New York. To deal in tires, etc.

Lightning Change Auto Wheel Corporation, August 16 (New York), $250,000. J. M. Sebring, Eggleston Hotel; F. Hess, 41 Clifford avenue, both of Rochester; B. R. Roblin, Holly—both in New York. Principal office, Rochester, New York. To deal in automobile tires, etc.

Lind-Hendrickson Co., Inc., July 29 (New York), $10,000. A. A. and B. Hendrickson, both of 14 Maple avenue, Hackensack, New Jersey; V. J. Lind, 228 Flatbush avenue, Brooklyn, New York. Principal office, 63 Dey street, New York. To manufacture and sell elastic and spring exercisers, etc.

M. F. & R. Tire Co., Inc., August 1 (New York), $500. L. Bleich; F. C. McGeechan; W. P. Riley—all of 2 Rector street, New York. To deal in tires.

Memorial Highway Tire Corporation, August 3 (New York), $25,000. W. C. Dargen, G. C. Riley, A. R. Hanson—all of 14 Ellicott square, Buffalo, New York. Principal office, Buffalo, New York.

O'Connor Rubber Co., Inc., August 1 (New York), $2,000. J. D. Fitzgerald president; R. W. Fitzgerald, secretary and treasurer, both of 348 East 78th street; H. J. O'Connor, vice-president, 1517 avenue A—both in New York. Principal office, 38 Bond street, New York. To buy and sell rubber.

Paragon Tire Co., Inc., August 16 (New York), $10,000. E. S. Wolbarst; J. P. Rieper, both of 66 Pine street; I. Skutch, 317 West 99th street—both in New York City. To manufacture tires, etc.

Paramount Hospital Supplies, Inc., June 15 (New York), $20,000. D. M. Crabb, president, 295 Mount Prospect avenue, Newark, New Jersey; J. Rosenberg, vice-president, 94 North Broadway, Yonkers; E. Spector, secretary, 51 Chambers street, New York—both in New York. Principal office, 1231 Third avenue, New York. To manufacture and sell surgical instruments, rubber goods, etc.

Peerless Safety Can & Device Manufacturing Co., Inc., June 2 (Illinois), $150,000. B. F. Allnutt; R. White, both of 2930 Giddings street, Chicago; R. Abram, Riverside—both in Illinois. Principal office, 129 South Green street, Chicago, Illinois. To manufacture, buy and sell automobile accessories, etc.

Peninsular Tire & Rubber Co., June 7 (Florida), $1,500,000. A. B. McMullen; J. D. Wood; S. H. Rogers, Jr.; W. B. Griffin; W. B. Coarsey; J. H. Stafford; T. E. Bryan; M. K. Thomas. Principal office, Tampa, Florida. To manufacture tires and tubes.

Sound Tire Service, Inc., August 3 (New York), $10,000. W. H. Katz, 45 Tiemann Place; S. Streit, 141 Attorney street, both of New York City; C. J. Cochran, 1137 Dean street, Brooklyn—both in New York. Principal office, Brooklyn, New York. To manufacture tires.

Stanard-Snyder Co., Inc., July 28 (New York), $10,000. C. H. Stanard, president and treasurer; E. Snyder, vice-president; T. Dohm, secretary—all of Syracuse, New York. Principal office, 603 North Lowell avenue, Syracuse, New York. To buy, sell, manufacture and repair all kinds of tires, etc.

Tire Service Co., July 15 (New Jersey), $50,000. J. A. Smith, 249 Delevan street; J. A. Hennessey, 83 Burnet street; W. F. Drury, 102 Suydam street—all of New Brunswick, New Jersey. Principal office, 412 George street, New Brunswick, New Jersey. To sell automobile tires, tubes, etc.

Trynoski-Peterson Tire & Accessory Co., Inc., August 13 (New York), $50,000. K. J. Trynoski; E. C. Peterson; E. C. Hanna—all of Rochester, New York. Principal office, Rochester, New York. To deal in automobile accessories.

Tyler Airless Tube Co., July 6 (Maryland), $100,000. E. L. Wade; W. J. Murphy; E. C. Rossel. Principal office, 757 Calvert Building, Baltimore, Maryland. To buy, sell and manufacture automobile tires, tubes, etc.

United Tire Co., July 7 (New Jersey), $10,000. A. Black, 1305 Princeton avenue; P. M. Dorsey, 224 Walnut avenue; H. Davidson, 1 Sanhican Drive—all of Trenton, New Jersey. Principal office, 137 East State street, Trenton, New Jersey. Agent in charge, J. J. Davidson. To buy and sell tires, etc.

Winthrop Tire & Supply Co., Inc., August 12 (New York), $5,000. E. J. Deffaa, 60 Stockholm street; J. J. Burke, 164 Highland Boulevard, both of Brooklyn; J. S. Seiler, Forest Parkway, Woodhaven, Post Office Queens Borough—both in New York. Principal office, Brooklyn, New York. To deal in tires and automobile accessories.

Yale Tire Co., July 25 (Delaware), $100,000. Delaware agent, Corporation Service Co., Wilmington, Delaware. To manufacture and sell tires.

CULP EVOLVES NOVEL PLAN

George K. Culp, who has been active in the tire industry for the past ten years, and has served in executive positions with several of the prominent companies, has organized under the name of George K. Culp, Inc., a corporation which has established offices at 56 West 45th street, New York, for the purpose of putting into effect the "Culp Plan" of cooperation in the manufacturing and merchandising of tires, tubes and other automotive accessories.

George K. Culp

According to statements by Mr. Culp, the plan is to take the surplus production of tires in this country and market it without waste, at minimum overhead costs. A number of tire manufacturers are engaged by George K. Culp, Inc., to confine their entire or surplus manufacturing capacity to the exclusive production of "Culp" and "Culp-Plan" tires. A large number of going tire stores enter into a chain store agreement that eliminates the usual factory and sales expense, by means of the delivery of Culp specification tires on a cost-plus basis. Overflow production is sold to outside accounts at store cost plus a service charge. The tire manufacturer, just like the "Culp Plan" distributer, retains control of his own business.

The tire manufacturers, it is claimed, can produce high-quality goods at low cost, having been supplied with a really and constant retail outlet, without any high selling, administrative, advertising and other expenses, while also having the opportunity of buying raw materials as a large group.

The distributer is put into virtually the position of the manufacturer, so far as the cost of tires is concerned, as the plan permits him to sell a quality tire at a low cost to the consumer, and yet, it is pointed out, with more profit to himself than other merchandising methods permit, since he takes his goods directly from the factory. As part of the Culp organization he is also assured at all times of sufficient quantities of tire merchandise of established and unvarying quality. In short, George K. Culp, Inc., is designed to give to individual distributers the advantage

of large buying power, and to manufacturers the advantage of an established market for tires.

The Culp company will maintain a staff of experts who will take care of the financial, market, technical and commercial problems for the "Culp Plan" distributers. The distributer is also allowed to make his own tire adjustments.

THE RUBBER TRADE IN THE EAST AND SOUTH

By Our Regular Correspondent

EASTERN NOTES

The business of Poel & Kelly, crude rubber importers, 347 Madison avenue, New York, N. Y., will be carried on in the future under the name of Poel & Kelly, Inc. The directors and officers of this company are: Frank Poel, president; William J. Kelly, vice-president; and Fred Pusinelli, treasurer.

French & Handy, Inc., crude rubber dealer, 347 Madison avenue, announces that William T. Easley has been placed in charge of the company's foreign department.

The Howe Rubber Co., Inc., 4614 Prospect avenue, Cleveland, Ohio, has established a branch house and warehouse at 232 West 58th street, New York, N. Y., under the management of Lewis E. Gensler as eastern district manager.

R. H. Hale has been appointed manager of the New York branch of The Mason Tire & Rubber Co. of New York, Inc., with offices at 233 West 58th street. Mr. Hale was formerly connected with The B. F. Goodrich Rubber Co., and subsequently became head of R. H. Hale & Co., wholesale dealers in automobile tires.

At the plant of The Electric Hose & Rubber Co., 12th street, Wilmington, Delaware, a one-story addition is being erected to enlarge the lead press department, and provide improved facilities for handling the work. The company manufactures metal armored rubber hose, etc. The officers are: George S. Capelle, president; Edmund Mitchell, vice-president; and C. D. Garretson, secretary, treasurer, and general manager.

The I. B. Kleinert Rubber Co., 719-727 Broadway, New York, N. Y., has let the contract for a new factory, to be built at Fifth avenue and 18th street, College Point, Long Island. The new plant, which will cost approximately $200,000, will be a four-story and basement structure, 75 by 150 feet. The officers of the I. B. Kleinert Rubber Co. are: V. Guinzburg, president; H. A. Guinzburg, vice-president and treasurer; and A. B. Salinger, secretary. The company manufactures sanitary rubber specialties.

H. K. Simmons, formerly New York manager for The Dayton Rubber Manufacturing Co., Dayton, Ohio, has been recently appointed eastern district manager, supervising the activities of the Boston, Brooklyn, and Philadelphia branches. H. P. Canniff, one of the company's former salesmen, succeeds Mr. Simmons in the management of the New York City branch.

The A. J. Goldsmith Co. announces the removal of its offices from 27 East 22d street and the establishment of a factory for the manufacture of rubber, fabric and waterproof products, at 433 Broome street, New York, N. Y.

The Electrical Exposition, displaying electric machinery, equipment, and vehicles, will be held at the 71st Regiment Armory, New York, N. Y., September 28 to October 8.

Former Congressman Augustine Lonergan of Hartford has been named by Judge Edwin S. Thomas of the United States District Court as receiver for The Kelley Tire & Rubber Co., New Haven, Connecticut. Mr. Lonergan displaces the Bridgeport Trust Co., Attorney A. H. Barclay of New Haven and Moses Ullman of New York City as joint receivers of the company, under appointment of the Superior Court. The Kelley company, originally capitalized at $1,000,000, was later incorporated under Delaware laws at $5,000,000.

The Akron Standard Mold Co., Akron, Ohio, has appointed S. E. Johnson eastern representative to handle its standard line of mold equipment and rubber machinery. Mr. Johnson has had much experience in the rubber industry, in both foreign and domestic lines of trade. His headquarters will be at 154 Nassau street, New York, N. Y.

Joseph M. Dine, recently vice-president and general manager of The Oldfield Tire Co., has been appointed general sales manager of The Madison Tire & Rubber Co., Inc., 20 West 60th street, New York, N. Y. Mr. Dine takes the position left vacant through the resignation of J. C. Matlack.

Charles S. Leslie, crude rubber broker, has removed to Room 405, 24-26 Stone street, New York, N. Y.

A copartnership, under the name of Oliver, Keeler & Scudder, has been formed by J. William Oliver, Louis V. Keeler, and Seldon S. Scudder. The firm, with offices at 24 Stone street, New York, N. Y., will deal in crude rubber. Mr. Oliver recently sailed from San Francisco for the Far East, where he will visit Singapore, Java, and Colombo, returning to New York by the way of London.

J. J. Hanse has been appointed director of production by George K. Culp, Inc., 56 West 45th street, New York. For the past ten years Mr. Hanse has been connected with the United States Tire Co. as a department executive, and his experience there makes him particularly well fitted for his new position.

Weber deVore has been elected secretary and acting treasurer of George K. Culp, Inc., 56 West 45th street, New York, succeeding William M. Sperry, 2d, secretary, and C. C. Dobbs, treasurer. Mr. deVore will be in charge of the financial and legal departments and will work out a policy for the complete protection of the financial and legal interests of the Culp associated stores. He has been associated in the past with rubber activities in the East and Middle West and more lately with a New York financial house.

W. D. Schwartz, vice-president of the L. H. Butcher Co., Inc., 239 Front street, New York, sailed August 23, for England and the Continent. Mr. Schwartz is on a business trip in the combined interests of the company's offices in New York City, and also on the Pacific Coast.

The Askam Rubber Co., Milford, Connecticut, manufacturer of reclaimed rubber, went into receivership last June. William B. McCarthy, receiver, states that the plant is at present closed down, and that the property is for sale.

NEW JERSEY NOTES

TRENTON

The tire manufacturers of Trenton, New Jersey, report a decided boom in the industry during the past month, and according to present indications the mills will be kept busy for some time. While this applies to the tire industry alone, it is believed by manufacturers that the mechanical end will gradually pick up later.

The Ajax Rubber Co. is one of the busiest concerns in Trenton and is operating twenty-four hours a day. The tire makers are working in eight-hour shifts. There is a big demand for cord tires at the present time.

The Empire Tire & Rubber Corporation, Trenton, reports an increase in tire output with men working in two shifts. The company is operating about 70 per cent of normal. The molded hose department is now very busy and its production equals that of August of last year. The Bergougnan Rubber Corporation has been compelled to employ a Sunday force of tire makers besides its day workers. The Mercer Rubber Co. announces that there has been no change in business conditions during the summer and that the mechanical business is not making a very good showing. The Essex Rubber Co. has many orders ahead for rubber heels, the other departments also being busy. The Puritan Rubber Co., manufacturer of mechanical goods, is operating twenty hours a day with two shifts.

The United & Globe Rubber Co., Trenton, is now manufacturing the new Globestos brake blocks and is already shipping these products to all parts of the country. They are used principally for industrial machinery and for coal mining machinery of about 800 horsepower. The blocks are a combination of rubber and asbestos, fifteen inches square and five inches in thickness, and are cast in steel molds. Each section is fastened to the other with a bolt, making the circular combination strong and secure.

The Acme, Ajax, Empire, Bergougnan, Thermoid and United & Globe rubber companies donated tires to the winner in the athletic events at the Trenton Chamber of Commerce outing recently. The Essex, Home, Hamilton, Mercer, Puritan, Joseph Stokes, Semple and Whitehead Brothers rubber companies donated hose, mats, etc.

The importance of the rubber proofing industry was emphasized by Neil E. Bowman, president of the Pocono Rubber Cloth Co., before a meeting of the Trenton Rotary Club. He reviewed the history from the beginning and described in an interesting manner the primitive methods practiced in the early days.

The Trent Rubber Co., Trenton, that was recently sold by the receiver to a number of creditors, is reported to be turning out 100 tires daily, which will be increased shortly to 250 tires a day. The officers of this new company are: Thomas H. Thropp, president and general manager; James H. Morris, vice-president, and Newton A. K. Bugbee, secretary-treasurer.

A petition in bankruptcy was recently filed by the Zee-Zee Rubber Co., Trenton, New Jersey. The company's liabilities are scheduled at $293,552 and the assets at $434,964. According to Herbert P. Backes, attorney for the corporation, the failure is due to general business depression. The company's plant at Yardville, a few miles south of Trenton, was built several years ago, and is valued at $392,000.

MISCELLANEOUS NEW JERSEY NOTES

The reorganization of The Braender Rubber & Tire Co., Rutherford, New Jersey, has been practically completed. After a petition in bankruptcy was filed last May against the company, the larger creditors decided to form a corporation to take over all the assets of the present company. All creditors, excepting members of the Braender family, will receive preferred stock in this new corporation in lieu of their claims. Such creditors are advised to communicate with Milton Dammann, 61 Broadway, New York, N. Y., chairman of the creditors committee, in regard to filing proofs of claim, or for any other information concerning the company's reorganization

The Standard Underground Cable Co., Pittsburgh, Pennsylvania, is planning to erect at Washington street, Perth Amboy, New Jersey, a 50 by 150-foot four-story building. The construction of this addition and the consequent enlargement of the plant are, however, dependent upon the action of the Board of Aldermen, to whom application has been made regarding permission to extend railroad trackage to the company's works. J. W. Marsh is president, and C. C. Baldwin, the vice-president, is in charge of the proposed construction at the Perth Amboy plant.

The following are the new directors of the New Jersey Car Spring & Rubber Co., Inc., Jersey City, New Jersey: J. J. Fields, Milford, Pennsylvania; H. H. Titsworth, J. K. Moore, and F. A. Rogers, New York, N. Y.; and G. W. Stephens, Charles Hoffman, and P. H. Ober, Mansfield, Ohio. G. W. Stephens resigned as president. F. H. Smith resigned as vice-president and general manager, and Charles Hoffman resigned as treasurer of the company. New officers were elected as follows: J. J. Fields, president; H. H. Titsworth, vice-president; and E. E. Dearth, secretary, treasurer and acting general manager.

The company manufactures mechanical rubber goods and automobile tires and tubes.

The boot and shoe department of the Lambertville Rubber Co., Lambertville, New Jersey, has been closed down because of the lack of orders and the employes have no promise when work will be resumed. The toy, ball and band departments are operating five days a week.

PENNSYLVANIA

The F. J. Stokes Machine Co., manufacturer of pharmaceutical and chemical machinery, and vacuum drying apparatus, has moved into its new plant at Tabor road and Cedar Grove Station, Philadelphia, (Olney P. O.), which occupies 5½ acres of ground, and is equipped with all modern facilities for handling light and heavy work.

F. A. Drake, who formerly sold the output of the Semple Tube Co., is now general representative of the Howe Rubber Co., Inc., Cleveland, Ohio, with headquarters in Philadelphia.

An encouraging report from the Nu-Cord Rubber Co., Greensburg, Pennsylvania, states that this plant is now running 24 hours a day, while the company expects to have its Jeannette, Pennsylvania, factory in operation in a few weeks. The Nu-Cord Rubber Co. manufactures tires and tubes. The present officers are: J. B. Reed, president and general manager; T. B. Dilts, vice-president; H. M. Donaldson, secretary-treasurer.

The Lehigh Rubber Co., New Castle, Pennsylvania, began operations on August 15 as successor to the New Castle Rubber Co. The business is now being conducted as a partnership consisting of F. A. and C. W. Sieberling. H. W. Smith is general manager. The company will manufacture automobile tires and tubes.

The Standard Underground Cable Co. is having plans and specifications prepared for a new building adjoining the present plant at 16th and 17th streets, Pittsburgh, Pennsylvania. The proposed enlargement will be a four-story and basement construction, approximately 300 by 100 feet. The contract for the new building will probably be let about September 1.

SOUTHERN NOTES

The Virginian Rubber Co., Charleston, West Virginia, elected on July 11 the following officers: A. A. Lilly, president; H. G. Young, vice-president; E. P. Stroman, secretary; and W. J. Johnson, treasurer. The factory of the Virginian Rubber Co. is a new building, with every modern facility for the manufacture of fabric and cord tires and gray tubes. Factory operations are under the supervision of T. A. Conger, a pioneer in tire manufacturing. Sales are made mainly through established jobbers located in all sections of the country. Virginian tires are made oversize and very rugged in construction, with an unusually thick tread, to meet the unusual conditions imposed on tires by the mountain roads of West Virginia.

The pulverizing mills and mine of the Franklin Soapstone Products Corporation, Henry, Virginia, which were purchased about a year ago by the Blue Ridge Talc Co., Inc., have been supplied with new equipment and are now in full operation. Open-quarry methods are being used at the mines, where the formation in the side of a mountain is about 80 feet deep, and approximately 300,000 tons are in sight. At this plant of the Blue Ridge Talc Co. soapstone and talc of differing grades of fineness are prepared for use in the manufacture of rubber goods. The rock mined is sorted into three grades, and then brought to the crusher hoppers. Mine material which has not been air-dried is passed through an indirect-fired rotary dryer. The pulverizing mill has a daily capacity of 65 to 70 tons of 200 mesh product. Tests recently made by the Bureau of Standards, Washington, D. C., showed 99.9 per cent passing 200-mesh screens.

The Dayton Rubber Manufacturing Co., with factory and general offices at Dayton, Ohio, has recently opened a new direct branch at Atlanta, Georgia. Fred W. Gorman, formerly with the Brunswick Tire & Rubber Co., has been appointed local man-

ager and, with the assistance of a number of salesmen, is already meeting with considerable success in this new field.

A QUARTER-CENTURY WITH U. S. TIRE CO.

George S. Shugart, vice president and general sales manager of the United States Tire Co., New York, N. Y., celebrated on June 24, the twenty-fifth anniversary of his connection with that company, culminating a quarter-century of notably intensive application to a single line of endeavor.

George S. Shugart

As a youth Mr. Shugart left a good bank position to put on overalls and learn the tire business in the Morgan & Wright factory, believing it offered a more promising future. This was when the bicycle was at the height of its popularity. His marked executive ability soon brought him into sales work, and at first, many of his calls were made on a bicycle, covering sections of New York and New Jersey in which seventy-five salesmen now represent the company.

He soon became a branch manager in important posts, and since Morgan & Wright's amalgamation with the United States Rubber Co., he has continued to advance to his present important position. Mr. Shugart is regarded as one of the best informed and most efficient men in the tire selling field, and a host of well-wishers trust that many years of health, happiness and success lie before him.

CUTTING OUT NON-ESSENTIAL LINES

Most rubber manufacturers make scores of articles because their competitors make them, because their customers demand them, or just because.

One of the New Jersey companies, the Thermoid Rubber Co., has, however, broken away from the time-honored custom, incidentally finding it very profitable, and concentrated its effort mainly upon tires, tubes, brake linings, universal joint disks, clutch rings, and radiator hose. The following is a brief outline of the articles which have been eliminated:

Air-pump hose—several styles	Patches
Brewers' hose	Pedal pads
Bumpers	Plumbers' supplies
C. I. tubing	Pure gum tubing—several styles
Corrugated matting	Reliners
Fan belts—several styles	Sheet packing
Force cups	Small molded goods—about 50 varieties
Garden hose	Stair treads
Gasoline hose	Steam hose
Hockey pucks	Vacuum hose
Mallet heads	Valve bases for inner tubes
Motorcycle brake lining	Washers—several styles
Molded mats	Water hose
Packing all styles	

Commenting upon this work the sales manager said:

"We not only standardized production but also simplified the construction of the articles still remaining. For example, we made three grades of radiator hose under two different brands, in 2-3-4 ply. Each of these grades was constructed from a different gage of rubber and represented about six different grades of duck and sheeting. On this particular article we reduced the two trade brands to one grade, using rubber of the same gage in both, and standardizing upon three grades of duck rather than six as heretofore. This enabled us to increase our machine output 100 per cent and to make better goods at a lesser unit cost. It also materially decreased the storage of raw materials and eliminated about fifteen ingredients.

"One of the troubles which we experienced prior to standardization was the utter impossibility of scheduling production. We never definitely knew the output of a machine, nor the maximum production ability of a man under varied working conditions. This human element of production was particularly baffling during periods of depression when it was necessary to shift a man from one department to another to keep him busy. Under the standardization plan we are able to schedule properly all of our merchandise and to keep definite record of labor costs on the basis of actual knowledge of what can be produced by each workman on any given machine.

"Standardization also enabled us to sell thousands of dollars' worth of old machinery which was working only 10 per cent of the time and which was kept in the factory for no other reason than to produce a few special articles, upon which we thought we were making money, but which were actually being produced at a loss. The elimination of this machinery released thousands of square feet of floor space, which also represented an additional saving.

"Another factor which must not be overlooked is that the concentration upon fewer articles has enabled our factory heads to direct all of their efforts to the development of the products which have a greater turnover and which consequently show the greatest net profit.

"Standardization has taught us that it must be confined within certain limits determined by the by-products of the merchandise

A Typical Group. Brake Lining Standardization Committee, Thermoid Rubber Co., Trenton, New Jersey

produced. It cannot be carried beyond the point where the by-products of the major articles are not profitably utilized, and this is a point which, if not carefully analyzed, is likely to defeat the major purpose involved."

UNITED STATES TIRE CO. MAINTAINS TECHNICAL SERVICE DEPARTMENT

A technical service department, made up of tire engineers, has been recently established by the United States Tire Co., New York, N. Y., to give impartial, disinterested advice to everybody engaged in truck operation.

"We intend that this technical service department shall be used freely by every person who owns a truck," said C. K. Whidden, manager of truck tire sales. "Whether an owner is a patron or not makes no difference, all our facilities for correct information

are at his disposal. Nearly half of the trucks of the country are operating on the wrong kind of tires. This is a condition which we hope to correct."

AMERICAN SOCIETY FOR TESTING MATERIALS ELECTS OFFICERS

The American Society for Testing Materials, Engineers' Club Building, 1315 Spruce street, Philadelphia, Pennsylvania, elected the following officers during the annual meeting held at Asbury Park, New Jersey, June 21-24:

President (for one year): C. D. Young, general supervisor of stores, Pennsylvania System, Philadelphia, Pennsylvania.

Vice-president (for two years): Guilliaem Aertsen, assistant to the vice-president, Midvale Steel and Ordance Co., Philadelphia, Pennsylvania.

Members of Executive Committee (for two years): F. R. Baxter, chief of testing laboratory, Vacuum Oil Co., Rochester, N. Y.; E. D. Boyer, cement expert, Atlas Portland Cement Co., New York, N. Y.; F. M. Farmer, chief engineer, Electrical Testing Laboratories, New York, N. Y.; W. H. Fulweiler, chief chemist, United Gas Improvement Co., Philadelphia, Pennsylvania.

Committee D-13 on Textile Materials will hold a meeting October 28 at Providence, Rhode Island.

THE RUBBER TRADE IN RHODE ISLAND

By Our Regular Correspondent

The close of August found a more encouraging feeling prevailing among industrial concerns of Rhode Island, through the evidences of an improvement in general prospects, as well as an apparent stabilizing tendency of conditions that give promise of an early advance toward the much desired normalcy.

After months of partial or complete idleness, many of the textile plants engaged in the production of tire fabrics are gradually resuming operations and the indications are favorable to further expansions in this direction.

One of the largest plants of this character that has resumed is that of the United States Cotton Division of the Jenckes Spinning Co., on Fountain street, Central Falls, Rhode Island, where approximately 350 employes began operations about the first of August after a period of two months of inactivity. The plant, which manufactures yarns for use in tire fabrics, suspended operations early last May. The number of employes has been increased as conditions have improved until there are now upwards of 500 employed at the plant.

After a shut-down of nearly two months the factory of the National India Rubber Co., at Bristol, Rhode Island, is reopening, it having been decided that the Keds division will have its first day's making on Tuesday, September 6. Other departments are resuming in regular order, beginning with the machine cutting department, which opened on Monday, August 22. To what percentage of the full complement of more than 4,000 operatives work will be afforded will be dependent entirely upon the extent to which orders are received, but it is the intention of the management to maintain operations to the fullest extent possible, both as regards hours and numbers.

The plants of the Revere, Providence, Bourn and Devol rubber companies, Providence, and of the Woonsocket Rubber Co.'s plants at Woonsocket and Millville, are in operation, although on curtailed time and employment schedules, in some departments.

Probably no incident of the past month was of more significance to the commercial, industrial and political affairs of Rhode Island than the death of Colonel Samuel Pomeroy Colt. The news of his death caused keen regret throughout the Commonwealth and State and city officials and business men united in expressions of praise for his character and career and of sympathy for the family. The town of Bristol, in which Colonel Colt began his business career, in which he had always maintained his home, and in which he died, mourned the passing of its first citizen with a keen sense of loss. Word of his death was sent promptly to the plant of the National India Rubber Co., which formed one of the links in the chain of industries controlled by him, and the bell on the factory was rung for half an hour and the flag was set at half-mast.

Despite the general business depression of the past six months, the tax assessment announced by the State Tax Commissioners on the corporate excess of corporations in Rhode Island computed to the close of the fiscal year of June 30, shows no striking evidences of such depression. The total tax assessed is $1,777,834.05, an increase of $50,053.94 over that for the year 1920. The total corporate excess this year upon which the tax is levied is $320,479,151.81. Among the corporations upon which the taxable excess is $100,000 or more are the following that are connected directly or indirectly with the rubber industry and the amount of the assessed valuation:

American Multiple Fabric Co., $131,997.18; American Webbing Co., $283,712.54; Atlantic Tubing Co., $187,730.00; Bourn Rubber Co., $308,306.29; Collyer Insulated Wire Co., Pawtucket, $365,329.69; Davol Rubber Co., $356,482.67; Everlastik, Inc., Boston, $186,222.54; Glendale Elastic Fabric Co., East Hampton, Massachusetts, $197,238.80; The B. F. Goodrich Rubber Co., Akron, Ohio, $222,336.73; The Goodyear Tire & Rubber Co., Akron, Ohio, $425,000.01; George Grow Tire Co., Boston, $107,500.25; Hamilton Web Co., Hamilton, $289,475.65; Hope Webbing Co., Pawtucket, $1,313,144.35; Jenckes Spinning Co., Pawtucket, $8,739,115.00; Mechanical Fabric Co., $586,826.06; National India Rubber Co., Bristol, $2,257,155.36; New England Butt Co., $347,070.17; Ninigret Co., Pawtucket, $1,754,340.00; O'Bannon Corporation, West Barrington, $869,600.00; Revere Rubber Co., $641,003.50; Tubular Woven Fabric Co., Pawtucket, $167,902.05; United States Rubber Co., New York, $2,247,291.26; Woonsocket Rubber Co., Woonsocket, $537,673.60.

In the list of tax assessments in the town of Bristol, just completed, by far the largest taxpayer is the United States Rubber Co., of New Jersey, which is taxed this year on a total valuation of $1,990,500 on all the property it owns in that town. This is an increase in valuation of $875,400 over that of last year. The tax to be paid by this corporation this year is $44,786.25, an increase of $18,246.87 over last year.

The announcement of the proposed consolidation of The Fisk Rubber Co., The Federal Rubber Co., and The Ninigret Co., a subsidiary fabric manufacturing corporation, was received in Rhode Island with more than usual interest from the fact that one of the plants of the Ninigret Co., is located in Pawtucket, where the corporation purchased the old Greene & Daniels mills and equipped and arranged them to meet the requirements of the corporation.

The sixth annual outing of the employes of the Revere Rubber Co., was held last month at the Hummocks in Hamilton, and more than 400 attended. After an enjoyable sail down Narragansett Bay, with an orchestra on board, the excursionists sat down to an appetizing luncheon at 12:30 o'clock. Then followed an elaborate card of sports and athletic events as well as dancing, bathing, and various other forms of entertainment. Prizes were awarded in connection with every event and when the party had enjoyed an old-fashioned Rhode Island clambake that was served at 5 o'clock, everyone voted that the committee had provided a perfect day.

Employes of the Bourn Rubber Co., to the number of nearly 200 conducted their annual outing last month at Duby's Grove on the banks of the Pawtuxet river. A lunch was served upon the arrival of the party at noon after which field sports were in order. Despite the rain the games went on, and the baseball contest between the cutters and the makers terminated in victory for the cutters by a score of 7 to 6, while the married men won the tug-of-war from their single opponents.

Henry C. Wagner, who was in the employ of the Woonsocket Rubber Co., for more than 15 years, has been elected general factory manager and a director of the Beacon Falls Rubber Shoe Co., and has assumed his new duties. The Beacon Falls company, operating two plants, one at Beacon Falls, Connecticut, and the other at College Point, Long Island, employs approximately 1,600 operatives. Recently Mr. Wagner was on the executive staff of the United States Rubber Co., as assistant to Myron H. Clark, general manager of the footwear division. While in the employ of the Woonsocket Rubber Co., he was successively superintendent of the Millville factory and of the Alice Mill at Woonsocket, and later, general superintendent of both plants.

According to a recent announcement from the American Wringer plant, Woonsocket, Rudolph Kowaiski has been made plant superintendent, and Charles Yahaux, assistant plant superintendent. Mr. Yahaux, who has been with the firm for nearly thirty years, will be in direct charge of the rubber working department. Definite plans as to the reopening of the plant on full time at an early date are now being considered.

The Apex Tire & Rubber Co. has been granted a charter under the laws of Rhode Island, to manufacture and deal in auto tires, etc., the capital stock being 250 shares of common stock without par value. The stockholders are David W. Smith, John M. Franklin and Charles H. Sprague.

According to statements filed with the city clerk's office in their respective cities the Newton Tire Shop, 400 Dexter avenue, Central Falls, is owned by John Newton and Herbert A. Newton, and the Lotta Miles Tire Co., 1035 Broad street, Providence, by William E. Angell.

THE RUBBER TRADE IN MASSACHUSETTS

By Our Regular Correspondent

Business in the rubber industry of Massachusetts continues unsettled and the future uncertain. Tire demand is holding up very well and most tire plants are operating at or very near capacity, but it is feared that there may be a falling off during the autumn months. The large production of rubber heels and soles continues with no indication of abatement. Owing to fine weather it has been a good year for canvas footwear. As usual this branch has been slack since July 1, but the new season ordinarily starts September 1. Rubber footwear production is suffering from the exceptionally open weather last winter. Should the late autumn open with storms indicating an early winter there is likely to be a shortage of rubber footwear. The mechanical rubber goods situation reflects the stagnation of general business, as does the decreased demand for stationers' sundries. Some improvement in druggists' sundries is anticipated this fall. The proofing branch continues quiet, and reclaimers, though operating at only about 25 per cent capacity, are optimistic regarding the fall demand for their better grades.

Inspectors connected with the Massachusetts Department of Public Works are continuing their campaign against overloaded motor trucks which are damaging highways throughout the state.

Under the law trucks may not carry more than 800 pounds per inch width of their tires, and in no case are they allowed more than a 14-ton load. In ascertaining the weight of a heavily loaded truck inspectors first lay a piece of white paper on the roadway and have the truck driven over it. The imprint of the tire is then measured and the total permissible weight of the truck and freight is calculated in accordance with the regulation cited above. A loadometer is then placed successively under the front and rear wheels of the truck to learn if the weight is within the legal limit.

INDUSTRIAL ABSENTEEISM

In a paper recently read before the American Association of Industrial Physicians and Surgeons, Dr. Robert S. Quinby, service manager of the Hood Rubber Co., Watertown, has given the results of twenty-eight months' study on the subject of industrial absenteeism in the Hood factory, where the average force of 6,700 persons consisted of 65 per cent males and 35 per cent females, about 50 per cent being of foreign birth.

The number of days lost per employe per year and the reason therefor was as follows: sickness, 6.61; industrial accident, 0.45; non-industrial accident, 0.25; personal reasons, 10.95; total for all causes, 18.26. On a percentage basis the total average time lost from all causes was 5½ per cent, of which 2 per cent was due to sickness, 0.14 per cent to industrial accidents and 0.08 per cent to non-industrial accidents. Dr. Quinby feels that only during unusual periods should sickness disability exceed 2 per cent of the working time, or 6 days per employe based on a 300-day working year.

It was found that single males lost the least time, married males 2 per cent more, widowed and divorced males 21 per cent more, females 40 per cent more, widowed and divorced females 154 per cent more, while married females lost 175 per cent more time than single males. Male employes averaged a loss of 5 days per year on account of sickness, while females lost 8¾ days.

Above the age of forty, the male disability rate increased rapidly, while in the case of females the increase was apparent above the age of forty. Persons of American birth tended to lose less time on account of sickness and accident than those of foreign birth.

The number of days disability per person lost on account of the more important diseases was as follows: influenza, .718; colds, .53; tonsilitis, .341; bronchitis, .312; tuberculosis, .24; rheumatism, .235. Combined respiratory diseases caused over 35 per cent of the total disability due to sickness and accident in 1920.

The length of disabilities due to sickness and accident was as follows: less than 1 week, 20 per cent of cases; less than 2 weeks, 27 per cent; less than 3 weeks, 52 per cent; less than 4 weeks, 68 per cent; less than 7 weeks, 83 per cent; less than 13 weeks, 93 per cent; less than 26 weeks, 98.5 per cent.

BOSTON NOTES

Receivers for the O'Bannon Corporation, Boston, have been appointed as follows: Richard LeBaron Bowen, general manager of the O'Bannon Corporation, is receiver of the corporation for the State of Rhode Island, and also, with Ripley L. Dana, receiver for the commonwealth of Massachusetts. All plants of the O'Bannon Corporation are now being operated by the receivers, new orders are being taken, and additional business solicited. William B. Simpson, the former purchasing agent, has severed his connection with the corporation, and raw materials are being purchased by the receivers.

MISCELLANEOUS MASSACHUSETTS NOTES

The Easthampton Rubber Thread Co., Easthampton, Massacusetts, reports that, at its recent election, no changes were made in the company's board of directors. Those constituting this board are as follows: William G. Bassett, president; L. S. Stowe, treasurer; F. W. Pitcher, general manager; R. L. Williston and W. L. Pitcher.

The Standard Rubber Cement Co., Canton, Massachusetts, specializes in standardized products for the shoe trade. The principal line of manufacture includes channel, sole and rubber heel cements. The rubber heel cement is said to be a superior product.

Claiming that the business was being run at a loss, creditors of the British-American Manufacturing Co., Springdale, Connecticut, have voted that the receivers would be justified in applying to the United States District Court for permission to sell the plant and wind up the business. The concern in question, which manufactures rubberized cloth, was organized in 1914, and took over the Interstate Rubber Co., which manufactured a product similar to its own. The plant of the British-American Co. is said

to be valued at $250,000, while liabilities, largely for raw material, are estimated at $470,000.

Encouraging reports from the Meade Rubber Co., Stoughton, Massachusetts, state that the company's output is being materially increased, which necessitated the installation of a 500 h.p. engine and additional presses. Officials of the company claim that business conditions seem to be improving, and that they are looking forward to a good season. Rubber heels and rubberized fabrics are the products manufactured.

George B. Hendrick, publicity manager of The Fisk Rubber Co., Chicopee Falls, Massachusetts, was recently appointed chairman of a committee organized to advertise the Direct Mail and Advertising Association Convention and Exposition which will be held at Springfield, Massachusetts, October 25-28, inclusive. Mr. Hendrick, who is president of the Publicity Club of Springfield, has been in advertising and publicity work throughout practically all his business career, and was especially active during the war. He was appointed publicity manager for The Fisk Rubber Co. about six years ago, and has an excelent record of achievement to his credit.

George B. Hendrick

With the production of nearly 10,000 casings and 13,000 tubes daily, The Fisk Rubber Co., Chicopee Falls, is operating at 90 per cent of its peak capacity. The August production schedule called for 225,000 tires, an increase of 32 per cent over the July output of 170,000 tires, which in turn represented an increase of nearly 50 per cent over June.

Operations will begin again in September at the plant of the Monatiquot Rubber Works Co., South Braintree, Massachusetts. Since the fire in February last, new and improved equipment has been added and many changes made. Several new products of interest to the trade are to be manufactured, and will continue to sustain the good reputation this company's product has already made. The officers are: James H. Stedman, president and treasurer; Merton A. Turner, vice-president and sales manager; and Benjamin Ayer, general factory manager.

The board of directors of the Res-Pro Industries, Inc., Boston, Massachusetts, recently held an important meeting when plans for the further financing of their organization were discussed. James J. Clifford, president and director, has resigned, and Luther S. Newell, formerly general manager of the Anchor Webbing Co., Pawtucket, Rhode Island, has been elected president. Recently elected directors are: William H. Gidley, formerly treasurer and general manager of Greene & Daniels Manufacturing Co., Pawtucket, Rhode Island; and Howard E. Burdick, of Woonsocket, Rhode Island, president of the Burdick-Clarke Co., of Providence. The company's offices will be removed from Boston to Canton, Massachusetts, where the factory is located.

The Converse Rubber Shoe Co., Malden, resumed operations August 8, following the customary two weeks' vacation shutdown. Enough goods have been sold to keep the factory running at 80 per cent capacity until December 1. President Converse states that the first quarter of the firm's fiscal year ended July 1 was the best the company has ever had, and he has every reason to believe the other nine months will be as good. The coupon note issue of $285,000 maturing on August 1, was paid on that date.

Sales of the Hood Rubber Co., Watertown, for the first six months of this year were almost equal to those for the first half of the year 1919, although some $5,000,000 behind the record-breaking figures for the same period of 1920. The tire department is running to full capacity and canvas footwear business has been better than was anticipated.

Harrison S. Royce has succeeded M. G. Hopkins as purchasing agent of the Boston Woven Hose & Rubber Co., Cambridge.

The Genuine Rubber Co., Saugus, a Massachusetts corporation with a capital stock of $50,000, consisting of 2,000 shares of $25 par value, was incorporated July 18 for the manufacture of rubber heels and soles, automobile step plates and other rubber specialties. Gustav E. Dahlen is president, Ernest L. Castle, vice-president and Paul V. Lindstrom, treasurer. The new firm has leased part of the "Made-Leather" factory in Saugus and has installed the necessary equipment.

WORCESTER TIRE FABRIC CO.'S NEW MILL

Production has been started at the new mill of the Worcester Tire Fabric Co., Worcester, the capacity of which is 4,000,000 pounds of fabric a year. The building is of steel and concrete and has four manufacturing floors and one storage floor with a total floor space of 50,000 square feet.

All machinery is operated by individual motor drive requiring a total of 600 horsepower. On the two upper floors are ring twisters for the preparation of five-ply strand twist. On the second floor are special Brownell gear-driven flier cord twisters which combine the three strands into the finished cord. The result of this process is maximum strength without variance of twist. On the first floor is the weaving room. It is equipped with cord fabric looms with attachments and refinements of the company's own design and construction.

The Worcester Tire Fabric Co., was incorporated in 1913 in Massachusetts. C. R. Brownell and A. D. Sykes, both of Worcester, are president, and treasurer and manager respectively, and H. J. Adams, Akron representative, is vice-president. The board of directors is composed of the officers together with G. L. Brownell, of Worcester.

THE RUBBER TRADE IN OHIO

By Our Regular Correspondent

AKRON TIRE PRODUCTION APPROACHING NORMAL

While the tire departments of the Akron rubber factories are operating at better than 80 per cent of normal, making 75,000 tires a day, the other lines of rubber goods continue to show improvement. Reports from the druggists' sundries departments indicate that July showed 25 per cent increase in sales over the previous month, due largely to sales of rubber bands, hot-water bottles, and other sundries, which indicate that business in the fall will be fairly good. The present is more or less between seasons and the fact that increases are registered is looked upon as an indication of a turn for the better. Mechanical goods sales continue to show some increases. Cement and concrete manufacturers are operating at peak, and manufacturers of washing machinery and sweepers are operating at normal. Sales indicate that packers, paper manufacturers, sugar refiners and many other lines of industry are purchasing rubber supplies for replacements to put their plants into operation in the very near future. One sales manager of mechanical goods believes that the tide has definitely turned and a better tone is clearly marked in the present situation. On the whole the mechanical goods departments await the improvements in the steel industry and in the railroad situation. Footwear sales continue as well as can be expected at this time of the year and indications are becoming clearer that a seasonable fall will mean 100 per cent operation of these departments by the first of the coming year. The reclaiming of rubber remains dormant because of the low price of crude rubber.

It is reported that practically every rubber company in Akron, with the exception of the large factories which were caught with heavy commitments, are buying tire fabric and the larger companies have ordered in large quantities shipment of material contracted for. Lower prices are not looked for during the remainder of the year, despite the large hold-over cotton crop in the South. Buying of fabric throughout the country, as in Akron, is confined to spot orders with demands for immediate delivery.

INCREASED FACTORY EFFICIENCY

The great change in the Akron rubber industry as a result of the business depression which has now lasted about a year is nowhere more apparent than in the increased efficiency of the individual workmen in the factories. At the present time with production of all the Akron factories close to 75,000 tires a day, a total of 27,000 day and piece-workers are employed. A year ago, when the industry was running at peak and approximately 90,000 tires were made daily, approximately 72,000 men and women piece-workers and day-workers were employed. As a typical example of the increased efficiency The Goodyear Tire & Rubber Co. recently announced that the company is now producing 30,000 tubes daily, a new record, with a total of 525 piece-workers. A year ago it required 1,100 men to produce a total of what was then peak tube production of 23,000 a day.

These figures indicate the change which has come about in the industry. Men are today working with every ounce of energy bent upon production. The overhead has been cut to the very bone, and the process of readjustment continues. Every man and woman in office or factory who can be dispensed with is dismissed and his place is not being filled. Wages have taken a drop which is almost as large as the increase in efficiency. Tire builders and finishers who were paid $1.25 an hour a year and one-half ago are now being taken on at 60 to 80 cents an hour, and common labor which a year ago would scarcely consider anything less than a dollar an hour is now being hired for 30 cents an hour, while the rate for women has dropped to 25 cents an hour. With piece-work still an important feature in those departments where it is feasible, it is possible for the workers to make much larger sums, but at best the wages received do not compare with peak post-war wages. It is conservatively estimated that wages as a whole have dropped between 35 and 40 per cent to date and that other adjustments can be expected, especially in salaries.

AKRON NOTES

Shelby A. Falor, president of the Falor Manufacturing Co., 126 West South street, Akron, Ohio, is a native of Akron, and his entire business career is connected with the rubber industry of that city. Beginning twenty years ago with The Goodyear Tire & Rubber Co. as a clerk, he has successively filled various positions, becoming manager of one of the departments, and finally, three years ago, was appointed a member of the company's board of control.

Shelby A. Falor

Mr. Falor has a wide acquaintance in the rubber industry, and is familiar with the business, along both selling and production lines. The new company will specialize in the manufacture of high-grade inner tubes.

The Firestone Tire & Rubber Co., Akron, Ohio, reports an increasing production of tires and tubes, which almost equals the peak production of 1920. At present the schedule varies between 26,000 and 28,000 tires daily, with a corresponding output of almost 30,000 tubes. The plant is operating six full days a week, with two shifts of nine hours each. In one or two departments three shifts of eight hours each is the rule. Sales to manufacturers continue encouraging, while August sales to dealers promise to be among the highest for any one month in Firestone history.

The Firestone Tire & Rubber Co., Akron, Ohio, has gathered statistics concerning the care being taken of their tires by automobilists and truck owners. They find that more attention is being paid to this subject than formerly, and there are fewer cases of tire abuse. Motorists and operators of trucks realize the importance of frequent checking up for possible imperfections in wheel alinement, tire inflation, etc. Today, with prices at the lowest level and quality of the best, an opportunity is afforded to demonstrate the worth that has been built into the modern tire.

Reports to the Firestone Tire & Rubber Co., Akron, early in the month indicated that the automotive industry is operating at about 61 per cent of the production registered in July this year. Firestone manufactures original tire equipment for 47 automobile manufacturers and also produces about about 65 per cent of the rim equipment for the country. It was reported at Firestone that although there is little actual profit in the manufacture of tires at the present time because of the actual cost of materials, the first of September will probably see enough of the old high-priced inventory worked off to enable the company to show an actual production profit.

H. B. Clingerman, industrial engineer of The B. F. Goodrich Co., Ernest Brownwood, The Goodyear Tire & Rubber Co., and J. A. Hildebrand, chairman of the smoke abatement committee of the Akron Chamber of Commerce, are among the five citizens appointed by the Mayor of Akron to serve as the smoke abatement commission recently organized.

The Goodyear Tire & Rubber Co., Akron, announced during the middle of August that 900 men were to be laid off. E. G. Wilmer, president of the company, stated that the decrease in working forces will not materially reduce production of 25,000 tires and 30,000 tubes a day.

Goodyear has inaugurated the budget plan which demanded either decrease in personnel or cuts in salary and personnel decreases were impossible in many departments. During the month Don Stevens, for many years head of the factory labor department of Goodyear, resigned. With him went Marshall Morris, formerly assistant general manager of the Los Angeles plant and later in charge of stock sales for the company. Harry Blackburn, assistant treasurer, and F. F. Dugan, formerly in charge of sales personnel, were among the others who left Goodyear during the month. C. C. Prather, manager of the products department, has been transferred to the sales department at Cincinnati and W. D. Shilts, formerly chairman of the board of control, has been made traveling auditor.

Willard Seiberling, head of the aeronautical department of The Goodyear Tire & Rubber Co., and Wade T. Van Orman, official of the department, will take part in the international free balloon race which is to be staged in Belgium, September 18. The "City of Akron," to be flown by these aeronauts, has been designated by the Aero Club of America as one of the American contenders for the international cup.

E. E. Helm, formerly head of the publicity department of The Goodyear Tire & Rubber Co., has resigned and will be succeeded by Hugh Allen, formerly managing editor of the *Beacon Journal*, an afternoon daily, and subsequently editor of *The Wingfoot Clan*, the official paper of the Goodyear factory.

The Amazon Rubber Co., Akron, following complete reorganization and some refinancing, started into production on a small scale during the second week in August and by the first of September will be manufacturing several hundred tires a day. L. J. Shott, founder of the company, is president of the new company; Albert Kroehle, Adam Kroehle Sons Co., Cleveland, is vice-president; R. C. Fulmer is treasurer, and C. E. Bettler is secretary.

Mr. Schott founded the Amazon Rubber Co. in 1916 and actual production started early in 1917. A year and a half ago the company was taken over by Dr. E. E. Quirk who has withdrawn from the company. The return of Mr. Schott to the business has created confidence on the part of the stockholders regarding the company's future, and to a large extent his return was responsible for the ready response of the stockholders to the request for additional capital.

The Adamson Machine Co., Akron, reports that while the plant is not operating anywhere near capacity, sufficient work is being found to keep it operating at less than half of normal.

Indications are, however, that prospects for the future are beginning to look brighter. The work which the company is doing at the present time is for the most part from the smaller factories.

The Akron Machine, Mold, Tool & Die Co., Akron, which has been operating for the last year, because of its comparatively small capacity has found sufficient business to operate day and night for the larger part of the last two months. A large portion of its work is for rubber companies near rather than in Akron.

The J. H. Dexter Co., Inc., Goshen, New York, has named the Akron Standard Mold Co., Akron, Ohio, its exclusive representative. This will necessitate the addition by the Akron company of the following products: bead wrapping, flap making and curing machinery. Andrew J. Fleiter is vice-president and general manager and J. C. Clinefelter is sales manager of the Akron Standard Mold Co.

MISCELLANEOUS OHIO NOTES

M. M. Whorley, who has been recently appointed sales manager of The Columbus Tire & Rubber Co., Columbus, Ohio, has filled various positions of responsibility in connection with the tire industry. Beginning in 1912 as a salesman for the Firestone company, he became manager of this company's Syracuse, New York, branch, and later was appointed assistant sales manager of The Mason Tire & Rubber Co. at Kent, Ohio. This position he held until his present appointment with the Columbus company. It is reported that this concern is daily producing 200 cord and fabric tires and 400 tubes.

On July 16 last The Ohio State Rubber Tire Co., Port Clinton, Ohio, went into receivership in equity in the United States District Court. William J. Slater, of Akron, Ohio, was appointed receiver.

The Waukon Rubber Co., capitalized at $500,000, and recently organized in Elyria, Ohio, will take over the assets and liabilities of the Hill Rubber Heel Co. The new company will construct a modern plant to manufacture air-cushion heels, automobile tubes and dipped goods. Officers and directors of the new company are: W. R. Huntington, president; O. S. Dollison, vice-president; J. W. Dewhurst, secretary and general manager; and J. A. Ebert, treasurer.

William A. Cuff, secretary of The Mason Tire & Rubber Co., has been named a member of the board of trustees of the Kent Normal School, a state institution at Kent, Ohio. He has been active in politics for many years.

The Mason Tire & Rubber Co., of Kent, Ohio, reports that on the basis of 24 hours a day operation, the plant is turning out more than 2,000 tires a day, and that the new Ford size tire selling for $13.50, which was recently placed upon the market, is oversold for the remainder of the year. At the present time the company reports sales increases of approximately 50 per cent in value over the same time last year, while the sales in units will run in many instances more than four to one as compared with the same period last year. Production of truck tires, both pneumatic and solid, are reported as increasing steadily, and, owing to the fact that consumers and dealers are buying only current requirements, the officials of the company look for business to hold up well throughout August and probably into September. The company recently entered into the original equipment field.

JUDGES APPOINTED FOR FIRESTONE SCHOLARSHIP COMPETITION

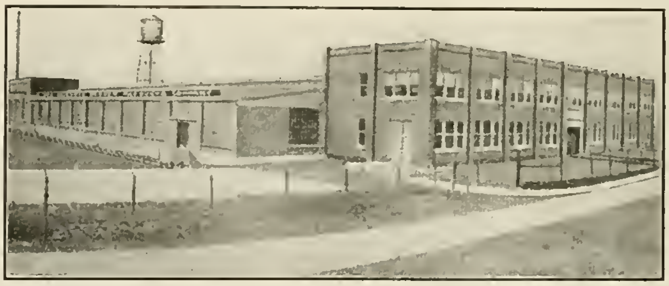
The best essays on "Good Roads and Highway Transport" which have been submitted during the last six weeks by high school pupils in the Harvey S. Firestone competition will be presented to the following judges for final decision: A. N. Johnson, dean of the department of engineering, University of Maryland, chairman; Harford Powel, Jr., Editor of *Collier's Weekly*; C. H. Huston, assistant secretary of the Department of Commerce and president of the Lee Highway Association.

THE BUCKEYE RUBBER PRODUCTS CO.

The Buckeye Rubber Products Co., an Ohio corporation organized for the manufacture of mechanical rubber goods, began manufacturing operations last month, at its plant in Willoughby, Ohio.

The main factory building is a one-story brick and steel structure, 180 by 350 feet, to which is joined a two-story building, 50 by 150 feet, containing offices, shipping room, time-keeper's office, first-aid room and laboratory. The buildings were originally built for the Ben-Hur Motor Co. but were not used for industrial purposes other than a government experimental plant for the development of poison gases during the war.

The land and buildings were purchased by The Buckeye Rubber Products Co. in January, 1920, and since then the plant has been arranged to meet the requirements of mechanical goods



New Plant of The Buckeye Rubber Products Co., Willoughby, Ohio

manufacture. Equipment has been installed for the manufacture of belting, matting, mats, molded goods, heels, friction tape, tubing, sheet packing and solid truck tires.

The Polack Tyre & Rubber Co. was acquired by the Buckeye company last year and its manufacturing equipment transferred to the Buckeye plant where Polack solid truck tires continue to be made.

The Buckeye Rubber Products Co. manufactures only the highest quality of rubber goods, and although a new-comer in the rubber manufacturing field, the personnel, both executive and manufacturing, comprises men of long and successful experience in their respective departments. The officers are: Charles H. Roth, president and general manager; Webster Norris, vice-president and technologist; James M. Mackay, secretary and sales manager; William E. Marks, treasurer; Edwin L. Stimson, factory manager.

WARN AGAINST A. E. F. TIRES

Akron tire companies have issued warnings to their dealers and to tire users generally to beware of American army tires which have been brought back from Europe and which have been placed on the American market. Because of exposure to weather for a long time many of the tires have deteriorated and in many instances the expected service can not be obtained from them. The number of these kinds of tires now on the market is very large, it is stated, although definite figures are not available.

EGYPTIAN COTTON FAILS IN TEXAS

It has been found that Egyptian cotton cannot be satisfactorily grown in Texas, according to a report recently made by the United States Department of Agriculture, Washington, D. C.

Careful and long-continued experiments with Egyptian cotton have proved that it is more susceptible to diseases and more exposed to weevil injury than other varieties. Durango cotton, however, appears to flourish in some parts of Texas, and attempts to raise this would seem to promise better success than any further attempts to grow the first-mentioned variety.

THE RUBBER TRADE IN THE MID-WEST

By Our Regular Correspondent

MID-WEST RUBBER MANUFACTURERS' ASSOCIATION

The regular monthly meeting of the Mid-West Rubber Manufacturers' Association was held August 9 at the Chicago Athletic Association, Chicago, Illinois. The most important matters under consideration at the board meeting were the resignations of George B. Dryden, of the Dryden Rubber Co., as treasurer of the association, and D. M. Mason, of the Mason Tire & Rubber Co., as president.

The new president of the association, W. W. Wuchter, of The Nebraska Tire & Rubber Co., Omaha, Nebraska, was formerly vice-president. The matter of electing a first vice-president to succeed him was postponed until the next meeting. To fill Mr. Dryden's unexpired term as treasurer the election was announced of Samuel J. Turnes, of the Brunswick-Balke-Collender Co.

An interesting feature of the occasion was a talk by W. E. Byles of New York concerning the present situation in the rubber industry. Other speakers at the meeting were: H. W. Ramsay, Cupples Company, St. Louis, Missouri; J. B. Longini, Pittsburgh Valve & Foundry Co.; C. H. Taveniere, Fred Stern & Co.; H. A. MacKusick, Philadelphia Rubber Works Co.; W. G. Brown, The Spreckels "Savage" Tire Co., San Diego, California; Sidney J. Roy, The Hannibal Rubber Co., Hannibal, Missouri; and H. O. Smith, The Racine Tire & Rubber Co., Racine, Wisconsin.

MISCELLANEOUS MID-WESTERN NOTES

William M. Gunlock, under whose direction the "Spring-Step" rubber heel has gained so great a publicity, is now vice-president of the Dryden Rubber Co., 1014 South Kildare avenue, Chicago, Illinois. Mr. Gunlock will be in charge of this company's heel and sole departments.

The Sears Tire Equipment Co., Davenport, Iowa, recently became the successor to the Altenburg Tire Equipment Co., and will continue the manufacture of tire making and tire-repairing machinery. Under the new organization the officers are: V. D. Sears, president and sales manager; R. P. Hayes, vice-president and general manager; and E. H. Hoehn, secretary and treasurer.

Favorable indications of a continuance of its present twenty-four hour schedule is the report made by the Odell Rubber Co., manufacturer of South Bend and Odell tires and tubes at South Bend, Indiana. A new building, 80 by 146 feet, of brick and steel construction, and costing approximately $50,000, is a recent addition. This will be used for office and warehouse purposes. R. M. Voorhees, secretary of the Odell company, claims that business conditions for the first six months of 1921 have been very satisfactory.

The entire property of The Fort Wayne Tire & Rubber Manufacturing Co., Fort Wayne, Indiana, including 2½ acres of ground, buildings, machinery and stock, was recently sold to Henry J. Bowerfind, of Fort Wayne, Indiana, for $90,000. The plant is to be dismantled, and reequipped for the purpose of manufacturing paint.

An optimistic report from The Jefferson Rubber Co., Jefferson, Wisconsin, states that the company's operations have steadily increased during the last four months. The output of tires and tubes per month, as at present planned, will be six times greater than the production, for a corresponding period, during the company's first year of business. Officials of the company claim that sales of their products are exceeding all expectations. R. W. Lyons is president.

The appointment of C. F. Faro, as Chicago district manager for The Dayton Rubber Manufacturing Co., Dayton, Ohio, has been recently announced. Mr. Faro will also have general supervision of the company's Kansas City and Denver branches. The local manager for Kansas City is George P. Colman, formerly one of the Dayton Rubber Co.'s special representatives; and for Denver, J. H. Redfern, previously connected with The Goodyear Tire & Rubber Co.

The Link-Belt Co., 910 South Michigan avenue, Chicago, Illinois, announces a practically uniform reduction of 10 per cent on malleable iron and steel—SS class—chains, sprockets, buckets, and other products. This price reduction becomes effective at once. Discounts are made on application.

Plans for the proposed St. Louis factory of the Standard Underground Cable Co., Pittsburgh, Pennsylvania, are subservient to present labor conditions and costs of building materials. Until some improvement is noted in these matters nothing further will be done beyond preparing plans and specifications for the building and grading the building site.

THE RUBBER TRADE ON THE PACIFIC COAST

By Our Regular Correspondent

Normalcy may not actually have arrived in the rubber trade on the Pacific Coast, but manufacturers and dealers agree that it is within hailing distance. With very few exceptions, trade leaders report a steady improvement in business, some stating that conditions for the latter half of 1921 will be better than a year ago. As might be expected, the improvement is most marked in tire sales, the volume mounting steadily from week to week. Warehouse stocks are low, and dealers often find it difficult to get factory orders filled promptly, owing to small stocks or the limited production. While tire sales are better in the lower coast territory, the Northwest is holding its own remarkably well, being favored with agreeable weather conditions. Coast-made tires and tubes are making good headway, although the eastern and mid-western products are maintaining their old-time precedence, despite the unavoidable freight handicap. Definite assurance that price cutting has gone its limit has heartened jobbers and stimulated sales of these goods. A livelier inquiry for automobiles has had a beneficial influence.

The active inquiry for rubber belting earlier in the year has quieted somewhat. Most of the new factories have been outfitted and prices have shaded off a little. Mining interests are stirring somewhat, the impression gaining ground that before many months there will be a sharp demand for the metals, operations will be steadily resumed, and considerable belting will be needed Oil-drillers are buying a fair amount of rubber belting.

An excellent trade is reported in garden hose for 1922 at fair prices. One coast factory has all it can do to fill orders. There is a fair inquiry for heavy suction and discharge hose from the big oil companies. Jobbers in rubber heels and soles note a good demand and a growing appreciation of the goods. Demand for various mechanicals keeps up well on account of increasing activity in the building trades. Lately there have been many large sales of radiator hose to coast concerns making automobiles, and rubber manufacturers and jobbers report an excellent demand for tire repair stocks and automobile accessories. In druggists' sundries, which of late had been somewhat quiet, interest has been awakened, and the big chain drug stores have been adding considerably to their stock of staples. Anticipating a good holiday trade, dealers in rubber toys and novelties are also doing much shopping.

Jobbers report a good outlook for rubber footwear in the fall and winter, and are adding to their orders for the 1922 spring stock. There is still a good inquiry for mining, lumbering, and cement workers' shoes, as well as heavy boots for fishermen and irrigation workers. Orders for tennis and sport shoes hold up well in the southern section, and there is a good demand for rubbers from the northern section, where the rains set in early. The same is true regarding raincoats for men and women, business being aided by the display of some new and attractive models, especially in women's rainproof garments.

LOS ANGELES AND VICINITY

Fred S. Wilson, vice-president and Pacific Coast manager for the Thermoid Rubber Co., Trenton, New Jersey, is now located at 238 Marsh Strong Building, Los Angeles, California.

The Dayton Rubber Manufacturing Co., Dayton, Ohio, has increased the sales force of its Los Angeles branch, and has recently appointed W. E. McCarthy as branch manager. Mr. McCarthy was previously sales manager for the Owen Tire & Rubber Co.

The B. F. Goodrich Rubber Co.'s Los Angeles branch is now in its new quarters in the Union Terminal Building, Seventh and Alameda streets. A considerable increase in warehouse room, better trucking accommodation, and a Southern Pacific Railway spur are some of the advantages gained by the new location. The branch will deal solely with the jobbing and wholesale trade.

The rubber industry was well represented at the Industrial and Trade Exposition held during the week of August 15 to 20, inclusive, at the new Union Terminal Building, to mark Los Angeles' promotion to tenth place in the nation's list of industrial centers. Six acres of warehouse space were devoted to the exhibits, of which the Goodyear Tire & Rubber Company of California had one of the most striking. A moving picture illustrated the process of tire making, and the Goodyear Textile Mills Co. made an exhibit of tire fabrics. Vice-president A. F. Osterloh of the Goodyear company was chairman of the manufacturers' committee of the Chamber of Commerce which sponsored the big show.

The California Cord Tire Co., 831 West Eighth street, Los Angeles, confines itself to marketing one tire, the California cord, size 30 by 3½, retailing at $20, which is made for the company by the Mid-Continent Tire Manufacturing Co., Wichita, Kansas. The California company is figuring on having its own plant on the Coast in the near future.

Paper mill owners, who formerly sent their big rolls East to be rubber covered, are now sending them to the Pacific Coast. The West American Rubber Co., 400 North Avenue 19, Los Angeles, has just covered its seventh roll, one of 4,000 pounds, and will shortly take on a heavier one. Some of the rolls weigh 6,000 pounds. The company has been doing very well with oil-pump valves and various mechanicals, and has also been making, among other specialties, many large rubber fishes for the motion picture industry.

SAN FRANCISCO AND VICINITY

Pawling & Harnischfeger Co., Milwaukee, Wisconsin, reports that its San Francisco office address has been recently changed from the Monadnock Building to 32 Beale street. R. M. Taylor, district manager for the Pacific Coast, has his headquarters at the new address. J. McFerran Taylor is a new member of the Pacific Coast sales force.

A branch house and warehouse has been opened at both Los Angeles and San Francisco by the Howe Rubber Co., Inc., Cleveland, Ohio, both under the management of C. A. Mullen.

Gilbert E. Foy, a former salesman, has been appointed manager of the San Francisco branch of The Spreckels "Savage" Tire Co., San Diego, California.

The Pioneer Rubber Mills, Pittsburg, California, and with main offices at 68-70 Sacramento street, San Francisco, is now operating at full capacity its recently completed unit solely devoted to the production of molded garden hose. The building is 85 by 240 feet, and is equipped to turn out 37,500 feet of hose daily. The old molding process has been discarded and a new hydraulic press has been installed that assures a practically unblemished product for every 500 feet cured in the big machine. The company has 300 men at work, and all its departments are working to full capacity.

The United States Rubber Co.'s San Francisco branch has received very encouraging reports from distributers, and hose and tires have been running particularly strong. The general average of sales is very much better than a year ago.

The Wellman-Seaver-Morgan Co. has made many sales of machinery recently to rubber mills in the coast district, and the officials report prospects as excellent.

The Coast Tire & Rubber Co., which recently finished the first unit of its plant at East 12th street and 48th avenue, Oakland, California, besides a large output of tubes and flaps, is making 140 tires daily, mostly cords, ranging from 30 by 3½ to 40 by 8. When the daily output reaches 500 the management intends to begin the building of the second unit of the plant.

SOUTHWESTERN NOTES

The plant of the Arizona Asbestos Association at Chrysostil, Arizona, which supplied considerable material to rubber manufacturers specializing in brake linings, has been closed, owing to a considerable falling off in orders. Very few asbestos mines in Gila county are reported to be busy, the impression being that buyers have accumulated more than enough to satisfy their needs for a long while.

Plans are being considered by Arizona and California cotton growers for sending their large surplus of "white gold," for which they had expected a much larger demand from the rubber tire and textile manufacturers, to the idle mills in Czecho-Slovakia. The finished product would then be marketed in England and the proceeds, less cost of weaving, etc., would accrue to the southwestern cotton raisers. The plan was recently outlined by Charles F. Wood, vice-president of the Warrant Warehouse Co., Birmingham, Alabama, to a group of planters and bankers in Los Angeles.

An excellent exhibit of guayule, chicle, and castilloa gums was made by the Government of Mexico at the recent Industrial and Trade Exposition in Los Angeles, and a strong appeal was made for investment in rubber growing and manufacturing in the southern republic.

Arrangements have been completed by the Dayton Rubber Manufacturing Co., Dayton, Ohio, for warehouse accommodations in Dallas, Texas, where a full stock of tires will be carried. C. K. Callaway, formerly with the Brunswick Tire & Rubber Co., Chicago, Illinois, is in charge of the Dallas branch.

Ford Dix II, representing the Howe Rubber Co., Inc., Cleveland, Ohio, is now covering Texas, Arkansas, and Oklahoma.

NORTHWESTERN NOTES

The Olympic Tire & Rubber Co. announces a change of address from 217 Lyon Building, Seattle, to the plant at Kent, Washington. B. G. Nelson is president of the company.

UNITED STATES TIRE CO. DEVELOPS NEW TIRE

Car designers are finding it desirable to build cars closer to the ground, thus getting a lower center of gravity with increased ability to stay on the road at all speeds. Following this innovation the United States Tire Co. has developed a 31 by 4 straight-side Royal cord tire, a size heretofore unknown among cord tires. The tire is to be mounted on a 30 by 3½-inch straight-side rim, having the standard 3½-inch straight-side cross-sectional contour. The rim will be the same as the 32 by 3½-inch straight-side rim except that it will be 23 inches in diameter instead of 25 inches.

This tire is in no way a substitute for the 31 by 4 clincher tire, nor can it be mounted on a 30 by 3½-inch clincher rim. It is of interest as being an extension of the straight-side principle into those sizes of tires which heretofore have been almost exclusively of the clincher bead type. By changing clincher rims to straight-side, cars can be equipped with 4-inch cord tires, and this is often necessary when there is particularly heavy service. Many rim and wheel manufacturers are now preparing to furnish 30 by 3½ straight-side equipment to interchange with their standard 30 by 3½ clincher demountable rims.

The Rubber Trade in Great Britain

By Our Regular Correspondent

The exceptionally hot and dry summer we are experiencing has been altogether against the sale of the accumulated stocks of waterproofs and raincoats. Moreover, there can be no activity in the sale of garden hose when the authorities forbid its use.

THE PLANTATION RUBBER SITUATION

These are insignificant matters in comparison with the immediate future of the rubber planting industry, a topic that is receiving serious consideration now that the Rubber Exhibition is out of the way. It has been pointed out by an authority that there is no other great industry producing a raw material in which one class of owner forms 75 per cent of the whole, or in which one nationality—British—is in the position to control nearly three-quarters of the world's production.

With regard to decreased output the Rubber Growers' Association did not propose a 25 per cent restriction on the 1920 output, but a similar reduction on the estimated output for 1921, and allowing for the average normal increase on the total area held by both old and young producers it means in reality a reduction of 18 per cent, which, under the circumstances, is of little or no use. There has been a tendency to say that no universal policy of restriction is possible, owing to the diversity of interests involved. Although the small native producer markets rubber of quality inferior to that of the large companies, yet his producing costs are so much lower that he is not faced with the bankruptcy which threatens the producer of superior rubber who cannot expect to get his costs down to 4*d.* a pound.

It now remains to be seen what response will be given to the new scheme for the salvation of the industry, an outline of which is published elsewhere in this issue. The plan is, in effect, a thoroughgoing valorization scheme, whereby the Rubber Producers' Corporation, Limited, is to be formed with a capital of £2,000,000. Whatever its merits or defects it is drastic enough.

It may be taken that this attempt to exercise effective control upon output will cause a "ring" whose operations will be looked upon with suspicion by outside planting interests. The consumers' interests would seem to be jeopardized, not perhaps at present, but certainly when demand does overtake supply, because the corporation will be in a position to exercise monopoly powers to the detriment of the consumer. As a means of support to the weaker companies by the stronger in the present acute state of depression there is nothing against it, as it will prevent land from going out of production. It is only with the continuance of such philanthropy when normal conditions are restored that resentment will probably be felt by those who look upon all trusts and combines in trade as inimical to the general welfare of the country.

TIRE AND RECLAIMING ACTIVITIES

On the manufacturing side the principal item of note is a distinct revival in the tire branch. The Dunlop works at Birmingham have now been put on full time and in other works there is decidedly more doing. To some extent this may be attributed to the export of pneumatics to America, emissaries having been over to get details regarding the American requirements in cord tires, those now being supplied by some of our firms apart from the Palmer company. This company's cord tire, which dates back eighteen years, is now being made after a new type called the "Flexicord."

The reclaiming business shows decided signs of improvement. The Rubber Regenerating Co., Limited, Trafford Park, Manchester, after being closed for a period, restarted on full time in the middle of July, while the Xylos Rubber Co., Limited, a near neighbor which never came to a full stop, reports a decided improvement in business.

THE ACTION OF MANGANESE ON RUBBER

That the origin of tackiness in raw rubber may probably be due in many cases to the presence of manganese compound was contended by G. Bruni and C. Pelizzola in an interesting paper read at the late International Rubber Conference. The figures given certainly support the view put forward by Thomson and Lewis in 1891 that manganese oxide follows soon after copper oxide as a deleterious constituent in rubber proofings, more especially those which are cold-cured.

The case of chromium oxide is at the moment receiving special attention in America, it having long been a question whether it is dangerous or not. It has been customary to test constituents of rubber mixings for manganese compounds, not so much in the case of metallic oxides like zinc, where it may occur in traces, but in regard to ochres and umbers, the latter especially being proven to contain it in quantity.

The origin of the manganese found in raw rubber appears to be two-fold, it coming either from the soil or from traces of permanganate used as a disinfectant. All possessors of old textbooks on analytical chemistry know of the warning given against using burettes with rubber connections for standard permanganate solutions, and the recommendations to deodorize rubber goods by permanganate solution have only emanated from people ignorant of the chemistry of rubber. With regard to the presence of manganese in the ash of raw rubber, no doubt careful testing will find that it is quite widely distributed in the soil. Like the so-called rare element, titanium, which careful examination has shown to be widely distributed in the earth's crust, manganese and other metals may be discovered albeit in infinitesimal amount by the dissector's scalpel.

I am reminded here of the recent investigation into the composition of coal ash by Sinnatt. Manganese in greater or lesser quantity has been found as an almost invariable constituent and it has been plausibly advanced that it acts as a catalytic agent in the case of certain coals notorious for liability to spontaneous combustion, the amount of manganese in such coals having been found high.

HEAT EFFECTS

Considering the number of cases of fire, whether by spontaneous combustion or not, during the hot summer, the rubber industry has been surprisingly immune. In France the large celluloid factory at Epinay took fire and was burned out on July 12. On the following day a large government dump of 500 tons of scrap rubber at Iver Bucks was destroyed by fire, and as it was presumably vulcanized it is not surprising that the firemen had to wear gas-masks. It is a coincidence that when this rubber was previously stored at Wapping on the Thames estuary last October it was on fire. On this occasion three firemen died and several other men were seriously injured.

On July 23, an outbreak of fire, the cause of which is unknown, occurred at the old established rubber works of J. L. Hancock, Limited, London, E. C. Two buildings of four floors, one 120 by 60 feet, and the other 60 by 40 feet, were involved, though the damage done was not very serious.

SOCIETY OF CHEMICAL INDUSTRY

The annual meeting of the Society of Chemical Industry was held at Montreal, Canada, August 29 to 31, and those members who attended derived much pleasure and instruction from the elaborate program prepared by the Montreal and Toronto Sec-

tions of the Society. On the conclusion of the Canadian visits the members traveled to New York City, to be entertained by the American Chemical Society and attend its meetings. They will also have an opportunity to visit the National Exposition of Chemical Industries in New York City. Among the nominations for new members of the Council is W. A. Williams, works manager of the North British Rubber Co., Limited, Edinburgh, Scotland.

THE MANUFACTURE OF DIPPED GOODS

No doubt many have read with interest the article by John Hadfield in The India Rubber World of July 1, on this subject. This branch is not widely distributed in Great Britain, only four or five of our large works touching it, and though there are one or two small works engaged, there are certainly no numerous small manufacturers as appears to be the case in America. At the time when I was in close touch with this branch—now a good many years ago—all joints in balloons, etc., were made by machine hammering, the girls in attendance having cotton in their ears, owing to the deafening noise. Now, the dipping process is generally employed.

Under the heading of cement it is stated that the solvent employed is 56 to 58-degree naphtha. I am not just clear as to the meaning of degree in this connection, or as to the origin of the naphtha, whether coal, tar, petroleum or shale. But it is stated that this naphtha should completely distil under 150 degrees F. This seems a very low point and I cannot help thinking that 150 degrees C. is intended.

The reference to the use of transparent first latex rubber reminds me of a conversation I had with Kelway Bamber on the subject, at the first London Rubber Exhibition, and of a pamphlet he gave me dealing with its potential advantages in this branch of rubber manufacture.

The manufacture of household rubber gloves is a larger business in America than in England because the American woman has been accustomed to do considerable of her own housework in rubber gloves for years, whereas, a similar state of affairs did not arise here until war work at high rates of pay reduced the supply of domestic servants to a minimum. To the best of my knowledge the cotton glove is more popular here, but that is by the way.

With reference to the vapor cure nothing is said as to the materials of the curing chamber or as to how the uniform temperature of 180 degrees F. is maintained.

THE RUBBER CLUB OF GREAT BRITAIN, LIMITED

Just a year after the project was first suggested in Manchester, the Rubber Club has been registered as a company limited by guaranty. The main obstacle to the progress which was anticipated by the promoting spirit has been the absence of support accorded by the principal manufacturers and it remains to be seen how their abstention from membership will affect the progress and future of the club. The council which will manage the affairs of the club is composed as follows: A. B. Cook, Anderson, Anderson & Anderson, Limited; J. H. C. Brooking, St. Helens Cable & Rubber Co., Limited; G. E. Watson; T. B Burrows, Wm. Somervilles' Sons' Rubber Co., Limited; O. Latham, raw rubber merchant; W. G. Abbott, Abbott, Anderson & Abbott, Limited; F. C. Jones, Reliance Rubber Co., Limited; H. W. H. Standring, journalist; J. L. Lake, rubber manufacturers' agent; W. H. Hatton, Premier Waterproof & Rubber Co., Limited.

THE LATE W. H. BATES

The death of W. H. Bates, one of the oldest rubber manufacturers, will be regretted by a wide circle of friends, though, owing to his advanced age of 88 years, he had naturally not taken an active part in the business of the well-known firm of W. & A. Bates, Limited, St. Mary's Mills, Leicester, of which he was the founder in 1863.

BRITISH NOTES

J. W. Reeves, formerly connected with Rubber Products, Limited, has recently become associated with Cooper & Layman, Limited, 30 Mincing Lane, London, E. C. 3, England, and will have charge of the latter company's rubber department.

Crude rubber represented one of the leading exports from Liverpool to the United States during the years 1919 and 1920. In 1919 the number of pounds exported is estimated at 7,247,838, with a value of $2,985,350. In 1920 the amount was 2,206,856 pounds, valued at $1,199,424.

Press reports state that the United Malaysian Rubber Co., which acquired stock of the Malaysian Rubber Co. of New Jersey in 1910, has been forced into liquidation with a deficit of almost £2,500,000. The company, formed ten years ago at the height of the rubber boom, imported and exported Eastern produce, doing business in Singapore, England and America. Losses incurred in Singapore are reported to be the cause of the failure.

The judges of the Rubber Growers' Association prize competition for new and extended uses of rubber, report that they are unable to announce the awards until tests have been made to prove or disprove the practicability of certain suggestions that were entered in the competition. The 2,000 entries have necessitated many meetings and careful consideration by the judges.

ENGLISH MOTORCYCLES DISPLAY NEW FEATURES

Many of the new English motorcycles have interchangeable wheels. In other cases where the wheels are not actually interchangeable, provision is frequently made to allow the rear wheel to be readily withdrawn, the knock-out rear spindle system being utilized for this purpose.

An increasing tendency is also noted toward using tires of larger cross section for the heavier classes of cycles. At present the largest standard wheel and tire size is 28 by 3 inches, but in the heavier tires it is probable that 3½-inch tires will not be unusual in the near future. The 26-inch diameter wheel is, however, the usual size with a 2½-inch tire for medium-weight machines. For the lightweights a good many makers use 24-inch by 2¼-inch wheels and tires, though quite as many fit wheels of 26-inch diameter.

EXTRACTS FROM THE REPORT OF THE RIVERSIDE (SELANGOR) RUBBER CO., LIMITED

The Riverside (Selangor) Rubber Co., Limited, 46 Charlotte Square, Edinburgh, has submitted a balance sheet for the year ended December 31, 1920. The present firm was incorporated March 17, 1920, and took over, as a going concern, the affairs of the former company of the same name. From the report of this company the following items are taken:

The rubber estates of the firm are in the Federated Malay States, and the total acreage planted represents 2,206.50 acres. It was estimated that the crop for the year 1920 would be 530,000 pounds of dry rubber. In accordance with the recommendations of the Rubber Growers' Association, the crop was restricted by 25 per cent as from November last. But for this restriction, the estimate would probably have been secured. The total crop collected (after allowing for loss of weight in transit) was 510,932 pounds.

For the purpose of comparison with the results of the previous five years of the old company, the following statement is given:

Year	Crop lbs. dry rubber	Gross average price realized per lb. s. d.	Cost of production f.o.b. per lb. s. d.	Selling charges, including freight and insurances, per lb. d.	Administration expenses, including directors' fees, per lb. d.	Cost of production "all in," per lb. s. d.	Profit for year before paying income tax £.
1915	330,756	2/ 7.85	8.58	1.69	.70	10.97	29,208
1916	405,520	2/ 5.65	9.60	1.28	.69	11.57	31,468
1917	372,000	2/ 1.68	10.30	1.51	.77	1/ 0.58	21,294
1918	326,852	1/10.30	1/ 0.24	1.18	.94	1/ 2.36	11,744
1919	376,310	2/ 1.71	1/ 0.82	1.15	.74	1/ 2.71	17,595
1920	510,932	1/ 2.39	1/ 0.29	1.02	.73	1/ 2.04	1,240

The International Rubber Exhibition

By George M. Naylor[1]

Practically every nation in the world in the tropics, or possessing colonies in the tropics, was represented at the London rubber exhibition this year, the principal government exhibitors being: British Malaya, Ceylon, North Borneo various British African colonies, and Egypt; the Philippines, Netherlands East Indies, French West Africa, French East Africa, and Siam; Belgian Congo, Portugal, Madagascar, and Brazil.

Professor Wyndham R. Dunstan, C. M. G., LL.D., F. R. S.,
Vice-President, Fifth International Rubber Exhibition

Other firm exhibits represented estates agents, rubber manufacturers, makers of rubber machinery, reclaimers of rubber, dealers in chemicals and rubber substitutes, and dealers in various tropical products. A new process for preparing crude rubber was also shown.

Probably the most interesting of the government exhibits from the crude rubber standpoint was that of the Netherlands East Indies. There were pamphlets showing the research work done at the Central Rubber Station, Buitenzorg, Java, and translations of one or two lectures by Dr. de Vries. A series of photographs showed the Central Rubber Station. A display consisting of a piece of ribbed smoked sheet, a piece of the sheet after breaking down, a third piece after compounding, and finally some vulcanized test rings, conveyed the idea that, as far as the final product is concerned, all effort expended in making a nice-looking sheet is wasted. Although it may seem absurd to the rubber manufacturer, this is actually news to some estate managers and to many rubber brokers in Singapore.

The method of testing samples of rubber and several graphs used for plotting the results of the tests were exhibited. The progress made by estates in the Netherlands Indies in producing a uniform rubber both in sheet and crêpe was illustrated by several charts showing the variability in curing rate before, and the uniformity in curing rate after adopting the standard method recommended by the Central Rubber Station at Buitenzorg. The degree of uniformity obtained by separate and grouped estates, as shown by charts illustrating the results of tensile tests, was quite remarkable.

In this the Netherlands East Indies are much in advance of British Malaya, for although the Agricultural Department of Malaya recommends various methods in the different stages of rubber preparation it does not recommend any one uniform method, with the result that practically every British estate varies in the method of rubber preparation.

Crêpes of various degrees of color were shown; first, a standard pale crêpe as accepted by the market; second, a crêpe prepared on a manufacturer's estate for his own use illustrating the disregard of color. Following this were various "off color" crêpes, some from improper handling of the coagulant, others from trees tapped after resting, causing the latex to coagulate too slowly—and brown crêpes made from lump and scrap.

An exhibit of special interest to crude rubber buyers and estate men was the display of several samples of defective crêpe and giving the following reasons for the defects:

Coagulation Faults: (1) Streaky crêpe caused by oxidation of serum on the surface of the coagulum which was due to too slow handling of the rubber. (2) Streaky crêpe caused by allowing partially precoagulated latex to stand too long before adding coagulant, also by adding improperly diluted acid, or improper mixing of diluted acid with the latex.

Faults During Rolling: (1) Discolored from rolls. (a) Rolls allowed to become rusty—a rare fault. (b) Crêpe run in a machine which had been running empty for some time, creating fine iron filings. These are run in the crêpe and on second rolling become throughly pressed in, causing gray stripes in the crêpe. (2) Crêpe containing cotton from native's clothing becoming entangled in the mills.

Drying Faults: (1) Slightly streaky crêpe caused by unevenly rolled and unevenly dried crêpe. (2) Pink, blue, yellow and green spotted crêpe, caused by insufficient drying space, resulting in the crêpe being taken down before thoroughly dry and lying folded up, which almost invariably causes the development of micro-organisms showing in the small colored spots so often seen in pale and palish crêpes.

Colored Spots in Crêpe: (1) The spots mentioned above sometimes develop in wet crêpe still hanging, and unless the remainder of the crêpe is removed from the shed at once and the shed disinfected these spots spread throughout the entire lot in a few hours. (2) Red streaks caused by the saliva of a native chewing betel nut. (3) Red discoloring caused by red lead from the pipes during crêping. (4) Dark streaks found in lump scrap crêpe which has been allowed to stand and heat, or overoxidize before crêping. These streaks often become soft and sticky and gradually spread throughout the rubber. (5) and (6) A clear lump crêpe and a red discolored lump crêpe (cause not given) which give the same results in testing for tensile strength. (7) Oil-streaked crêpe caused by oil from bearings resulting in very uniform vulcanization. (8) Sticky brown streaks caused by oil containing copper from bearings. This stickiness will gradually spread throughout all the latex with which it comes in contact.

An exhibit similar to the preceding one displayed the various defects in ribbed smoked sheets and the reasons for these imperfections.

Air bubbles in the sheets are caused by: (1) Insufficient mixing of coagulant with latex. (2) Prematurely coagulated latex. (3) Failure to properly skim foamy substance from the surface of the latex. (4) Insufficient dilution of latex causing fermentation of proteins during the drying process which in turn creates gases resulting in bubbles.

Dark and light patches in sheet are caused by surface discoloration of coagulum.

Blistered sheet caused by too high temperature in the smoke house.

Sheet containing sand. This is due to the removal of all undergrowth as well as dead leaves from estates, leaving bare ground, resulting in sand being blown into the latex cups.

Barky sheet due to insufficient attention to latex strainers.

[1]The Fisk Far East Limited, Singapore, S.S.

Sheets with light streaks across the center, due to insufficient turning of the sheets in the smoke house.

The fact that good appearance of rubber does not guarantee good quality was demonstrated by several lots of the best pale crêpe One lot containing .02-gram of copper sulphate added to latex will deteriorate within two years. Another crêpe of the same appearance containing .2-gram of copper sulphate will become a sticky mass within a year. Another lot coagulated with hydrochloric acid, a very slow-curing rubber, will soon become a sticky mass. There were sheets coagulated with alum—as is the case on most native estates—and very elastic and strong on hand pulling but showing abnormal vulcanizing properties.

Latex coagulated by electricity without acid was hardly satisfactory, as a part of the coagulum—15 to 20 per cent, precoagulated—has the appearance and properties of lump crêpe and the remainder although of appearance and quality of average fine pale, shows no improvement over acetic acid coagulation.

A display of rubber prepared by various methods included: slab rubber coagulated by acetic acid and cut into blocks giving good tensile tests; rubber prepared after the fine hard Pará method (There were several balls of this type displayed which were of the same appearance as Brazilian Pará. The Netherlands Government is attempting to get all native estates to prepare their rubber after this method rather than the usual alum coagulation, as the equipment necessary is inexpensive.); unsightly alum-coagulated native sheets prepared after the usual native fashion; rubber of the appearance of clean unsmoked sheet prepared without acid by slowly revolving a large broad drum, the bottom portion of which comes in contact with a pan of latex, the upper portion passing through a current of warm air.

Next came several illustrations of bark and root diseases and their cures, such as pink disease, mouldy rot, white ants, boring insects, etc. Following this was a display of Hevea tree trunks showing various ideas in tree tapping from the old "herring-bone" method to the present method of one-third or one-quarter alternate-day tapping allowing six or eight years bark removal.

Another exhibit was a bale of rubber packed in straw matting sewed together with a coarse twine and bound with metal straps, the total cost including labor being given at 5/3.

At one side was a display of gutta percha of excellent quality with a chart showing the relative values obtained from various methods of production, the most approved method being that of obtaining the gutta percha by grinding up the leaves and subjecting them to an extraction process.

The exhibit of the Government of Malaya, while fairly extensive, did not compare to that of the Netherlands East Indies, and consisted of samples of pale crêpe, ribbed smoked sheet, and slab rubber both in slab and crêpe form. There were displays of root, bark and leaf diseases and pests of the rubber tree, and various methods of tapping were illustrated by sections of tree trunks.

The Government of Ceylon's exhibit was similar to that of Malaya, showing samples of thick Ceylon crêpe and scrap grades. Several rubber tree stumps and trunks were in evidence, illustrating the effect of various diseases as well as methods of tapping.

The next government exhibit in the order of interest from the standpoint of crude rubber, was that of Brazil. Although an extensive exhibit, rubber held only a minor place, consisting of displays of fine hard Pará in form of "Pigs" and "Knapsacks." The remainder of the exhibit displayed all of the principal products of the country, including cotton, coffee, sugar, tobacco, timber, hides, wool, meats, minerals and manufactured goods.

Among the exhibits of estate agents those of Harrisons & Crosfield, Limited, Francis Peek & Co., Limited, and Guthrie & Co., Limited, were of great interest. These exhibits displayed samples of fine pale, ribbed smoked sheet, and scrap crêpes from their various estates, which were of prime appearance. Other displays consisted of tree diseases and cures, illustrations of tapping, implements and tools used on estates, models of estate bungalows and smoke houses, estate machinery, etc., and various other tropical products.

Much interest is being shown on the part of crude rubber producers in the development of rubber roadways. An exhibit showing the methods of paving and the progress made was the subject of much discussion, as it is the hope of rubber planters that some new and extensive use of rubber will soon be found to insure the consumption of the large output now being produced.

FOREIGN TARIFFS

FRANCE

FURTHER tariff increases which apply to the importation of goods into France have been recently made, and the "coefficient" plan has again been made use of.

The coefficient is the figure by which the original rate of duty must be multiplied to find the new rate of duty. For example, the original rate of duty on belting, hose, and other mechanical rubber goods was 70 francs per 100 kilos. The revision of July, 1919, applied the coefficient of 1.5 to this making the total rate 70 times 1.5=105 francs per 100 kilos. The fresh revision applies the coefficient of 4.0, raising the rate to 280 francs per 100 kilos.

The following includes the most important items of interest to the rubber industry:

No. in French Tariff	Article	Tariff Duty. 100 Kilos N. Francs	Coefficient of Increase Former	Coefficient of Increase Present
ex 620	India rubber and gutta percha manufactures:			
	Sheets of india rubber, pure, not vulcanized	20	1.1	1.7
	Threads of vulcanized india rubber more than 3 mm. in thickness or diameter	20	1.3	2
	Elastic tissues	200	1.7	2
	Rubbered tissues in pieces	135	1.9	3.3
	Made-up articles of rubbered tissues weighing 400 grams or less per square metre and having 44 threads or more in warp and weft in a square of 5 mm. side	450	1.7	2
	Clothing, accessories of clothing and made-up articles other than those included in the following paragraphs:			
	Dress shields	250	1.4	1.8
	Braces, garters, stocking or sock suspenders, belts of threads of textiles, other than natural or artificial silk	250	1.4	1.8
	Of threads of natural or artificial silk, combined or not with other materials	300	1.4	3
	Other	250	2	3
	Special rubbered tissues for cards, without the teeth	70	2.4	2.6
	Footwear	100	2.1	2.6
	Treads, air tubes, or pneumatic tires, blocks, solid tires for vehicle wheels rough, worked, or finished	80	1.3	1.5
	Treads air tubes, or pneumatic tires, covers for cycle wheels, rough, worked, or finished	220	1.3	Same coefficient as for detached cycle parts
	Belting, hose valves, and other articles of india rubber or gutta percha, pure or mixed, flexible or hard, combined or not with tissues or other materials	70	1.5	4
620 bis	Manufactures of asbestos or amianthus:			
	Paper or board	50	2	2.7
	Threads and cords, combined or not with other materials	60	2.3	3.3
	Plaits, tissues and other manufactures with or without additions of other materials	75	2.3	3.3
	Lace of asbestos	..	2.3	Same coefficient as for cotton lace

Articles not elsewhere mentioned, of asbestos, paper, or tissue of asbestos, namely, tissue of rubbered asbestos, articles of rubbered asbestos, gloves, clothing, caps, masks, boots and shoes, cushions of asbestos tissue (and also rubbered), all these articles, even combined with other materials, are dutiable under No. 620 bis, unless they become liable to higher duties by reason of such combination.

ITALY

The new customs tariff of Italy, which went into effect July 1 last, is based on the law submitted by a Royal Commission in 1913,

which laws were later modified in August, 1920, and in January, 1921. Provision has been made, however, in the new tariff, for an increase of these basic rates by a series of "coefficients of increase" which indicates the figure by which the duty is to be multiplied to determine the amount to be added in order to arrive at the total duty payable. The new duties are subject to a surtax when payment is not made in gold.

Category XLIII.—Rubber and Gutta-Percha

Tariff No.	Articles	Import Duty (Gold Lire) Lire c.	Co-efficient of increase
826	Rubber:		
a	Raw	Free	..
b	Re-manufactured	20.00	..
c	Mixed with other substances not vulcanized ... 100 *kilogs.*	50.00	..
827	Rubber sheets and plates:		
a	Cut ... 100 *kilogs*	80.00	0.2
b	Other:		
	1. Combined with tissues or with tissues inserted ... 100 *kilogs.*	70.00	0.3
	2. Containing metal threads or metal gauze ... 100 *kilogs.*	40.00	0.3
	3. Not specially mentioned ... 100 *kilogs.*	60.00	0.2
828	Rubber tubes:		
a	Of cut sheet ... 100 *kilogs.*	100.00	0.3
b	Other:		
	1. Combined with tissues or with tissues inserted ... 100 *kilogs.*	80.00	0.3
	2. Containing metal threads or metal gauze ... 100 *kilogs.*	50.00	0.3
	3. Not specially mentioned, except those for inner tubes of tires ... 100 *kilogs.*	70.00	0.2
829	Rubber cords, even combined with textile materials ... 100 *kilogs*	60.0[illegible]	0.2
830	Threads of rubber of a thickness of:		
a	Up to 3 mm ... 100 *kilogs.*	150.00	0.1
b	More than 3 mm ... 100 *kilogs.*	100.00	0.1
831	Disks, even if perforated, bands and valves, or tubes of rubber:		
a	Of cut sheets ... 100 *kilogs.*	110.00	0.2
b	Other:		
	1. Combined with tissues or with inserted tissues ... 100 *kilogs.*	90.00	0.3
	2. Not specially mentioned ... 100 *kilogs.*	80.00	0.2
832	Tires and covers of rubber for vehicle wheels:		
a	Combined with metal ... 100 *kilogs.*	60.00	0.3
b	Other, even if combined with tissues ... 100 *kilogs.*	80.00	0.3
833	Mats (*baderne*):		
a	Combined with metal ... 100 *kilogs.*	60.00	0.3
b	Other ... 100 *kilogs.*	80.00	0.3
834	Pneumatic tires and inner tubes, for vehicle wheels, even combined with tissues ... 100 *kilogs.*	100.00	0.1
835	Transmission belts of rubber, combined with tissues or with inserted tissues ... 100 *kilogs.*	80.00	0.3
836	Carpets of rubber:		
a	Combined with tissues or with inserted tissues ... 100 *kilogs.*	70.00	0.3
b	Other ... 100 *kilogs.*	60.00	0.2
837	Rubbered tissues, in the piece:		
a	Of silk or mixed with more than 50 per cent. of silk	Duty on the silk tissue according to kind.	..
b	Other	Duty on the tissue according to quality increased by 20 lire per 100 kilogs.	..
	Tissues consisting of several layers, joined by layers of rubber, in the composition of which tissues of different textile materials enter, are classified as rubbered of the most highly-taxed tissue of which they are composed.		
	Tissues, unbleached or bleached, covered with colored rubber, are not considered as dyed.		
838	Elastic trimmings, ribbons, galloons, bands, nets and tissues:		
a	Mixed with vegetable textile materials ... 100 *kilogs.*	1[illegible]0.00	0.3
b	Other	Duty on trimmings, ribbons, galloons, bands, nets and tissues of the textile material of which they are composed.	
839	Wearing apparel and traveling requisites, of rubbered tissues:	Duty on the rubbered tissue of which they are mainly composed, increased by 25 per cent.	
840	Manufactures not specially mentioned, of rubbered tissues:	Duty on the rubbered tissue of which they are mainly composed, increased by 25 per cent.	
841	Gloves of rubber:		
a	Weighing 50 grams or less per pair *kilog.*	4.00	0.2
b	Other, including parts of gloves ... *kilog.*	2.50	0.5
842	Cakes and pieces of india rubber, for erasers, even with wooden sheaths ... *kilog.*	80.00	0.1
843	Manufactures, not specially mentioned, of rubber:		
a	Of cut sheets ... *kilog.*	150.00	0.2
b	Other ... *kilog.*	90.00	0.3
844	Ebonite:		
a	In sheets or in thin plates ... *kilog.*	80.00	0.3
b	In cylinders or tubes ... *kilog.*	100.00	0.3
c	Manufactures, not specially mentioned ... *kilog.*	150.00	0.3
845	Gutta percha:		
a	Raw	Free	..
b	In sheets or thin plates of a thickness of:		
	1. 0.5-mm. or more ... 100 *kilogs.*	60.00	0.2
	2. Less than 0.5-mm ... 100 *kilogs.*	100.00	0.2
c	Manufactures, not specially mentioned ... 100 *kilogs.*	120.00	0.3

AUSTRALIA

The changes in Australian import duties, which became effective June 30, 1921, are as follows: galoshes (Item No. 328) have a general rate of duty at two shillings a pair, and preferential rate of duty one shilling and sixpence a pair. These articles, ad valorem, have a general and preferential rate of duty of 35 per cent and 25 per cent respectively. Under Item No. 332 rubber stoppers or corks are omitted, while subhead (C) is amended to read "Floor covering and floor and carriage mats of rubber, on and after May 28, 1921." Under Item No. 351 (B), "brakes and transmission linings" are added.

The prohibition of April 2, 1919, against the importation of rubber-covered wire without prescribed labels has been amended. It has now been decided that a statement "Manufactured to Railways Signal Association's specification, 1919, for rubber covered wire" (or date of subsequent R. S. A. specification under which wire was manufactured) may be accepted as an alternative to the marking heretofore required.

BRITISH INDIA

The revised valuations, fixed by the Governor-General of British India, were issued May 21, 1921. Among articles classed as miscellaneous, and also wholly or mainly manufactured, were the following:

	Tariff valuation	Duty Per Cent
Pneumatic rubber tires and tubes for motor cars, motor lorries, motor cycles, motor scooters, bicycles and tricycles	Ad valorem	20
Rubber tires and other manufactures of rubber, not otherwise specified	Ad valorem	11

SPAIN

On the eighth of July last the new customs tariff for Spain became effective. This tariff supersedes all those previously published. Import tariff items which relate to the rubber industry are as follows:

Imports

Tariff No.		Duties 1st Tariff Pes. c.	2nd Tariff Pes. c.
	Asbestos		
28	In sheets or plates, with or without admixture of other materials (excepting rubber or metal wire), including tiles, tubes and pipes, of asbestos and cement ... 100 *kilogs.* G	125.00	50.00
30	Manufactured, with admixture of rubber or metal, into couplings for machines, braids, plates, belts and other articles ... 100 *kilogs.*	300.00	150.00
	Balloons		
	Of rubbered silk, weighing:		
712	Less than 300 kilogs ... *kilog.*	1.00	0.50
713	300 kilogs. and more ... *kilog.*	1.20	0.60
	Of other fabrics, varnished or rubbered, weighing:		
714	Less than 500 kilogs ... *kilog.*	0.30	0.15
715	500 kilogs. and more ... *kilog.*	0.40	0.18
	Rubber, gutta percha and the like		
1376	Pure, without admixture of other materials, of the natural color or red, in sheets up to 2 mm., inclusive, in thickness, not vulcanized, called "English sheet," with a specific gravity not greater than 1 ... *kilog.*	0.45	0.[illegible]0
	Vulcanized		
1377	Threads up to 1 mm. thick ... *kilog.*	6.00	1.30
1378	Threads more than 1 mm. thick ... *kilog.*	10.00	5.00

Tariff No.		Duties: 1st Tariff. Pes. c.	Duties: 2nd Tariff. Pes. c.
1379	Elastic rings and armlets; bands up to 3 mm. thick and up to 5 cm. wide, for insulating electric wires and cables; guiding belts for the manufacture of paper and billiard-table cushions...*kilog.*	12.00	6.00
1380	Raw or washed, even if in blocks, artificial rubber and other imitations of rubber, not manufactured........................100 *kilogs.* G	5.00	1.00
	Tubes, weighing per meter		
1381	Less than 15 grams....................*kilog.*	12.00	6.00
1382	From 15 to 50 grams inclusive...........*kilog.*	11.00	3.50
1383	More than 50 grams......................*kilog.*	8.00	2.50
1384	Hose pipes or tubes, rings and sheets not included in other tariff numbers, washers, machine packing and foot-wipers ("limpiabarros") even if strengthened with textile fibers or iron, brass or other wire, and tiles for paving with or without part of other materials..........*kilog.*	7.00	2.30
1385	Transmission belts, disks and valves for machinery, and borseshoes, whether or not strengthened or combined with other materials.........*kilog.*	15.00	3.00
1386	Solid tires for carriages.....................*kilog.*	11.00	3.50
1387	Tires with metal studs (armaduras)........*kilog.*	6.00	2.00
1388	Inner tubes, used or not..................*kilog.*	19.00	7.50
1389	Outer (tire) covers, used or not, with or without parts of metal ....*kilog.*	15.00	5.00
1390	Articles of rubber for hygiene, orthopedic or medical purposes, without admixture of other materials ....*kilog.*	20.00	8.00
1391	Combs, hairpins and hatpins................*kilog.*	15.00	6.00
1392	Footwear, soles and heels, even with part of other materials except leather and skins........*kilog.*	12.00	4.00
1393	Dress preservers of rubber, and those of impregnated fabric, covered or lined with rubber.*kilog.*	18.00	6.00
1394	Articles not included under other tariff numbers even with part of other materials.........*kilog.*	15.00	5.00
	Cut into pieces, from tires, outer covers and inner tubes:		
1395	Of less than 0.5 meter..............100 *kilogs.*	700.00	135.00
1396	Longitudinal pieces less than 0.05 meter in width.............................100 *kilogs.*	5.00	1.00
	Fabrics impregnated or covered or lined with rubber, in the piece, weighing per square meter:		
1397	More than 800 grams.....................*kilog.*	21.00	7.00
1398	More than 400 and up to 800 grams inclusive.*kilog.*	18.00	6.00
1399	Up to 400 grams inclusive.................*kilog.*	15.00	5.00
1400	Elastic fabrics for boots and shoes..........*kilog.*	15.00	5.00
1401	Elastic hands with admixture of any textile fiber for garters, suspenders, braces and the like....*kilog.*	15.00	6.00
1402	The same, made up into the above mentioned articles ....*kilog.*	18.00	7.00
1403	Waterproof fabrics, made up into clothing, sewn or not*..*kilog.*	30.00	12.00
1412	Toys and games, of rubber and the like......*kilog.*	20.00	8.00
	Exports		
31	Tires, outer covers and inner tubes of rubber and the like, cut into pieces................100 *kilogs.*	50.00	....

Note.—Covers and pneumatic tires imported separately are dutiable as follows: In the case of covers, the dutiable weight is that of the cover plus the paper wrapping (whether or not this is the exterior packing), only the weight of the packing cloth (if any) being deducted; in the case of pneumatic tires, the dutiable weight is that of the tire plus the paper box or sheath of tissue which forms the interior packing.

Packing, belting and fabrics for machinery with admixture of rubber to the extent of more than 15 per cent by weight is dutiable as rubber.

*By "waterproof tissues" are to be understood those tissues which are furnished on one or both sides with a layer of india rubber, as also those coated inside with this material. Other waterproof tissues, into the composition of which india rubber does not enter, shall be dutiable according to those tariff numbers under which they fall by virtue of their quality and condition.

MEXICO

Among Mexican import duties which have been recently modified the following item was noted: elastic webbing, of cotton and india rubber, more than 4 cm. in width, is rated at 100 pesos per kilogram. When the width does not exceed 4 cm. the duty is rated at 1.50 per kilogram.

THE RUBBER TRADE IN EUROPE

FRANCE

Etablissements Hutchinson report net profits of 3,439,076 francs for the business year 1920-1921 against 3,702,825 francs for 1919-1920. A dividend of 50 francs a common share and of 30 francs on preferred shares was declared. New material and installations for the factory at Langlée cost 564,520 francs.

The Société Financière des Caoutchoucs is one of the many large planting firms that have decided not to distribute dividends for the business year just ended. For 1919 the dividend had been 15 francs per share. The report for 1920 shows that the financial condition is satisfactory. Net profits were 3,377,226 francs against 4,021,656 francs in 1919, loss in exchange alone being responsible for a decrease of 555,419 francs. Toward the end of 1920 the capital was increased from 40,000,000 francs to 50,000,000 francs.

Under the name of Caoutchoucs Duc, a new firm has been formed to manufacture and deal in all kinds of rubber goods, compounds, and similar products, by-products and plastic materials. Headquarters are at Aubervilliers (Seine).

THE COLONIAL INSTITUTE AT MARSEILLES

The increasing activities of the Colonial Institute at Marseilles have necessitated the addition of a special chemical department with its own library. The building comprises several offices, the library, a spacious room for the machines and industrial apparatus, and a chemical laboratory with adjoining yard for open air research.

This laboratory has the newest equipment for the study of vegetable oils and fats, rubber, and various grains.

BELGIUM

The Société Belge Pirelli, with headquarters at Brussels, is a new enterprise that will manufacture and sell rubber goods. It has a capital of 300,000 francs.

The "Delta" is another new concern in Belgium that will manufacture rubber goods. Its headquarters are at 6, quai du Halage, Anderlecht, and it has a capital of over one million francs.

THE RUBBER INDUSTRY IN BELGIUM

Belgian rubber manufacture, while not as large as some other industries, is nevertheless of considerable importance, particularly as some articles which heretofore were imported are now being manufactured locally.

Among the large rubber companies in Belgium are "Jenatzy-Leleu," which was founded in 1913 with a capital of 1,000,000 francs; Compagnie Générale des Caoutchoucs et Térébenthins, for the exploitation of patents relating to rubber, capital 2,500,000 francs; Société Anonyme pour le Commerce et l'Industrie du Caoutchouc, capital 1,300,000 francs. The capital of the Colonial Rubber Co. at Ghent is 3,500,000 francs. Another large company is the Ateliers de Constructions Electriques de Charleroi, organized in 1904, and with a capital at present of 20,000,000 francs. Insulated wire and cables are among its products.

American automobile tires are popular in Belgium although there is considerable local manufacture. Some of the local firms are beginning to manufacture straight-side tires, in order to compete with the United States. They are also beginning to make cord tires, which are being used on trucks and heavy cars. Other sources of supply for tires are France (Michelin), Italy (Pirelli), and England (Dunlop). The latter company in particular holds a position of importance in Belgium in connection with the solid tire business.

The market for American rubber boots and shoes is somewhat restricted, due to the high rate of exchange. Rubber for industrial purposes is chiefly secured through the United States and Great Britain. The latter country also has furnished heretofore most of the rubber clothing, as well as a large part of the supply of soles and heels. Great Britain and the United States have also sent into Belgium considerable hard rubber and insulated wire, although Pirelli, the Italian company, is particularly active along these lines. Miscellaneous rubber goods, including druggists' sundries, and also rubber toys, are now being made in Belgium, although most of such articles were formerly imported.

AUSTRIAN RUBBER TRADE FOR 1920

Austrian imports of rubber and gutta percha manufactures from the United States were 270 metric tons during 1920. Exports of rubber goods to the United States, for this period are valued at $107,996. There were 1,359 tons of india rubber imported into Austria from all countries in 1920. For the same period 8,767 tons of rubber and resin substances were imported.

BULGARIA'S IMPORTS INCREASE

Imports into Bulgaria from all countries exceeded in quantity those of 1919 by more than 50 per cent. The share of the United States in these importations was, however, comparatively insignificant, as Italy represented the chief factor. Imports of rubber goods into Bulgaria from all countries during 1919 and 1920 were as follows:

	1919		1920	
	Kilos*	Leva†	Kilos	Leva
Rubber, gutta percha and manufactures	9,337	1,444,727	92,010	11,030,198

*One kilo equals 2.2 pounds.
†The normal value of the lev is $0.193.

GERMANY

The following abstracts are from "Die Kautschukwarenindustrie Deutschland," by Dr. W. Vaas, in a recent issue of the *Gummi-Zeitung*.

The rubber industry, which is of comparatively recent date, rapidly became one of Germany's foremost industries. During the 1913-1914 period 185 rubber factories gave employment to 60,000 workmen and produced goods worth 295,204,000 gold marks. The amount of crude and waste rubber consumed was 27,565 metric tons. In 1913 the exports of rubber goods, not including products of the cable industry, were 20,508,200 kilos, valued at 135,000,000 marks.

The outbreak of the war put an end to all this trade and the German rubber industry, cut off from all supplies of crude rubber, found itself in an unenviable position. Strict measures were taken to enforce the economic handling of such stock as was on hand and as was obtained somehow from the outside. Methods for regenerating were improved and renewed attention was paid to synthetic rubber.

The need for economy can best be judged when the amounts of rubber imported from the second half of 1914 to 1918 (inclusive) are known. For the second half of 1914, the quantity imported is given as 2,583 tons; for 1915, 260 tons; for 1916, 668 tons—this includes 547 tons brought over in U-boats; for 1917, 9 tons and for 1918, 2 tons; altogether 3,450 tons in 4½ years as compared with over 16,500 tons in 1913. The total amount of raw rubber brought into Germany during the war was 4,601 tons.

From August, 1916, old and regenerated rubber was carefully collected by government order and distributed as needed. The amounts thus apportioned came to 2,449 tons in 1916—August to December only; 5,449 tons in 1917 and 4,619 tons in 1918. Of synthetic rubber, 67.5 tons were delivered in 1917—July to December only; 392.8 tons in 1918, and 850.5 tons in 1919.

Naturally prices rose considerably. Hevea crêpe that in July, 1914, had cost 4.80 to 4.85 marks per kilo, rose to 25 marks in November of the same year. In 1915, 38.60 marks per kilo was the price charged abroad, and in 1916 this jumped to 75.25 marks. In Germany, prices were regulated by the War Ministry and up to July 23, 1915, the price for hard fine Pará and first latex crêpe was 15 marks per kilo; up to November 15, 1915, it was 22.50 marks and after this, 33.75 marks per kilo.

Prices for synthetic rubber were extremely high and rose from 25 marks per kilo for hard and 27.50 marks for soft, to 45.50 and 47 marks, respectively.

Latest reports about Germany's rubber trade show that while conditions are depressing, it is expected that business will look up soon. There is a certain amount of propaganda being carried on in Holland and the Dutch East Indies to encourage the exchange of German manufactured rubber for Dutch crude rubber. Hopeful eyes are also being turned to Russia, particularly now that the Russian powers are recognizing the fact that their communistic system will not do in business.

Figures for Germany's rubber trade during the eleven months ended November, 1920, show that imports were 19,300 quintals of soft, and 200 quintals of hard rubber goods; this as compared with 38,700 quintals soft rubber goods and 1,000 quintals hard rubber goods, in 1913. Exports amounted to 26,800 quintals (180,100 in 1913), value 256,000,000 marks. Of this 25,200 quintals (166,900 in 1913), were soft rubber goods, value 220,100,000 marks, and 1,600 (13,200 in 1913) quintals, value 35,900,000 marks, of hard rubber and hard rubber goods.

Much satisfaction has been caused by the report that the Minister for Finances has agreed, subject to consent of the Reichsrat, to free mantles and wraps of rubber combined with cotton or half woolen fabrics from the luxury tax of 15 per cent. It is not thought possible that the Reichsrat will object. As far as other kinds of rubber mantles and wraps are concerned, these will continue to pay the tax.

The Rheinland commission has made out a free list of goods that are to be allowed to enter unhindered from all borders of the occupied territory. This, says the *Gummi-Zeitung*, will permit the influx of a number of luxury articles and will hit German industry hard, particularly the textile goods industry, which of course includes rubberized fabrics and goods. Other rubber goods, as atomizers, seamless articles, and hard rubber goods, appear on this free list and dealers are urged to reject them.

FOREIGN TIRES

Much indignation has been aroused here by the revelation that the Reichstreuhandgesellschaft of Berlin, a corporation founded with the aid of the Government—which owns half of the stock, is putting quantities of foreign-made tires on the local market. These tires are free from the 15 per cent luxury tax and can easily compete with the German article.

It was known that this concern had imported several thousands of pneumatic and solid tires a few months ago with permission from the Foreign Trade Bureau for Rubber. But the importations took place with the consent of the Finance and Economy Departments. When protests began to be heard, it was explained that these tires had to be imported in accordance with the Treaty of Versailles, but the assurance was given that the disposal of the tires would take place with as little harm to the local industry as possible. It was said that most of them were intended for export and the rest were to be used for the Army, Navy, etc. However, the facts are far different, as the foregoing shows, and will require a good deal of explanation.

A report from Antwerp concerning millions of American tires and tubes lying in Belgium and French ports ready for shipment to Germany, is another cause for alarm and indignation. These tires are described as being of an inferior quality seldom met with on the market. Most of the tubes consist of three and four pieces put together. The prices are extraordinarily low. The tires have no mark whatever and the covers are perfectly smooth, without any distinguishing mark. It is reported that they have been sent over by "The Surinam Rubber & Wood Plantation Co., Delaware, North America." This firm it is said, deals in crude rubber and used rubber tires.

NOTES

The Veith-Werke, Aktiengesellschaft, Sandbach, Odenwald, intends to double its capital which at present is 4,000,000 marks. This firm manufactures bicycle tires chiefly.

The Samoa Kautschuk Compagnie, Aktiengesellschaft, Berlin, has decreased its capital to 1,450,000 marks. The capital is now divided into 757 preferred shares and 698 privileged preferred shares.

The Conrad Scholtz, Aktiengesellschaft Treibriemenfabrik, Hamburg-Barmbeck, reports net profits of 362,084 marks over the business year 1920; a dividend of 15 per cent was declared. The report of this firm shows that prices for the firm's product, belting, began to drop heavily in 1919, and world competition has aided in keeping prices down, so that nothing definite can be said with regard to future prospects.

The Leipziger Gummiwarenfabrik Vulkan, Weiss & Bässler, Leipzig, has become a stock company with a capital of 4,000,000 marks.

The Deutsche Kautschuk-Aktiengesellschaft Berlin und Kamerun reports that its former possessions in the Kamerun are in the hands of the English. The trading post Duala is also exploited by English, while a French house now operates the branch at Bonaberi. At a recent meeting it was unanimously decided to build up the enterprise again at the proper time.

The Deutsche Kabelwerke Aktiengesellschaft, Berlin-Lichtenberg, has increased its capital to 22,000,000 marks. The subsidiary in England has been liquidated. The concern has several more or less large claims outstanding in England, but it is not clear how much of this will come into the company's possession.

NEW FIRMS

The Gummi- und Verbandstoff Compagnie Goldhammer & Bernsdorf, Dresden, will manufacture and sell rubber products and bandage material.

Kölner Gummimäntel-Vertriebs Gesellschaft m. b. H., Cologne Commission agents.

A Polish factory for rubber goods has been established at Bromberg with capital of 15,000,000 marks. Most of the stock is in the hands of Poles.

D. Stroyman & Co., Berlin. Export of rubber manufactures and other articles suitable for America.

Schwalenberg & Schumacher, Dusseldorf. Rubber and asbestos manufactures.

Kleutze & Co., G. m. b. H., Hamburg. Trade in and import crude rubber, balata and gutta percha.

Firma Möllering, G. m. b. H., Hanover. Manufacture and sale of rubber goods.

Fabrik isolierter Drähte, G. m. b. H., Munich-Gladbach. Manufacture of insulated wires.

Graf & Co., Dresden. Manufacture and sale of belting and chemicotechnical products.

Hans Steinberg & Co., Hamburg. Manufacture of raincoats for men and women.

Orthopädie-Werk Habermann, G. m. b. H., Munich. Manufacture and sale of artificial limbs, bandages and orthopedic apparatus of all kinds.

Kautschuk-Industrie, G. m. b. H., Berlin. Manufacture and sale of rubber goods and trade in raw materials for rubber and cable manufacture.

Halga-Werke Werntgen & Co., G. m. b. H., Bredenscheid. Manufacture and sale of rubber goods.

Norddeutsche Gummiwaren-Vertrieb en gros Arnold Adams, Bremerhaven. Dealers in rubber goods.

Heinrich Ulrich & Co., Frankfort-on-the-Main. Wholesale dealers in rubber heels, soles and allied goods.

Vereinigte Hartgummi- Bein- und Holzwaren-industrie Gross-Bieheran, G. m. b. H., Gross-Bieheran, Hessen. Manufacture and sale of hard rubber goods of all kinds.

Verkaufsbureau der Martell-Gummiwaren, G. m. b. H., Halle a. S. Sale of the products of Gummiwerke Martell, G. m. b. H., in Halle, and also sale of rubber goods not made by Martell.

Asbest- und Gummiwerke Martin Merkel, G. m. b. H. Acquisition and continuation of the firm of the same name founded by Martin Merkel.

Ruhrtaler Gummiwarenfabrik, G. m. b. H., Hattingen (Ruhr). Manufacture and sale of rubber goods.

Firma H. Otto Hofmann, Dresden. Buying and selling sporting goods.

Deutsche Radbereifung Fritz Stoll, Dresden. To trade in rubber goods, particularly rubber bicycle tires.

Theodor Thurbahn & Co., Gummiwaren-Gesellschaft m. b. H., Berlin. Wholesale dealing in all kinds of rubber goods.

Gummiabsatz-Spezialvertrieb Johann B. Hirschmann, Frankfort-on-the-Main. Sale of rubber heels.

Firma Ernst Pfennigsdorff, Leipzig. Sale of rubber heels.

Rheinisch-Westfälische Gummi-und Gutta Percha Werke Atlantic Fröndenberg, Verkaufszentrale Düsseldorf, G. m. b. H., Düsseldorf. This firm will sell the bicycle, motorcycle and automobile tires manufactured by the Rheinish-Westfälische Gummi- und Gutta-Percha-Werke Atlantic G. m. b. H., in Fröndenberg.

Firma Peter Floss, Düsseldorf. Wholesale dealer in rubber tires.

The Rauhgummi Aktiengesellschaft, Berlin, has just been formed and is capitalized at 2,000,000 marks, to manufacture and sell rubber articles, particularly automobile tires made with a special outer covering of raw rubber. This covering is protected by German patent No. 273,159 and has been recognized in most European countries and also in Canada and Australia.

Firma Ernst Erich Eisenhauer, Hamburg. Agency for surgical and technical hard and soft rubber goods as well as technical necessaries.

Gummiwerk India G. m. b. H., Hanover. To manufacture and trade in all kinds of rubber goods.

Arnold & Schneiderheinze G. m. b. H., to manufacture and trade in rubber goods and raw and manufactured products for the rubber industry.

THE RUBBER TRADE IN THE FAR EAST

By Our Regular Correspondent

MALAYA

The optimistic tone of American rubber publications has been eagerly noted by some local papers, while others steadfastly refuse to see any signs of improvement. Matters here seem to be going from bad to worse. Estate after estate is closing down, the latest company to cease operations being the Beverlac (Selangor) Rubber Co. Limited, which has stopped working both Beverlac and Kapar estates since August 31. In a circular issued to shareholders, crop and expenditure are given as follows:

Beverlac.—Crop 70,000 pounds on an expenditure of $25,391 (Straits currency). Cost per pound 36.27 cents.

Kapar.—Crop 100,000 pounds on an expenditure of $32,940. Cost per pound 32.94 cents. Combined cost per pound, 34.31 cents, with standard crêpe at 28 to 27 cents.

The company intends to reopen the estates as soon as market conditions justify such action.

The general rubber-planting public cannot accept the law of the survival of the fittest as Ceylon has done, and schemes for restriction and control are constantly coming up, although it is realized that without government aid nothing can be expected. Consequently there is a feeling of bitterness against the Government, particularly the Home Colonial Office.

More stress is now being laid on the need for economy and efficiency. The *Malayan Tin & Rubber Journal* publishes an interesting article, originally appearing in the *Manchester Guardian Commercial*, in which the author, who signs himself "Kedah," announces that the rubber industry is suffering from the number and inefficiency of its directors. He thinks that a few highly paid directors capable of running a big concern with success is preferable to a number of possibly superfluous persons, drawing moderate fees, in charge of smaller concerns. "Kedah" takes 100 companies with paid up capital of £20,388,600 and 488 directors and contrasts this with the well-known concern of Lever Bros., with a paid up capital of £46,966,499 and 18 directors.

To come back to restriction, *The Straits Budget* in its *Rubber*

Supplement, replying to the question whether rubber producers outside of Malaya could supply the world demand for more than a year, gives figures which it thinks ought to convince the Dutch East Indies and other countries that it is to their interest to cooperate with Malaya in restricting outputs.

The possible production of the various countries for 1921 is given as 374,000 tons. Of this Malaya, producing at full capacity, would contribute 210,000 tons. The probable consumption in 1921, has been estimated at 250,000 tons by the Rubber Growers' Association. Total stocks at the end of 1920 amounted to 310,000, the present excess, at a conservative estimate, being 150,000 tons. If the estimated consumption of 250,000 tons is correct then we have:

	Tons
Producers other than Malaya	164,000
Present total stocks—310,000 for 1920 plus 20,000 since December, 1920	330,000
	494,000
One year's consumption	250,000
Stock at end of one year	244,000
Normal stocks—safe stocks during depressed trade	180,000
Excess stocks at end of one year	64,000

Therefore, if Malaya ceased to produce, the other countries could supply one year's requirements to the world.

If Malaya produces half normal, the position at the end of 1921 will be worse than at the end of 1920.

	Tons
Stock at end of 1921 excluding Malaya	244,000
Malayan production 1921	105,000
	349,000
Stock at end of 1920	310,000
Excess over last year	39,000

CEYLON

At a meeting of the Rubber Control Committee, held in Colombo on July 5, it was decided that as only about 55 per cent of Ceylon producers had supported the restriction scheme it was impossible for the committee to discharge its functions and they accordingly resigned.

THE RUBBER PRODUCERS' CORPORATION

The news that the Rubber Growers' Association is planning a scheme to control the rubber industry for five years and that a capital of £6,000,000 will be provided for the purpose when the requisite control of 2,220,000 acres is secured, has been very coldly received in Colombo. Practically all persons in the rubber industry here are opposed to any interference with the operation of the law of supply and demand. It is pointed out first, that the Rubber Growers' Association represents only 1,150,000 acres. Then, as far as Ceylon is concerned, where restriction by 25 per cent has just proved a failure, it appears to be impossible to get a sufficient number of estates to adhere to a plan of restriction by 50 per cent.

"Generally speaking," said Mr. Burns, Chairman of the Ceylon Chamber of Commerce, to a representative of the *Times of Ceylon*, "I can say that Ceylon is rather tired of the restriction idea, because it has not been carried out either in the Straits or Ceylon. If there is to be elimination by the survival of the fittest, the probability is that Ceylon will be able to carry on and the Straits be compelled to restrict by a number of estates having to cease tapping. If Java, Ceylon and the Straits could take steps to curtail production compulsorily, then the Ceylon producers might be inclined to favor such a scheme because it would then be general. I think this is very improbable."

Mr. Burns further pointed out the unwisdom of attempting to raise prices at this time when producers were trying to rehabilitate the trade; at such a time consumers would naturally object to anything which would put up the price.

RUBBER EXPORT DUTY

About the middle of June a joint deputation of the Ceylon Chamber of Commerce and the Planters' Association of Ceylon waited on the Governor with the purpose of securing the abolition or readjustment of the export tax on rubber. At present prices, the duty on rubber amounts to an ad valorem rate of 9 per cent Since the price of rubber was below 50 cents a pound, no export duty on rubber was paid in the Straits, where a sliding scale of taxation exists. Thus the advantage that Ceylon has of a lower cost of production is neutralized to a certain extent, and to that extent the export tax makes her less able to compete with the Straits.

NETHERLANDS EAST INDIES

Until quite recently the general opinion here was not in favor of restriction. However, of late, warnings in local papers and the news that a bank to aid the rubber industry was to be established showed that the Government had fully realized the seriousness of the situation. At a meeting of the Association for the Promotion of Agriculture and Industry, held to discuss crop restriction, Mr. Hierneiss, of London, was asked to give information on the position of rubber. In his opinion restriction of 50 per cent was the only salvation. The theory of the survival of the fittest is of no use and unless something is done other sources of rubber will be developed. If rubber producers continue as at present, then it will not be the fittest that will survive, but America will take their place.

"Now what will become of the value of Eastern plantations if rubber producers do not take proper measures to protect themselves?" asks Mr. Hierneiss. "Will it be surprising if America finds that the time is arriving when she must strengthen her position in Brazil? Or will the scheme of Henry C. Pearson, Editor of The India Rubber World, to plant a rubber yielding shrub on a large scale in the United States, be carried out?"

After this talk, the Association decided to inform the Director of Agriculture, Industry and Commerce that the Association was unanimous in the opinion that the only remedy is a 50 per cent restriction together with such fixing of the market prices that the costs of normal exploitation may be covered.

According to latest information, at a meeting of representatives of rubber producing associations in the Netherlands East Indies and the Straits Settlements, held at Batavia, it was decided that identical interests make cooperation necessary, and that joint restriction of output is the only remedy. Malaya, Netherlands East Indies and Ceylon should cooperate as far as restriction is concerned. Moreover, a selling combination is also necessary for the proper control of the industry. The Rubber Growers' Association, London, and the Internationale Vereeniging voor Rubbercultuur in Nederlandsch-Indië, the Hague, will be strongly urged to form the necessary organization for control immediately.

GOVERNMENT'S GUTTA PERCHA ESTATE, "TJIPETIR"

The report of the Government's Gutta Percha Estate, "Tjipetir," for 1919 gives the following information:

The total area under gutta percha is 1332 hectares—hectare equals 2.47 acres—of which 1020 hectares are producing. The rubber acreage is 344 hectares, of which 325 hectares are in bearing. Expenditure for the upkeep of gutta percha was 57.61 gilders per hectare, 10.92 gilders being written down for manuring and 3.03 gilders for overcoming pests and diseases. Rubber cost 97.83 gilders per hectare, and fighting diseases responsible for 29.82 gilders.

Gutta percha suffered rather severely from insect pests, while rubber had to fight brown bast.

The crop of leaves amounted to 3,512,746 kilos against 3,555,587 kilos in 1918. The yield of plucked leaves was 5,452 kilos per hectare against 5,072 the year before, and 646 kilos per hectare of pruned leaves against 896 kilos in 1918.

As for rubber, the 325 hectares yielded 96,072.6 kilos as compared with 110,295.2 kilos in 1918. The yield per tree per day averaged 5.9 grams. In 1918 this was 5.6 grams.

The yield of gutta percha obtained from the leaves and the bark of the pruned branches and stem pieces was 73,181.1 kilos,

as against 67,593.6 kilos in the previous year. The entire yield of gutta percha was sold to an English concern that had been taking the whole crop of the estate for some years. The price obtained was 7.50 gilders against 7 gilders per kilo in 1918.

The cost price of gutta percha in the leaf, delivered to the factory, increased from 2.40 gilders to 2.43 gilders per 100 kilos. Costs of preparing the gutta percha were 1.07 gilders per kilo, as compared with 0.86 gilders in 1918. Total costs were 4.14 gilders per kilo against 3.83 gilders in 1918 and 6.08 gilders in 1914.

JAVA PLANTATION WORKERS' WAGES

The following statistics regarding wages paid per day to laborers on the rubber plantations of Java are taken from a recent United States Government report. One florin, it should be noted, equals, at par, 40 cents.

	Florins
Tappers, rubber	[1]0.70—0.80
Tappers, beginners	[1]0.50
Mandoers in charge of drying, smoking, and sorting rubber	30
Mandoers in charge of machining rubber	20
Skilled labor, rubber factory	15—20
Coolies, males	[1]0.50
Coolies, females	[1]0.30

[1]Per day.

SOUTH AMERICAN NOTES

THE GUIANAS

The report of the Balata Compagnie Surinam for 1920 shows that 215,000 kilos of balata were gathered during the year, of which some was sold at satisfactory prices and other sales have since taken place.

The general situation, which adversely affected all enterprises in Surinam, also influenced the exploitation of the new undertaking Plantage Susanna's Daal, which suffered a loss of 8,261.65 gilders. The company's total profits amounted to 45,440 gilders from which losses at 42,924 gilders over the year 1919 had to be deducted.

The production of balata in Surinam during 1920 amounted to 442,071 kilos, as compared with 492,896 kilos the year before.

During the four months ended April 30, 1921, 387,190 pounds of balata were shipped from British Guiana. This is an increase of 145,423 pounds over the amount for the corresponding period of 1920 when 241,767 pounds were exported.

DECLINE OF THE BRAZILIAN RUBBER INDUSTRY

The rubber industry was one of the most important of Brazilian activities, but, not being able to compete with the oriental product, it has suffered a decline.

Year	Quantity Kilos[1]	Value Milreis[2]	Year	Quantity Kilos	Value Milreis
1912	42,286,089	241,425,379	1917	33,998,125	144,080,243
1913	36,231,550	155,630,906	1918	22,661,690	73,727,818
1914	33,531,469	113,598,319	1919	33,251,564	105,536,953
1915	35,165,308	135,785,729	1920	23,586,895	58,350,054
1916	31,494,701	152,239,480			

[1]One kilo equals 2.2 pounds.
[2]One milreis equals $0.544 normal.

There are many things which have affected Brazilian rubber unfavorably—the rubber trees are scattered in a dense jungle and are long distances from ports of shipment, the gatherers must face many hardships, and often the rubber must be carried on the backs of natives long distances to places where it may be floated downstream to a port. These methods are very costly and can hardly hope to compete with the more modern methods used on plantations. Due, however, to its recognized superior quality, Pará rubber has been able to maintain a certain position on the market. In 1918 the United States bought 17,887 tons out of the 22,662 tons exported, and in 1920, 13,609 tons out of 23,586 tons exported. Great Britain came next with 6,990 tons.

BRAZILIAN NOTES

Brazil has been awarded the gold cup for the best pavilion, and the gold medal for excellency and variety of the produce exhibited at the London Rubber and Tropical Products Exhibition. The States of Amazonas and Pará have been awarded the silver cup for best-quality rubber. It is hoped here that these results will materially benefit the country, particularly the rubber lands which are in a sorry plight. To quote from a recent issue of *Wileman's Brazilian Review*:

"Foreigners and natives are migrating from the rubber land in large numbers and little by little the once prosperous cities of Pará and Manáos would seem to be falling into decay. Still the *seringueiro* contents himself with farinha and drink, and continues to tap devalorized rubber trees. The time may come when rubber will look up again, but it is doubtful whether the Amazon trade will ever witness the prosperity of pre-war years."

The Brazilian centenary is to be marked by the Brazilian Centenary Exhibition, which will be one of the most important commercial expositions to be held in 1922.

BAHIA'S RUBBER TRADE

Interest in the local rubber product centers in the variety known as maniçoba, which forms the bulk of the shipments from Bahia, Brazil. The other grade is known commercially as mangabeira. Of the last rubber crop the United States took about three quarters, while the remainder went to France and England. The quantity of mangabeira exported during 1919 was 40,062 pounds, while the amount in 1920 decreased to 11,773 pounds. The values of these shipments were $11,778 and $3,331 respectively. The amount of maniçoba exported during 1919 was 517,885 pounds, valued at $101,364. The shipment during 1920 was 101,236 pounds, valued at $37,447.—*Commerce Reports.*

PALESTINE

A correspondent of the *Gummi-Zeitung* who is at present in Palestine gives some idea of the rubber goods that could be sold in that country. Industries in Palestine are growing and an increasing quantity of mechanical goods will be needed. All kinds of tires are in demand. It also seems that a good market could be developed for most surgical and druggists' sundries, as well as for toy balls, rubber dolls, hard rubber combs, syringes, electrotechnical goods and articles made of elastic bands and fabrics. The duty on all articles in Palestine is 11 per cent ad valorem.

EGYPTIAN RUBBER TRADE

Under the name of North African Rubber Co., Raffo, Rubrigi et Cie. will engage in the manufacture and sale of rubber goods, with headquarters at Cairo. The capital is given as £15,000—Egyptian.

Imports of Automobile Tires

Imports of automobile tires into Egypt show that whereas England has formerly had almost a monopoly of this trade, and is still in the lead, American imports for 1920 were more than six times greater than for 1919. Both French and English importations, while much larger in quantity and value than those from the United States, have merely doubled for the corresponding period.

	1919		1920	
Countries of origin:	Kilos	Value	Kilos	Value
United Kingdom	76,189	$164,420	148,955	$389,590
France	31,602	91,275	61,822	202,030
United States	9,164	24,045	59,458	195,890
All other countries	12,725	28,765	20,626	65,735
Total	129,680	$308,505	290,861	$853,245

I. B. Kleinert Rubber Co., 719 Broadway, New York, N. Y., is putting out the "Grayline" moist-proof colored cases for tourist travel, designed to withstand the strains of bath-room and travel wear. These are made in staple French gray, lined with a trimming of a harmonious color. Pocket arrangements are made to meet the requirements of individual taste. These cases are of the usual protective material which characterizes the shields, sanitary goods, household aprons, etc., which have long been standard articles of this manufacturer.

Recent Patents Relating to Rubber

THE UNITED STATES

GRANTED JUNE 21, 1921

NO. 1,381,934 Compressible, non-inflatable core for tires. F. V. Roesel, Wellington, O., assignor of ½ to E. Miller, Perry, Ia.
1,381,996 Cushion wheel. C. J. Jackson, Galva, Ill.
1,382,033 Pessary. G. J. Wallace, Kensington, London, Eng.
1,382,216 Pneumatic tire. A. F. Morey, Oklahoma, Okla.
1,382,218 Noise-reducing typewriter-platen. W. R. Mulock, Winnipeg, Man., Can.
1,382,228 Animated sign showing tire rolling along roadway. G. R. Pyper, assignor to Pyper Animated Sign Co.—both of Salt Lake City, Utah.
1,382,231 Animated sign representing tire enclosing the words, "The Dough Tire." G. R. Pyper, assignor to Pyper Animated Sign Co.—both of Salt Lake City, Utah.
1,382,389 Pneumatic valve. M. C. Schweinert, West Hoboken, N. J.
1,382,399 Pneumatic tire with inner tension belt. J. S. Williams, Riverton, N. J. (Original application divided.)
1,382,436 Massage tool. H. Malm, New York, N. Y.
1,382,446 Garter with pocket. L. G. Warren, Westwood, Calif.
1,382,506 Running-board with interlocking mat, for automobiles. J. T. Hayne, Detroit, Mich.
1,382,537 Resilient wheel. N. L. Olson, Highland Park, Mich.
1,382,587 Toothbrush with series of elastic disks. R. M. Withycombe, Penshurst, near Sydney, New South Wales, Australia.
1,382,593 Cushioned bedpan. B. A. Arata and T. L. Mattie, Los Angeles, Calif.
1,382,600 Siphon. A. W. Schreiner, Brooklyn, assignor to Standard Scientific Co., New York—both in New York.

GRANTED JUNE 28, 1921

1,382,615 Device for painting golf-balls. A. J. Bate, Yonkers, N. Y.
1,382,630 Resilient tire. L. R. Davis, assignor to Revere Rubber Co.—both of Providence, R. I.
1,382,648 Footwear with textile-lined waterproof tongue folded inside upper, etc. F. A. Joseph, Naugatuck, assignor to L. Candee & Co., New Haven—both in Conn.
1,382,679 Water-bottle stopper. M. C. Schweinert, West Hoboken, N. J.
1,382,706 Hose supporter. C. G. Wright, Kansas City, Mo.
1,382,718 Pneumatic tire with reinforced tread. H. C. Egerton, Ridgewood, N. J.
1,382,722 Power-driven tire-pump. J. G. Graham, Tomah, Wis.
1,382,748 Footwear protector with elastic heel-strap and elastic cord in forward edge. K. Slasor, Seattle, Wash.
1,382,768 Rubber sole for boots and shoes, having stitch-receiving strip embedded in rubber at edge. G. Ferguson, Wollaston, Mass., assignor by mesne assignments to United Shoe Machinery Co., Paterson, N. J.
1,382,831 Pneumatic cushion sack. F. C. Hilker, Fort Wayne, Ind.
1,382,833 Non-slipping foot for ladder-legs. Z. L. Hurd, Nashville, Tenn.
1,382,840 Hose mender. A. Levedahl, Aurora, assignor to Independent Pneumatic Tool Co., Chicago—both in Illinois.
1,382,844 Tire reliner. A. O. Mason, Highland Park, Ill.
1,382,918 Pneumatic cushioned tire. A. H. Kerr, Fort Worth, Tex., assignor to said Kerr, J. A. Smith, J. M. Atkinson, J. A. Dacus, and W. L. Coley, trustees for an association.
1,382,982 Vaginal syringe. E. Jeanjaquet, Swartz Creek, Mich.
1,383,036 Swimming appliance. Luther P. Sifford, Barstow, Calif.
1,383,058 Hose clamp. F. H. Atkin, San Francisco, Calif.
1,383,067 Pneumatic heel, E. Borman, Chicago, Ill.
1,383,070 Child's pedaling car with rubber tires. R. B. Bukolt, Stevens Point, Wis.
1,383,115 Inflatable geographical globe. E. Hendry, Fresno, Calif.
1,383,134 Hose clamp. C. J. Lundgren, Mount Jewett, assignor of ½ to H. J. Walter, Bradford—both in Pa.
1,383,155 Round rubber heel. L. J. Schaefer, Toledo, O.
1,383,190 Armored pneumatic tire. D. J. Demas, Pittsburgh, Pa.

GRANTED JULY 5, 1921

1,383,358 Demountable tire-rim. C. G. Westerberg, Monessen, Pa.
1,383,416 Double-flow fountain pen. Yuji Mukojima, Minowa, near Tokio, Japan.
1,383,458 Pneumatic tire. T. D. Frazier, Martin's Ferry, O.
1,383,502 Vaginal syringe. C. F. L. Vultee, Milwaukee, Wis.
1,383,583 Hose coupling. J. M. Towle, West Somerville, assignor of ½ to L. I. Beckwith, Boston—both in Mass.
1,383,591 Button, with metal shank. L. A. Angle, assignor to Art in Buttons, Inc.—both of Rochester, N. Y.
1,383,679 Demountable rim for tires. J. H. Wagenhorst, Jackson, Mich.
1,383,763 Resilient heel. W. E. Sanders, assignor to Essex Rubber Co., Inc.—both of Trenton, N. J.
1,383,767 Stopper for water bottles, etc. M. C. Schweinert, West Hoboken, N. J.
1,383,783 Rubber razor. R. E. Billingsley, San Antonio, Tex.
1,383,810 Demountable rim for tires. H. M. Howell, assignor by direct and mesne assignments, of 7½ per cent each to C. Schultze, R. Downs, J. E. Doughtie, S. C. Blackmon, and A. King, 15 per cent to L. H. Krickel, and 35 per cent to S. Kaplan—all of Monroe, La.
1,383,818 Cushion tire. D. W. Kirby, Gurdon, Ark.
1,383,962 Inner-tube container. J. H. Mills, Gallipolis, O.

GRANTED JULY 12, 1921

1,384,038 Drain plug. N. Becker, New York, N. Y.
1,384,094 Resilient inflatable pontoon. A. B. Saliger, assignor to Saliger Ship Salvage Corporation—both of New York, N. Y.
1,384,134 Sectional pneumatic tire. N. Jackson, Washington, D. C.
1,384,210 Sanitary douche. W. A. E. Pfaff, Kansas City, Mo.
1,384,243 Puncture-proof tire insert. R. B. Disbrow, St. Paul, Minn.
1,384,244 Inner tube relatively thicker at tread portion. R. B. Disbrow, St. Paul, Minn.
1,384,262 Tire tread. C. L. Landon, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.
1,384,274 Demountable rim for tires. O. A. Parker, Cleveland, O.
1,384,332 Hose coupling. B. J. Mullenux, Afton, N. Y.
1,384,399 Hydrometer syringe. E. Neerup, Chicago, Ill.
1,384,484 Reinforced pneumatic tire. H. E. Penwell, Turlock, Calif.
1,384,508 Resilient tire core. W. A. Black, Rocky Ford, Colo.
1,384,551 Reinforced tire. A. B. and H. A. Broluska, assignors of ⅓ to C. Cailliau—all of Detroit, Mich.
1,384,673 Swimming glove. S. J. Niemann, St. Paul, Minn.

THE DOMINION OF CANADA

GRANTED JUNE 7, 1921

168,097* Pneumatic tire. C. F. A. Gray, Montreal, Que.

* Withheld from publication during war with Germanic Powers.

GRANTED JUNE 28, 1921

212,272 Adjustable rubber sole pad. K. Kalen, Ottawa, Ont.

THE UNITED KINGDOM

PUBLISHED JULY 6, 1921

163,038 Reservoir-pen filler. T. Kovâcs, 108 Lindenstrasse, Berlin, Germany. (Not yet accepted.)
163,089 Cushion tire. W. Parker, 148 Burnley Road, Accrington, Lancashire.
163,102 Respirator and apparatus for detecting gases. L. A. Levy, 31 Shoot-up Hill, Cricklewood, and R. H. Davis, 187 Westminster Bridge Road—both in London.
163,126 Rubber and fabric band for reinforcing or repairing tire casings. A. E. Osborne and D. Robinson, 4 Lloyds Bank Chambers, Jamaica Row, Birmingham.
163,211 Motorcycle knee-grip. J. C. Burton and A. G. Barrett, Post Office Place, Leicester.
163,235 Garter. E. Landgraf, nee Cartharius, 44 Muller-Bersetstrasse, Dresden, Germany.
163,246 Rubber heel. O. Mussinan, 2 West 45th street, New York, New York, U. S. A.
163,285 Tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)

PUBLISHED JULY 13, 1921

163,434 Demountable rim for tires. T. J. Hobson, 17 Chain Walk, Aston, Birmingham.
163,502 Reservoir pen. C. Livsey, 11 Groveland Road, Wallasey, Cheshire.
163,503 Reservoir pen. W. T. K. Calton, 76 Newgate street, London.
163,542 Friction roller for contact with tire to drive motorscooter. M. Mehler and R. J. Nash, 132 Steelhouse Lane, Birmingham.
163,592 Inflatable safety belt for aviators. R. H. Davis, 187 Westminster Bridge Road, London.
163,638 Sectional pneumatic tire. W. J. Harper, Glenariff, Warren Drive, New Brighton, Cheshire.

PUBLISHED JULY 20, 1921

163,734 Pneumatic artificial foot with hard rubber tread and metal-protected toe and heel. G. Hardman, Belmont, Audenshaw Road, Audenshaw, Manchester.
163,890 Device for marking golf balls. J. H. Bromilow, 411 Gillott Road, Edgbaston, Birmingham.
163,895 Rubber-coated garment bags. A. Westwell, 88 Winwick street, Warrington.
164,013 Stopper for bottles, jars, etc. H. Quilitz, 12 Kulmbacherstrasse, Berlin, Germany. (Not yet accepted.)
164,099 Insert molded into edges of rubber soles to serve as hold for stitching. E. R. Pearce, Ajax Rubber Works, Leyland, Lancashire, and Wood-Milne, Limited, 2 Central Buildings, Westminster.

PUBLISHED JULY 27, 1921

164,152 Tire protector. F. and A. Crook, 27 Herbert street, Leyland, near Preston, Lancashire.
164,190 Parachute. E. R. Calthrop, Eldon Street House, Eldon street, London.
164,241 Reservoir pen. R. de Echevarria, Santa Cruz, Tagulaya, Davao, Philippine Islands.
164,321 Fabric and rubber endless track for vehicle wheels. A. Kegresse, 28 avenue de Tourville, Paris. (Not yet accepted.)
164,334 Electric coupling with rubber cap. Naamlooze Vennootschap Electriciteits Maatschappij Electrostoom, Postbox 301, Rotterdam, assignee of C. H. Jaspar, 8 Van der Poelstraat, same city. (Not yet accepted.)
164,369 Pneumatic tire. J. and C. Butazzi, 58 Pelayostreet, Barcelona, Spain.

NEW ZEALAND

PUBLISHED JUNE 2, 1921

43,036 Resilient tire. F. L. Rapson, Childwall Hall, Liverpool, Eng. (See THE INDIA RUBBER WORLD, December 1, 1919, page 156.)
45,445 Bicycle pedal with rubber inserts. Canada Cycle & Motor Co., Limited, Weston, York, assignee of H. W. Peace, 76 Pine Crest Road, Toronto—both in Ontario, Canada.

Chemical Patents will be found on pages 896-897. Machinery Patents on pages 905-907.

PUBLISHED JUNE 16, 1921

44,265 Stethoscope for engineers. R. B. Foord, Eltham, Taranaki.

PUBLISHED JUNE 30, 1921

45,628 Demountable rim for tires. A. J. Kohanski, 3065 Avers avenue, Chicago, Ill., U. S. A.

GERMANY

PATENTS ISSUED, WITH DATES OF ISSUE

340,006 (November 22, 1914) Pneumatic pressure tire with reserve tubes. Autobereifung "Ideal" Muller & Co., Berlin.

340,235 (October 5, 1919) Injection syringe. Albert Netzow, Vierländerstrasse 11, and Hans Fischer, Schultzweg 8—both in Hamburg.

340,345 (June 20, 1919) Exchangeable tread patch of rubber for heels of boots. Alois Droll, Krahnenstrasse 8, Köln-Mülheim.

TRADE MARKS

THE UNITED STATES

TWO KINDS OF TRADE MARKS NOW BEING REGISTERED

Under the rules of the United States Patent Office, trade marks registered under the Act of February 20, 1905, are, in general, fanciful and arbitrary marks, while those registered under the Act of March 19, 1920, Section 1 (b), are non-technical, that is, marks consisting of descriptive or geographical matter or mere surnames. To be registered under the latter act, trade marks must have been used for not less than one year. Marks registered under this act are being published for the first time when registered, any opposition taking the form of an application for cancellation.

GRANTED JUNE 21, 1921, ACT OF FEBRUARY 20, 1905

No. 143,941 Selwin—leather shoes with leather, rubber, or composition soles and heels. Elliott Shoe Co., Brockton, Mass.

143,957 Goodrich—rubber thread. The B. F. Goodrich Co., New York, N. Y.

143,959 Air Lock—valves for tires, pneumatic cushions, life preservers, etc. The Griffin Manufacturing Co., Boston, Mass.

144,048 Monarch—elastic webbings. The Russell Manufacturing Co., Middletown, Conn.

ACT OF MARCH 19, 1920, SECTION 1 (b)

144,137 Sterling—slab zinc. The New Jersey Zinc Co., Newark and Franklin Borough, N. J.

144,140 O'Sullivan's—rubber soles and heels. O'Sullivan Rubber Co., Inc., New York, N. Y.

144,153 Representation of seal bearing the words Never Stick around black disk in center—preparation to prevent tires from sticking to molds when curing. Western Vulcanizer Manufacturing Co., Chicago, Ill.

144,154 Peerless following W in white on black disk forming inner one of two concentric circles—belts, suspenders, and garters. The Wolfson Co., Chicago, Ill.

GRANTED JUNE 28, 1921, ACT OF FEBRUARY 20, 1905

144,157 Brite Mawnin—jar-rings. Amboy Products Co., Inc., Chicago, Ill.

144,171 Drive On!—sheet rubber patches. Edward T. Barker, Oakland, Calif.

144,214 Faultless—toy balloons. The Faultless Rubber Co., Ashland, O.

144,219 Goodrich—druggists' and surgical sundries. The B. F. Goodrich Co., New York, N. Y.

144,235 Eagle Brand Rubber Toys—toy balloons. The Eagle Rubber Co., Ashland, O.

GRANTED JULY 5, 1921, ACT OF FEBRUARY 20, 1905

144,391 Ship by Truck—tires and tubes. Firestone Tire & Rubber Co., Akron, O.

144,401 Goodrich—valves, belting, hose, packing, tires, washers, reliners and repair plugs. The B. F. Goodrich Co., New York, N. Y.

144,402 Anthracite—rubber pump-valves. The B. F. Goodrich Co., New York, N. Y.

144,418 Sycamore and Illinois Wire on representation of rising sun—insulated wire and cable. Illinois Wire & Cable Co., Sycamore, Ill.

144,422 Red Spot—brake linings and clutch facings. J. Russell Kelso, Trenton, N. J.

144,426 Las-Stik—fabric and rubber repair patches. Las-Stik Patch Manufacturing Co., Hamilton, O.

144,456 A red-banded nipple—rubber nipples. Revere Rubber Co., Providence, R. I.

144,465 Panama Girl and representation of head of girl wearing Panama hat—elastic webbings, garters, hose supporters, suspenders, ladies' dress belts, etc. The Russell Manufacturing Co., Middletown, Conn.

144,468 Seibel—pneumatic shock absorbers. Seibel Air-Spring Co., Inc., Phoenix, Ariz., and San Francisco, Calif. (See The India Rubber World, February 1, 1921, page 345.)

144,497 Willard Thread Rubber Insulation—storage batteries and parts of hard rubber. Willard Storage Battery Co., Cleveland, O.

144,501 Wrigley Brownie-type figure seated on stick of chewing-gum—chewing gum. Wm. Wrigley Jr. Co., Chicago, Ill.

ACT OF MARCH 19, 1920, SECTION 1 (b)

144,521 Cupples tires and tubes. Cupples Company Manufacturers, St. Louis, Mo.

144,525 Akron Rubber Shoe Co.—boots and shoes made wholly or partly of rubber. The B. F. Goodrich Co., New York, N. Y.

144,527 Wurkshu—rubber boots and shoes. Hood Rubber Co., Watertown, Mass. (See The India Rubber World, June 1, 1919, page 491.)

144,530 Sterling—zinc oxid. The New Jersey Zinc Co., Newark and Franklin Borough, N. J.

144,540 Best-Test—rubber hose and rubber and asbestos packing and brake-lining. Union Rubber & Asbestos Co., Trenton, N. J.

GRANTED JULY 12, 1921, ACT OF FEBRUARY 20, 1905

144,575 Goodrich—battery jars made of hard or semi-hard rubber, or having rubber incorporated therein. The B. F. Goodrich Co., New York, N. Y.

144,578 Spiralweave—insulated wire and cables. Hazard Manufacturing Co., Wilkes-Barre, Pa. (See The India Rubber World, August 1, 1921, page 831.)

144,605 Eagle Brand and representation of eagle—insulated wire and cables. Marion Insulated Wire & Cable Co., Marion, Ind.

THE DOMINION OF CANADA

REGISTERED

28,453 Insurance—canvas and other hose for fluids. Canadian Consolidated Rubber Co., Limited, Montreal, Que.

28,540 Flexyde—belts for wear. The Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio, U. S. A. (See The India Rubber World, June 1, 1921, page 673.)

28,541 Marathon—belts for wear. The Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio, U. S. A. (See The India Rubber World, June 1, 1921, page 673.)

28,551 Ornamental label bearing the words, "The Player's Delight," "A Six to One Shot," above representation of head of racehorse within a circular opening—transparent rubber goods. The Transparent Rubber Goods Co., Limited, Toronto, Ont.

28,572 National Brand—suspenders, garters and armbands. The National Suspender Co., Limited, Toronto, Ont.

28,624 Eclipse—druggists' rubber sundries. J. G. Ingram & Son, Limited, The London India Rubber Works, Felstead street, Hackney Wick, London, England.

28,630 Viceroy—erasers, footwear, rubber clothing, heels and soles, vehicle covering, hose, tires, insulating material, cement, and druggists' sundries. The Canadian I. T. S. Rubber Co., Limited, Toronto, Ont.

28,656 Two concentric circles, the inner one being solid black with the words Gregory Rubber Products showing in white thereon at a slight angle to the horizontal; the space between the inner and outer circles containing the words Canadian Made at the top and the words For World Trade at the bottom. The Gregory Tire & Rubber Co., Limited, Vancouver, B. C.

28,664 Sole followed by a large X; after that the letters tra; all enclosed in a framework made by extending lines from the edges of the letter X—composition for treating rubber, leather and canvas goods. J. S. C. Adamson and J. R. Montpetit, Ottawa, Ont.

THE UNITED KINGDOM

PUBLISHED JULY 6, 1921

B409,996 Edinburgh—pneumatic tires for cycles and motorcycles. The Dunlop Rubber Co., Limited, Dunlop House, 1 Albany street, Regent's Park, London, N. W. 1.

412,129 Condensite—buttons, trays, knobs, wheels, handles, etc., manufactured from phenol-methylene compounds, included in Class No. 50. Condensite Company of America, 1 Grove street, Bloomfield, New Jersey, U. S. A. Address for service in the United Kingdom, care of White, Langner, Stevens & Parry, Jessel Chambers, 88-90 Chancery Lane, London, W. C. 2.

414,562 Belfry—hose included in Class No. 50. Raven Hose & Belting Co., Limited, 295 Liverpool street, Salford, Manchester, Lancashire.

414,563 Ivanhoe—hose included in Class No. 50. Raven Hose & Belting Co., Limited, 295 Liverpool street, Salford, Manchester, Lancashire.

414,564 Sporran—hose included in Class No. 50. Raven Hose & Belting Co., Limited, 295 Liverpool street, Salford, Manchester, Lancashire.

PUBLISHED JULY 13, 1921

403,662 Avon—rubber footwear sundries not included in classes other than No. 40. The Avon India-Rubber Co., Limited, Rubber Works, Bath Road, Melksham, Wiltshire, and 343-5 Euston Road, London, N. W. 1. (Advertised before acceptance, alleging distinctiveness.)

403,663 Avon—golf balls. The Avon India-Rubber Co., Limited, Rubber Works, Bath Road, Melksham, Wiltshire, and 343-5 Euston Road, London, N. W. 1. (Advertised before acceptance, alleging distinctiveness.)

414,768 Brindia—tires for all kinds of motor vehicles. The Hercules Cycle & Motor Co., Limited, Britannia Works, 145 Conybere street, Birmingham.

415,133 Representation of profile of Indian maiden's head, with word Inca on band around head-dress, silhouetted against circular black disk—rubber pads for boots and shoes. Blakey's Boot Protectors, Limited, Armley Malleable Ironworks, Modder Place, Armley, Leeds.

415,134 Representation of profile of Indian chief, with word Inca on band around head-dress, silhouetted against circular black disk—rubber pads for boots and shoes. Blakey's Boot Protectors, Limited, Armley Malleable Ironworks, Modder Armley, Leeds.

415,517 Charmer—rubber tobacco pouches. The Civic Co., Limited, 81 Fulham Palace Road, Hammersmith, London, W. 6.

PUBLISHED JULY 20, 1921

B406,440 Farrel rubber machinery, etc. Farrel Foundry & Machine Co., 25 Main street, Ansonia, Conn., U. S. A. Address for service in the United Kingdom, care of White, Langner, Stevens & Parry, 88-90 Chancery Lane, London, W. C. 2.

B408,239 Flexo—garters, hose supporters and arm bands included in class No. 38. A. Stein & Co., 1149 West Congress street, Chicago, Ill., U. S. A. Address for service in the United Kingdom, care of Marks & Clerk, 57-8 Lincoln's Inn Fields, London, W. C. 2.

411,483 Raynetite below representation of a club spot and the words Club Brand "A 1"—raincoats, etc. J. T. Newall, Oak House, Cross street, Ashton-on-Mersey, Cheshire.

412,613 Quies—ear silencers to lessen vibration. M. H. Lepaute, 17-23 rue Desounettes, Paris, France. Address for service in the United Kingdom, care of Abel & Imray, 30 Southampton Buildings, London, W. C. 2.

B412,799 Firefoam—fire-extinguishing apparatus for volatile inflammables. Foamite Firefoam, Limited, 65 South Molton street, London, W. 1.

B412,801 Firefoam—fire-extinguishing compounds for volatile inflammables. Foamite Firefoam, Limited, 65 South Molton street, London, W. 1.

413,665 Halo-friction disks, etc., of impregnated fibrous material. Scandinavia Belting, Limited, 59 Southwark street, London, S. E. 1.

PUBLISHED JULY 27, 1921

414,704 Penoril—fountain and stylographic pens. J. R. Brough, "Eversly," Shepherd's Hill, Highgate, London, N. 6.

415,001 Mallatype—rubber erasers, fountain pens, etc. E. J. Revilière, trading as Etablissements Mallat, 80 Finsbury Pavement, London, E. C. 2, and 53 boulevard de Strasbourg, Paris, France.

NEW ZEALAND

17,497 Representation of label bearing the words Wrigley's Juicy Fruit Chewing Gum in two panels and the signature Wm. Wrigley Jr. Co. in one, accompanied by the words Chicago, New York, Toronto, London—chewing gum. Wm. Wrigley Jr. Co., 5 North Wabash avenue, Chicago, Ill., U. S. A.

17,571 Flintos in panel with conventionalized outline—footwear of fabric and rubber. Canadian Consolidated Rubber Co., Limited, 201 Inspector street, Montreal, Quebec, Canada.

17,577 Representation of seal bearing words Rhode Island Rubber Co., U. S. A.—rubber footwear, particularly overshoes. Woonsocket Rubber Co., Woonsocket, Rhode Island, U. S. A.

17,578 Woonsocket—rubber footwear, particularly overshoes. Woonsocket Rubber Co., Woonsocket, Rhode Island, U. S. A.

17,936 Pussy-Foot—rubbers, rubber footwear, etc. The Hurlbut Co., Limited, Preston, Ontario, Canada.

17,979 Dainite—rubber and gutta percha goods not included in classes other than No. 40. W. E. and O. W. H. Briggs, trading as Harborough Rubber Co., Rubber Mills, St. Mary's Road, Market Harborough, England.

18,027 Agrippa—druggists' rubber sundries. J. G. Ingram & Son, Limited, The London Indiarubber Works, Felstead street, Hackney Wick, London, England.

DESIGNS

THE UNITED STATES

No. 58,178 Tire casing. Patented June 21, 1921. Term 14 years. E. L. Campbell, assignor to The J. R. Watkins Co.—both of Winona, Minn.

58,180 Pneumatic tire. Patented June 21, 1921. Term 14 years. W. F. Collins, assignor of ½ to J. J. Schweinefuss—both of Centerville, Ia.

58,181 Tire casing. Patented June 21, 1921. Term 14 years. F. S. Dickinson, New York, N. Y., assignor to The Perfection Tire & Rubber Co., a Delaware corporation.

58,182 Tire casing. Patented June 21, 1921. Term 14 years. F. S. Dickinson, New York, N. Y.

58,187 Tire. Patented June 21, 1921. Term 14 years. I. V. Humphrey, Highland Park, Pa.

58,191 Non-skid tire tread. Patented June 21, 1921. Term 14 years. C. B. Klopfenstine, assignor to Iowa Cord Tire Co.—both of Des Moines, Ia.

58,192 Non-skid tire tread. Patented June 21, 1921. Term 14 years. C. B. Klopfenstine, assignor to Iowa Cord Tire Co.—both of Des Moines, Ia.

58,198 Tire. Patented June 21, 1921. Term 7 years. H. Raflovich, Buffalo, N. Y.

58,218 Tire Patented June 28, 1921. Term 14 years. G. K. Culp, New York, N. Y., assignor to New England Tire & Rubber Co., Holyoke, Mass.

58,243 Tire tread. Patented June 28, 1921. Term 14 years. G. Lambright, Fond du Lac, Wis.

58,316 Combined garter and powder-puff receptacle. Patented July 12, 1921. Term 7 years. A. Heald, Washington, D. C.

58,187 58,181 58,182 58,192 58,180 58,178 58,419 58,243 58,500 58,494 58,463 58,464 58,465 58,478 58,218 58,491 58,198 58,191

58,419 Tire. Patented July 19, 1921. Term 14 years. J. M. Alderfer, Akron, O.

58,463 Non-skid tire tread. Patented July 26, 1921. Term 14 years. E. N. Downes, assignor to McClaren Rubber Co.—both of Charlotte, N. C.

58,464 Non-skid tire tread. Patented July 26, 1921. Term 14 years. E. N. Downs, assignor to McClaren Rubber Co.—both of Charlotte, N. C.

58,465 Non-skid tire tread. Patented July 26, 1921. Term 14 years. E. N. Downes, assignor to McClaren Rubber Co.—both of Charlotte, N. C.

58,478 Tire tread. Patented July 26, 1921. Term 14 years. W. S. Gauntt, Kansas City, Mo.

58,491 Tire tread. Patented July 26, 1921. Term 7 years. E. F. Kling, assignor to The Batavia Rubber Co.—both of Batavia, N. Y.

58,494 Tire. Patented July 26, 1921. Term 7 years. E. L. Lawlor, Youngstown, O.

58,500 Tire. Patented July 26, 1921. Term 14 years. C. S. Park, assignor to Corona Cord Tire Co.—both of East Butler, Pa.

THE DOMINION OF CANADA

5,075 Tire tread. Patented June 22, 1921. H. T. Pyke, Toronto, Ont.

5,076 Tire tread. Patented June 22, 1921. R. S. Smart, Ottawa, Ont.

5,077 Tire tread. Patented June 22, 1921. R. S. Smart, Ottawa, Ont.

5,078 Tire tread. Patented June 22, 1921. R. S. Smart, Ottawa, Ont.

5,079 Inside blow-out shoe for tires. Patented June 22, 1921. Dunlop Tire & Rubber Goods Co., Limited, Toronto, Ont.

GERMANY

DESIGN PATENTS, WITH DATES OF ISSUE

778,092 (April 2, 1921) Valve for inner tubes. Lammerspieler Metallwaren und Schraubenfabrik Melber & Co., Lämmerspiel, near Offenbach-on-the-Main.

781,037 (April 9, 1921) Rubber heel protector. August Glöckner, Peter strasse 6, Worms.

781,231 (May 23, 1921) Solid rubber heel with edges of leather or similar material. Carl Grebe, Carnapstrasse 74, Elberfeld.

781,864 (May 24, 1921) Arrangement of treads for covers of pneumatics for bicycles, motorcycles and automobiles. The Dunlop Rubber Co., Limited, London; represented by Dr. R. Wirth, C. Weihe, Dr. H. Weil, M. M. Wirth, Frankfurt-on-the-Main, and T. R. Koehnhorn, Berlin, S. W. 11.

781,985 (April 29, 1921). Protective Cap for rubber nipples. Franz Plödt, Hersbruck.

782,175 (May 28, 1921) Rubber nipple for milk bottles. Willy Bach, Schedewitz, near Zwickau.

782,228 (May 25, 1921) Linen band on rubber collar. Heinrich Wolf, Gelsenkirchen-Bismark.

782,397 (May 18, 1921) Tread for tires, solid rubber tires and felloe tires. Friedrich Rutge, Haaren, near Aachen.

782,827 (June 4, 1921) Water pipe cock with rubber ball closing. Rudolf Schmid, Carl Fritz and Hermann Schmidd—all of Balingen, Württenberg.

782,865 (May 17, 1921) Rubber sole. Westdeutsche Gummi Co. H. Chormann, Düsseldorf.

782,958 (June 6, 1921) Pen holder with rubber end. Hermann Poser, Siegen i. W.

783,031 (May 30, 1921) Rubber tire having a tread on which semicircular ridges are arranged to form a lattice design. Vereinigte Gummiwarenfabriken Harburg-Wien, formerly Menier-J. N. Reithoffer, Harburg a. E.

783,033 (May 31, 1921) Metal disk for attaching rubber soles. Rheinische Gummi-Gesellschaft W. Klotz & Co., Düsseldorf.

783,041 (June 3, 1921) Metal insert under tread to protect tubes of bicycles, etc. Arno Paul, Thalstrasse 13, Gera, Reuss.

783,307 (December 18, 1920) Football. Alfred Paetzold, Wassertorstrasse 32, Berlin.

783,318 (April 13, 1921) Return valve for pneumatic tires. Neumann & Pfeiffer, Osnabrück.

783,321 (April 20, 1921) Tire. Gummiwerk Martell G. m. b. H., Halle-on-the-Saale.

783,428 (June 6, 1921) Rubber heel. Julius Löwenstein, Savignystrasse 33, and Robert Baldenweck, Leerbachstrasse 50—both in Frankfurt-on-the-Main.

783,536 (June 14, 1921) Rubber heel. Bernhard Bossmann, Benderstrasse 158, Düsseldorf-Gerresheim.

783,707 (September 23, 1920) Tire valve. Gustav Treutler, Dittersbach, near Waldenburg, Silesia.

783,714 (March 5, 1921) Elastic tire for motor vehicles. Neumann & Pfeiffer, Osnabrück.

783,866 (June 18, 1921) Injector syringe. Max Fleischer, Kirchstrasse 1 B., Charlottenburg.

784,256 (June 11, 1921) Rubber layer for tread of footwear with opening for the passage of a piece of material. Otto Stöhr, Quasnitz, Post Lützschena.

784,311 (June 14, 1921) Vulcanized rubber handle, in two parts, for bicycles. Gummiwarenfabrik P. Pens, Berlin.

NEW JAPANESE TRADE-MARK LAW

According to the new trade-mark law of Japan, dated April 9, 1921, the registration fee is 30 yen, which covers a period of 20 years, with a renewal fee of 50 yen. One yen equals $0.4985. A collective trade-mark may be registered by an organization of persons in the same business, or by business men intimately connected with the object of promoting the common business interests of the members of the organization. The registration fee for a collective trade-mark is 100 yen, with a renewal fee of 150 yen.

A trade-mark is canceled when not used in the Empire for a year after registration, or when its use has been suspended for a period of 3 consecutive years. The trade-mark right in a trade-mark which has been registered as a foreign trade-mark is terminated when the trade-mark right in the home country is terminated.

Review of the Crude Rubber Market

NEW YORK

Generally speaking, the plantation rubber market has been fairly steady during the past month, and, although a firm undertone has prevailed throughout the period in review, prices have shown minor declines since the first of August.

There was considerable factory buying early in the month, giving strength to the market situation that was further supported by the firmness with which dealers held to their prices. As there was very little distressed rubber in sight at this time, factory offers of 13 to 13½ cents for spot ribs and 15 to 15½ cents for first latex were ignored. Large buying orders placed in the Far East and attributed to local dealers indicated an actual demand that stiffened the eastern market on all grades.

Following a fairly active demand featured by factory buying and dealers' business, the market sagged under selling pressure, and spot ribs sold around 13¾ to 14 cents with latex at 15 to 15¼. For some time crêpe has been at a premium over ribs, but quite recently values have tended toward similar price levels. This is due to more crêpe and less ribs being made in the primary markets, as the quantity of moldy ribs that have been arriving for some time has had a depressing effect on this market.

Toward the close of the month, market conditions became dull and there was very little trading, although factory interest in the way of inquiries was evident. Buyers and sellers could agree only when the former were forced into the market for needed supplies, and at the sellers' prices of 14½ cents for latex and 13½ cents for ribs.

Brazilian Parás gained several points early in the month, due to the rise in Brazilian exchange, and upriver fine rose to 19½ cents, but lacking interest it later fell to 17½ cents.

Imports of all grades during July were 11,692 tons, compared with 15,884 tons last year. Plantation arrivals for July were 11,140 tons, compared with 14,695 tons a year ago. Total imports of all grades for the seven months ended July 31, 1921, were 90,404 tons, compared with 167,773 tons for the corresponding period in 1920.

Spot and future quotations on standard plantation and Brazilian grades were as follows:

Plantations. August 1. Spot, first latex crêpe, 15 to 15½ cents; August—September, 15½ cents; October—December, 15½ cents. August 23. Spot, first latex crêpe, 14½ cents; October—December, 15¾ cents; January—March, 16¼ cents; January—June, 17¼ cents.

August 1. Spot, ribbed smoked sheets, 13¾ cents; August—September, 14 cents; October—December, 14½ cents. August 23. Spot, ribbed smoked sheets, 13½ cents; October—December, 14¼ cents; January—March, 15¼ cents; January—June, 16½ cents.

August 1. Spot, No. 1 amber crêpe, 13 cents; August—September, 13¼ cents; October—December, 13½ cents. August 23. Spot, No. 1 amber crêpe, 13 cents; October—December, 13½ cents; January—March, 14½ cents; January—June, 16½ cents.

August 1. Spot, No. 1 rolled brown crêpe, 11 cents; August—September, 11 cents. August 23. Spot, No. 1 rolled brown crêpe, 10½ cents; October—December, 11 cents; January—March, 12 cents.

South American Parás and Caucho. August 1. Spot, upriver fine, 17 cents; islands fine, 17 cents; upriver coarse, 8¾ cents; islands coarse, 7 cents; Cametá, 8¼ cents; caucho ball, 9½ cents. August 23. Spot, upriver fine, 17½ cents; islands fine, 17½ cents; upriver coarse, 9½ cents; islands coarse, 7 cents; Cametá, 8 cents; caucho ball, 10 cents.

NEW YORK QUOTATIONS

Following are the New York spot quotations, for one year ago, one month ago, and August 25, the current date:

	September 1, 1920	August 2, 1921	August 25, 1921
PLANTATION HEVEA			
First, latex crêpe	$0.31 @	$0.15½ @	$0.14½ @
Off latex crêpe	@	.15 @	.13½ @
Amber crêpe No. 1	.29 @	.13¾ @	.12½ @
Amber crêpe No. 2	.28 @	.12¾ @	.11½ @
Amber crêpe No. 3	.27 @	.11¾ @	.10½ @
Brown crêpe, thick and thin	.26 @	.12½ @ .13	.11 @
Brown crêpe, specky	.25 @	.11½ @	.10½ @
Brown crêpe, rolled	.24½ @	.11¼ @	.10½ @
Smoked sheet, ribbed	.30 @ .30½	.14½ @	.13¾ @
Smoked sheet, plain	.29 @	.12 @	.11½ @
Unsmoked sheet	.26 @	@	@
Colombo scrap No. 1	.22 @	@	@
Colombo scrap No. 2	.21½ @	@	@
EAST INDIAN			
Assam crêpe	@	@	@
Assam onions	@	@	@
Penang block scrap	@	@	@
PONTIANAK			
Banjermassin	.09¼ @ .11½	.06½ @ .07	.07½ @
Palembang	.10¼ @	.07¾ @	.07½ @
Pressed block	.19 @	.09 @ .10	.10 @ .11
Sarawak	.08¾ @	.06¼ @	.06¾ @
SOUTH AMERICAN			
PARAS			
Upriver, fine	.30 @	.17 @ .17½	.17¼ @
Upriver, medium	.29 @ .30	.15½ @	.14¼ @
Upriver, coarse	.21½ @ .22	.08½ @	.09¼ @
Upriver, weak, fine	.27 @	.14 @	.13½ @
Islands, fine	.28 @	.16½ @	.17 @
Islands, medium	*.26 @ .28	.13½ @	.14 @
Islands, coarse	.19 @	.08 @ .08½	.07 @
Cametá	.17 @	.08¼ @	.08 @
Acre Bolivian, fine	.33½ @ .34	.17 @	.17½ @
Madeira, fine	.35 @	.18½ @	.22 @
Beni Bolivian	@	@	.17¾ @
Peruvian, fine	.31 @	.15½ @	.17½ @
Tapajos, fine	.30 @ .31	.15 @	.17 @
CAUCHO			
Upper caucho ball	.21½ @ .22	.10 @	.10 @
Lower caucho ball	.18½ @	.08¼ @	.07½ @
MANICOBAS			
Ceará negro heads	.23 @	.10 @	*.10 @
Ceará scrap	.20 @	.07½ @	*.08 @
Maniçoba, 30% guaranty	.25 @	.09 @	*.10 @
Mangabeira thin sheet	.28 @	.10 @	*.12 @
CENTRALS			
Corinto scrap	.18 @	.10 @ .11	.08 @ .11
Central scrap	.18 @	.10 @ .11	.08 @ .11
Central scrap and strip	.15 @	.08 @ .10	.07 @ .09
Central wet sheet	.13 @	.02 @ .04	.05 @
Esmeralda sausage	.18 @	.10 @ .11	.08 @ .11
Guayule, 20% guaranty	.27 @	@	@
Guayule, washed and dried	.37 @	.25 @	.25 @
AFRICANS			
Benguela, No. 1, 28½%	@	.04 @ .05	@
Benguela, No. 2, 32½%	@	.06 @	.05 @
Conakry niggers	@	@	@
Congo prime, black upper	@	@	@
Congo prime, red upper	@	@	@
Kassai, black	@	@	@
red	@	@	@
Massai sheets and strings	@	@	@
Niger flake, prime	@	.11 @ .13	@
Rio Nunez ball	@	@	@
Rio Nunez sheets, strings	@	@	@
GUTTA PERCHA			
Gutta Siak	.20½ @ .22½	.14 @ .15	.15 @
Red Macassar	2.00 @ 2.95	2.50 @ 3.00	2.50 @
BALATA			
Block, Ciudad, Bolivar	.67 @ .68	.53 @ .54	.53 @
Colombia	.47 @	.39 @ .40	.39 @
Panama	.40 @	.39 @ .40	.25 @
Surinam sheet	.75 @	.67 @ .68	.64 @ .65
amber	.82 @	.70 @	.68 @ .69

*Nominal.

RECLAIMED RUBBER

Conditions in the market for reclaimed rubber remain essentially the same as last month. The tendency to improvement in demand increases with the approach of normal output in automobile tire and other rubber manufacturing lines. Reclaimers, however, continue to operate their plants at about 25 per cent of capacity.

The immense over-stock of crude rubber at record low prices has effectually blocked demand for reclaimed except along certain lines where it offers special technical advantages.

Quotations remain nominal and unchanged from last month.

NEW YORK QUOTATIONS

August 25, 1921

Prices subject to change without notice.

STANDARD RECLAIMS	
Floating	$0.14 @ $0.16
Friction	.14 @ .16
Mechanical	.09 @ .11
Shoe	.11¼ @ .12¼
Tires, auto	.11¼ @ .13¼
truck	.09 @ .11
White	.14 @ .15

COMPARATIVE LOW AND HIGH NEW YORK SPOT RUBBER PRICES

	August 1921*	1920	1919
PLANTATIONS			
First latex crêpe	$0.14¼ @ $0.17	$0.29¾ @ $0.33½	$0.41¾ @ $0.45½
Smoked sheet ribbed	.13½ @ .15	.29½ @ .33¼	.39¾ @ .44½
PARAS			
Upriver, fine	.17 @ .19½	.30 @ .35	.54 @ .55
Upriver, coarse	.08¾ @ .11½	.20 @ .27	.31½ @ .32
Islands, fine	.16½ @ .18½	.29 @ .32	.47½ @ .47½
Islands, coarse	.07 @ .08	.19 @ .20	.21½ @ .21½
Cametá	.07½ @ .09	.18 @ .18	.21½ @ .21½

*Figured to August 25, 1921.

ANTWERP RUBBER MARKET

OSTERRIETH & CO., Antwerp, report under date of August 6, 1921.

Our market seems to have recovered from the state of pessimism prevailing at the time of our last report, and although the activity still leaves much to be desired there is a steadier undertone and a bit of inquiry, too, on the part of consumers who generally consider the actual level of prices interesting and seem to be in possession of some more orders for manufactured goods. We close the week as follows:

	Crêpes, Francs per Kilo	Sheets, Francs per Kilo
August, 1921	4.25	4.00
September	4.50	4.00
October	4.65	4.15
November	4.75	4.25
December	4.80	4.25
January, 1922	5.00	4.35
February	5.00	4.35
March	5.00	4.45
April	5.00	4.45
May	5.00	4.45
June	5.00	4.45
July	...	...

In Congo rubber there has not been much business passing, although there are buyers in the market, whose idea of prices, however, is rather out of the question. We quote today:

	Francs per Kilo
Prime Red Kasai	3.40
Kasai Loanda II	1.60/2.50
Red thimbles	0.75

Usual Antwerp terms.

AMSTERDAM RUBBER MARKET

JOOSTEN & JANSSEN, Amsterdam, report, under date of August 5, 1921: There was a good demand this week, though little offering, and prices going up gradually. In the beginning October-December crêpe was quoted at 47-48 cents; later on this position has been sold at 53-54. August-September and January-March were going up as well. The market closed this afternoon on the following prices:

Hevea crêpe, Fl. 50	Sheets, Fl. .48 spot.
Hevea crêpe, Fl. .54	Sheets, Fl. .51 October—December.
Hevea crêpe, Fl. .57	Sheets, Fl. .54 January—March.

There was almost no business in spot; while the future market had a good turnover.

HAMBURG RUBBER MARKET

Effektiv-Rohgummimakler-Verein, Hamburg, reports, under date of July 23, 1921:

While the market was very firm and business was brisk up to the middle of the week, a certain weakening in standard qualities was noticeable toward the end of the week. The demand for medium qualities like brown crêpe and inferior smoked sheets, as well as Pará grades, particularly caucho ball, remained active with higher prices.

During the week selling was active in all grades and large quantities of medium qualities were sold.

	Marks
First latex crêpe	24 @ 25
Ribbed smoked sheets	22 @ 23
Ribbed smoked sheets, lower grade	18.50 @ 20.50
Brown crêpe, clean	17 @ 19
Brown crêpe, somewhat barky	15.50 @ 17
Dark crêpe	15 @ 16
Hard fine Pará	27.50 @ 28.50
Caucho ball	17 @ 18
Panama and Colombia black balata	.55 @ .75
No. 1 balata sheet	100 @ 110
Jelutong	10 @ 12

SINGAPORE RUBBER MARKET

GUTHRIE & CO., Limited, Singapore, report under date of July 7, 1921:

The firmer tendency evidenced in the local rubber market a week ago matured to an active market, due chiefly to dealers covering, and a general rise in values of 2½ cents resulted. The weekly auctions held yesterday opened quietly, but improved later on, additional buyers coming in. At the afternoon session competition was keen and the sale closed strongly at best. No standard quality sheet and crêpe was sold. Good F. A. Q. sheet was in strong demand up to 22½ cents (1 lot sold for 23 cents) and off quality lots fetched relatively good prices. Off quality crêpe sold up to 26 cents (26½ cents was paid for one lot), an advance of 2½ cents on the week. Fine browns were in short supply and advanced 2½ cents. Good brown and dark crêpes remained steady. A small quantity of bark crêpe sold from 5 to 8½ cents. Of 681 tons catalogd, 469 tons were offered and 390 tons sold. The following is the course of values:

	In Singapore per pound	Sterling Equivalent per pound in London
Sheet, good ribbed smoked	15 @ 23	—/ 6¼ @ —/ 8½
Crêpe, good pale	16 @ 26½	—/ 7 @ —/10
Crêpe, fine brown	13 @ 18½	—/ 6⅛ @ —/ 7¾
Crêpe, good brown	8½ @ 12½	—/ 4⅞ @ —/ 6
Crêpe, dark	8 @ 11	—/ 4¾ @ —/ 5⅜
Crêpe, bark	5 @ 8½	—/ 3⅞ @ —/ 4⅞

PLANTATION RUBBER EXPORTS FROM MALAYA

(These figures include the production of the Federated Malay States, but not of Ceylon)

	January 1 to May 31, 1921 Singapore	Malacca	Penang	January 1 to July 7, 1921 Port Swettenham	Totals
To United Kingdom ....*pounds*	25,947,473	2,299,953	9,482,699	9,984,792	47,714,917
The Continent	4,724,272	1,739,485	101,600	59,132	6,624,489
Japan	17,487,668	......	......	37,575	17,525,243
Ceylon	44,627	......	113,999	243,884	402,510
United States and Canada	42,110,628	15,640	930,733	......	43,057,001
Australia	509,294	806	......	......	510,100
Other countries	......	......	796,533	......	796,533
Totals..*pounds*	90,823,962	4,055,884	11,425,564	10,325,383	116,630,793

Compiled by Barlow & Co., Singapore.

NEW YORK AVERAGE SPOT RUBBER PRICES

Prices in Cents Per Pound

JULY, 1921

PLANTATIONS	18	19	20	21	22	23	25	26	27	28	29	30
Sheet												
Ribbed smoked	15¼	15¼	15	14¾	14½	14½	14⅜	14¼	14⅛	13¾	13¾	13¾
Crêpe												
First latex	16½	17½	16⅜	16¼	16¼	16¼	15¼	15¼	15⅜	14¾	14¾	14¾
Off latex	14	16⅞	14¼	14⅝	14¾	14¾	14¼	13⅝	14	13¾	13½	13½
No. 1 blanket	13¾	13⅝	13⅝	13¼	13¼	13¼	13¾	13⅝	13¼	12¾	12¾	12¾
No. 2 blanket	12¾	12⅞	12½	12¾	12¼	12¼	12¾	12½	12¼	12⅛	11¾	11¾
No. 3 blanket	11¾	12⅛	11½	11¾	11¾	11¾	11¾	11½	11¾	11¼	10¾	10¾
Thin, clean, brown	13	13¼	12½	12¾	12¾	12¾	12¾	12¾	12¼	11¾	11¾	11¾
Specky brown	11½	12	11¼	11⅝	11⅝	11⅝	11½	11¼	11	10¾	10¾	10¾
Rolled brown	11	11⅛	11¼	11¼	11¼	11¼	10¾	11⅛	10½	10¾	10¾	10¾

AUGUST, 1921

PLANTATIONS	1	2	3	4	5	6	8	9	10	11	12	13
Sheet												
Ribbed smoked	13¾	14	14¼	14¾	14¾	14¾	14¾	14¾	14¾	14⅛	13¾	14
Crêpe												
First latex	15⅛	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	14⅞	14¾	14½
Off latex	13¾	13¾	13¾	13¾	13¾	13¾	14¼	14¼	14¼	14	14¼	14¼
No. 1 blanket	12¾	12¾	12¾	12¾	12¾	12¾	13	13¼	13¼	12¾	12¾	12¾
No. 2 blanket	11¾	11¾	11¾	11¾	11¾	11¾	12¼	12¼	12¼	11¾	11¾	11¾
No. 3 blanket	10¾	10¾	10¾	10¾	10¾	10¾	11¾	11½	11¼	10¾	10¾	10¾
Thin, clean, brown	11½	11½	11½	11½	11½	11½	11¾	12¼	12	11½	11¼	11¼
Specky brown	10½	10¾	10¾	10¾	10¾	10¾	10¾	11¼	11	11	10¾	10¾
Rolled brown	10¾	10¾	10¾	10¾	10¾	10¾	11	11	11	11	11	11

FEDERATED MALAY STATES RUBBER EXPORTS

An official report from Kuala Lumpur states that the exports of plantation rubber from the Federated Malay States in June amounted to 5,823 tons, which compares with 7,658 tons in May and 9,049 tons in the corresponding month last year. Exports for the first half of the present year amounted to 41,509 tons as against 55,475 tons last year and 50,717 tons in 1919. Appended are the comparative statistics:

	1919	1920	1921
January ....tons	7,163	11,119	7,085
February	10,809	9,781	6,091
March	10,679	9,524	7,408
April	7,664	8,375	7,444
May	7,308	7,627	7,658
June	7,094	9,049	5,823
Totals ....tons	50,717	55,475	41,509

STRAITS SETTLEMENTS RUBBER EXPORTS

An official report from Singapore states that 10,111 tons of rubber (transhipments, 1,810 tons) were exported from Straits Settlements ports in the month of June as compared with 8,813 tons in May and 11,663 tons in the corresponding month last year. The half year's exports amounted to 43,912 tons as against 73,483 tons last year, and 82,725 tons in 1919. Appended are the comparative statistics:

	1919	1920	1921
January ....tons	14,404	13,125	5,809
February	15,661	17,379	5,813
March	20,908	5,931	7,275
April	10,848	9,768	6,091
May	15,845	15,617	8,813
June	5,059	11,663	10,111
Totals.............tons	82,725	73,483	43,912

CEYLON RUBBER EXPORTS

	January 1, to June 30	
	1920	1921
To United Kingdom.....................pounds	17,869,744	16,384,417
Austria	......	980
Belgium	106,830	249,904
France	440,817	317,900
Germany	108,228	1,823,488
Holland	28	374,281
Denmark	......	51,565
Italy	89,600	95,200
Norway	......	2,240
Western Australia	56	......
Victoria	89,669	125,890
New South Wales..........................	180,094	103,800
United States	22,078,498	22,317,223
Canada and Newfoundland..........................	425,600	419,148
India	586	8,382
Straits Settlements	44,800	......
Japan	157,667	207,376
Totals ....pounds	41,592,217	42,481,794

Compiled by the Ceylon Chamber of Commerce.

PLANTATION RUBBER EXPORTS FROM JAVA*

	May		Five Months Ended May	
	1920	1921	1920	1921
To Netherlands ....kilos	317,000	876,000	1,846,000	3,728,000
Great Britain	407,000	213,000	2,731,000	4,065,000
Germany				145,000
France	31,000*	3,000	49,000*	......
Belgium				5,000
Italy				4,000
United States	1,362,000	117,000	7,041,000	2,508,000
Singapore	176,000	11,000	1,865,000	1,058,000
Japan	6,000	......	184,000	95,000
Australia	30,000	834,000	46,000	1,043,000
Totals ....kilos	2,329,000	2,054,000	13,762,000	12,651,000
Ports of origin:				
Tandjong Priok ....kilos	1,274,000	1,940,000	6,645,000	6,786,000
Samarang	8,000	29,000	193,000	160,000
Soerabaya	1,045,000	28,000	6,517,000	4,802,000

*Destinations not separately mentioned.

CRUDE RUBBER ARRIVALS AT ATLANTIC AND PACIFIC PORTS AS STATED BY SHIPS' MANIFESTS

PARAS AND CAUCHO AT NEW YORK

	Fine	Medium	Coarse	Caucho	Totals Pounds
July 24. By the S. S. "Dunstan" from Pará.					
Schafer & Meyer..........	57,396	4,488	23,760	......	85,644
Paul Bertuch	......	......	22,982	......	22,982
Meyer & Brown, Inc..........	48,775	......	......	......	48,775†
Poel & Kelly, Inc..........	112,000	4,480	4,480	30,000	150,960
July 24 By the S. S. "Dunstan" from Manáos.					
Paul Bertuch	56,484	......	......	......	56,484
August 10. By the S. S. "Justin" from Manáos.					
Fred Stern & Co..........	1,120	......	4,480	......	5,600
August 10. By the S. S. "Justin" from Pará.					
Poel & Kelly, Inc..........	70,000	......	6,720	56,000	132,720
August 12. By the S. S. "Sallust" from Pará.					
H. A. Astlett & Co..........	40,000	15,000	......	......	55,000
Poel & Kelly, Inc..........	22,400	......	......	22,400	44,800
August 12. By the S. S. "Sallust" from Manáos.					
Paul Bertuch	28,924	......	......	58,532	87,456
Fred Stern & Co..........	44,800	......	22,400	......	67,200
August 17. By the S. S. "Balzac" from Pará.					
Poel & Kelly, Inc..........	36,000	......	......	117,000	153,000

†Includes medium.

PLANTATIONS

(Figured at 180 pounds net to the bale or case.)

	Shipment from:	Shipped to:	Pounds.	Totals.
July 20. By the S. S. "City of Chester" at New York.				
Konig Bros. & Co......	Colombo	New York	20,340	
Meyer & Brown, Inc....	Colombo	New York	145,600	
Baring Bros.	Colombo	New York	20,160	
Charles T. Wilson Co., Inc.	Colombo	New York	80,640	
General Rubber Co......	Colombo	New York	151,200	
Smith & Schippers, Inc.	Colombo	New York	175,860	
Poel & Kelly, Inc.......	Colombo	New York	44,100	
Fred Stern & Co.......	Colombo	New York	22,400	
H. A. Astlett & Co.....	Colombo	New York	22,000	
Various	Colombo	New York	475,540	1,157,840
July 21. By the S. S. "Lancaster" at New York.				
Netherlands Corporation for Oversea Trade....	Soerabaya	New York	215,640	
L. Littlejohn & Co., Inc.	Soerabaya	New York	173,880	
J. D. Lewis...........	Soerabaya	New York	24,840	
Various	Soerabaya	New York	49,680	
J. T. Johnstone & Co., Inc.	Malacca	New York	90,000	
Firestone Tire & Rubber Co.	Malacca	Akron	205,740	
Manhattan Rubber Manufacturing Co.	Batavia	New York	18,720	
Mitsui & Co., Limited...	Batavia	New York	30,600	
L. Littlejohn & Co., Inc.	Batavia	New York	217,800	
Pacific Trading Co.....	Batavia	New York	13,500	
L. C. Gillespie & Sons..	Batavia	New York	36,000	
Mitsubishi Goshi Kaisha.	Batavia	New York	22,500	
Baird Rubber & Trading Co.	Batavia	New York	76,500	
Lewis & Peat..........	Batavia	New York	30,240	
Poel & Kelly, Inc.......	Batavia	New York	240,480	
John D. Lewis.........	Batavia	New York	235,440	
Phelan, Borland & Fearons	Batavia	New York	69,480	
Various	Batavia	New York	492,360	
Fred Stern & Co.......	Singapore	New York	116,480	2,359,880
July 21. By the S. S "Lancaster" at Baltimore.				
Poel & Kelly, Inc.......	Singapore	Baltimore	280,000	280,000
July 22. By the S. S. "Rotterdam" at New York.				
Meyer & Brown, Inc....	Rotterdam	New York	44,800	
Various	Rotterdam	New York	125,120	169,920
July 28 By the S. S. "Vasconia" at New York.				
Goldman, Sachs & Co...	London	New York	524,880	524,880

UNITED STATES CRUDE AND WASTE RUBBER IMPORTS FOR 1921 (BY MONTHS)

1921	Plantation	Parás	Africans	Centrals	Guayule	Maniçoba and Matto Grosso	Balata	Miscellaneous	Waste	Totals 1921	Totals 1920
January ....tons	12,819	1,312	43	3	......	......	41	173	1,071	15,462	22,401
February	7,913	432	269	2	25	......	25	216	37	8,919	33,984
March	12,241	1,794	377	1	......	3	29	7	345	14,797	33,998
April	16,861	403	......	5	......	......	64	226	7	17,566	24,957
May	9,127	1,570	......	2	33	......	40	186	41	10,999	28,666
June	12,361	1,091	......	25	......	......	49	203	72	13,801	15,606
July	11,140	495	27	30	......	......	25	189	34	11,940	17,487
Totals, 7 months, 1921...	82,462	7,097	716	68	58	3	273	1,200	1,607	93,484	......
Totals, 7 months, 1920...	149,098	13,924	3,644	590	504	13	327	5,937	3,062	......	177,099

Compiled by The Rubber Association of America, Inc.

PLANTATIONS—Continued

	Shipment from:	Shipped to:	Pounds.	Totals.
July 28 By the S. S. "Eastern Sea" at New York.				
Various	Rotterdam	New York	279,540	279,540
July 28. By the S. S. "Mongolian Prince" at New York.				
J. T. Johnstone & Co., Inc.	Malacca	New York	45,000	
L. Littlejohn & Co., Inc.	Singapore	New York	495,180	
Charles T. Wilson Co., Inc.	Singapore	New York	25,200	
Poel & Kelly, Inc.	Singapore	New York	61,400	
Baird Rubber & Trading Co.	Singapore	New York	94,500	
F. R. Henderson & Co.	Singapore	New York	188,820	
East Asiatic Co., Inc.	Singapore	New York	100,800	
Peninsular Trading Agency, Inc.	Singapore	New York	72,000	
Rubber Importers & Dealers Co., Inc.	Singapore	New York	143,100	
J. T. Johnstone & Co., Inc.	Singapore	New York	54,000	
Thomas A. Desmond & Co.	Singapore	New York	295,200	
Raw Products Co.	Singapore	New York	70,200	
Adolph Hirsch & Co.	Singapore	New York	14,400	
E. G. Curry & Co., Inc.	Singapore	New York	63,360	
Ajax Rubber Co., Inc.	Singapore	New York	38,520	
Fred Waterhouse Co., Limited	Singapore	New York	8,640	
Phelan, Borland & Fearons	Singapore	New York	85,680	
Smith & Schippers, Inc.	Singapore	New York	100,800	
Meyer & Brown, Inc.	Singapore	New York	161,280	
General Rubber Co.	Singapore	New York	102,060	
The Fisk Rubber Co.	Singapore	Chicopee Falls	147,060	
Firestone Tire & Rubber Co.	Singapore	Akron	153,900	
Hood Rubber Co.	Singapore	Watertown	13,566	
Various	Singapore	New York	791,094	3,325,760
July 30 By the S. S. "Yamagata Maru" at New York.				
Baring Bros.	Singapore	New York	118,800	
Baird Rubber & Trading Co.	Singapore	New York	59,400	
William H. Stiles & Co.	Singapore	New York	27,000	
H. S. Seferiro & Co.	Singapore	New York	169,920	
Hood Rubber Co.	London	Watertown	89,600	464,720
August 1. By the S. S. "Ryndam" at New York.				
Meyer & Brown, Inc.	Rotterdam	New York	179,280	
Various	Rotterdam	New York	720,000	899,280
August 1. By the S. S. "Cedric" at New York.				
Various	Liverpool	New York	343,980	343,980
August 3 By the S. S. "Melville Dollar" at New York.				
Firestone Tire & Rubber Co.	Singapore	Akron	216,540	
Pacific Trading Co.	Singapore	New York	197,820	
Fred Stern & Co.	Singapore	New York	112,000	
Rubber Trading Co.	Singapore	New York	27,000	
Poel & Kelly, Inc.	Singapore	New York	22,400	
L. Littlejohn & Co., Inc.	Singapore	New York	132,120	707,880
August 3. By the S. S. "Veendyk" at New York.				
Various	Colombo	New York	401,632	
Wm. Schall & Co.	Soerabaya	New York	13,105	
Various	Soerabaya	New York	684,462	
Manhattan Rubber Mfg. Co.	Batavia	New York	34,369	
Poel & Kelly, Inc.	Batavia	New York	22,400	
Wm. Schall & Co.	Batavia	New York	31,088	
H. A. Astlett & Co.	Batavia	New York	62,000	
Various	Batavia	New York	33,826	
Hood Rubber Co.	London	Watertown	11,220	
Various	Betong Asahan	New York	213,539	
Various	Belawan-Deli	New York	177,313	1,684,954
August 4. By the S. S. "City of Lehore" at New York.				
J. Aron & Co.	Colombo	New York	20,160	
F. R. Henderson & Co.	Colombo	New York	180	
Hayley & Kenney	Colombo	New York	138,600	
Poel & Kelly, Inc.	Colombo	New York	59,000	
Goldman, Sachs & Co.	Colombo	New York	69,660	
Meyer & Brown, Inc.	Colombo	New York	78,400	
Various	Colombo	New York	578,380	
Hood Rubber Co.	London	Watertown	22,400	966,780
August 6. By the S. S. "Nieuw Amsterdam" at New York.				
Meyer & Brown, Inc.	Rotterdam	New York	22,400	
Various	Rotterdam	New York	82,650	105,050
August 6. By the S. S. "Boveric" at New York.				
Charles T. Wilson Co., Inc.	Colombo	New York	42,120	
Whittall & Co. of Ceylon	Colombo	New York	129,240	
Smith & Schippers, Inc.	Colombo	New York	284,040	
Goldman, Sachs & Co.	Colombo	New York	91,440	
H. A. Astlett & Co.	Colombo	New York	45,000	
Various	Colombo	New York	108,340	700,180
August 6. By the S. S. "Boveric" at Boston.				
Hood Rubber Co.	Ceylon	Watertown	130,160	130,160

	Shipment from:	Shipped to:	Pounds.	Totals.
August 6. By the S. S. "Yaka" at New York.				
The Goodyear Tire & Rubber Co.	Rotterdam	Akron	1,477,080	1,477,080
August 7. By the S. S. "Maryland" at New York.				
Fred Stern & Co.	London	New York	11,200	11,200
August 8. By the S. S. "Carmania" at New York.				
General Rubber Co.	Liverpool	New York	11,200	
Various	Liverpool	New York	46,260	57,460
August 9. By the S. S "Topa Topa" at New York.				
Firestone Tire & Rubber Co.	Singapore	Akron	202,140	
Baird Rubber & Trading Co.	Singapore	New York	67,320	
Poel & Kelly, Inc.	Singapore	New York	186,000	
Various	Singapore	New York	76,620	532,080
August 10. By the S. S. "Clan MacLaren" at Boston.				
Various	Ceylon	Boston	172,970	172,970
August 10. By the S. S. "Clan MacLaren" at New York.				
Smith & Schippers, Inc.	Colombo	New York	63,180	
Goldman, Sachs & Co.	Colombo	New York	40,320	
H. A. Astlett & Co.	Colombo	New York	22,000	
Various	Colombo	New York	383,910	509,410
August 10. By the S. S. "Osakis" at New York.				
H. A. Astlett & Co.	Java	New York	56,000	
Hood Rubber Co.	London	Watertown	22,400	
Fred Stern & Co.	Singapore	New York	150,080	
Poel & Kelly, Inc.	Singapore	New York	82,000	310,480
August 10. By the S. S. "Medford Hall" at New York.				
Hood Rubber Co.	Ceylon	Watertown	89,900	89,900
———. By the S. S. "West Carmona" at Los Angeles.				
H. A. Astlett & Co.	Singapore	New York	56,000	56,000
———. By the S. S. "West Carmona" at San Francisco.				
H. A. Astlett & Co.	Singapore	New York	112,000	112,000
August 13. By the S. S. "Bowes Castle" at New York.				
Poel & Kelly, Inc.	Singapore	New York	250,000	
Fred Stern & Co.	Singapore	New York	33,600	
Meyer & Brown, Inc.	Singapore	New York	239,680	
Hood Rubber Co.	Singapore	Watertown	145,730	
Continental Rubber Co. of New York	Singapore	New York	44,800	713,810
August 13. By the S. S. "Noordam" at New York.				
Meyer & Brown, Inc.	Rotterdam	New York	100,800	
Poel & Kelly, Inc.	Rotterdam	New York	89,500	
Hood Rubber Co.	London	Watertown	134,332	324,632
August 18. By the S. S. "West Neris" at New York.				
Hood Rubber Co.	London	Watertown	56,530	
Fred Stern & Co.	Singapore	New York	56,000	112,530

PONTIANAK

July 21. By the S. S. "Lancaster" at New York.				
Fred Waterhouse Co., Limited	Soerabaya	New York	5,100	5,100
July 30. By the S. S. "Yamagata Maru" at New York.				
Pacific Trading Co.	Singapore	New York	110,400	110,400

AFRICANS

July 25. By the S. S. "Bassa" at New York.				
Fred Stern & Co.	Lagos	New York	44,800	44,800

GUTTA PERCHA

July 28. By the S. S. "Mongolian Prince" at New York.				
L. Littlejohn & Co., Inc.	Singapore	New York	31,500	31,500

BALATA

July 24. By the S. S. "Dunstan" at New York.				
Various	Pará	New York	4,350	4,350
July 25. By the S. S. "Mayaro" at New York.				
Middleton & Co., Limited	Cayenne	New York	5,610	5,610
July 31. By the S. S "Mahopac" at New York.				
Earle Bros.	London	New York	1,200	1,200
August 7. By the S. S. "Nickerie" at New York.				
Middleton & Co., Limited	Surinam	New York	13,810	
Wm. Schall & Co.	Paramaribo	New York	3,000	16,810
August 8. By the S. S. "Carmania" at New York.				
Various	Liverpool	New York	1,200	1,200
August 11. By the S. S. "Maraval" at New York.				
Middleton & Co., Limited	Cayenne	New York	16,900	16,900

EXPORTS OF INDIA RUBBER MANUFACTURES AND INSULATED WIRE AND CABLE FROM THE UNITED STATES BY COUNTRIES, DURING THE MONTH OF MAY, 1921

EXPORTED TO—	Belting Value	Hose Value	Packing Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Soles and Heels Value	Automobile Tires: Casings Value	Automobile Tires: Inner Tubes Value	Automobile Tires: Solid Tires Value	All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
EUROPE																
Azores and Madeira Islands	....	....	....	....	....	....	....	$41	....	....	....	....	....	....	....	$41
Belgium	$2,044	....	$591	....	....	....	....	....	$85	$21	....	....	....	$788	$8,267	11,796
Bulgaria	....	....	....	....	....	....	....	....	....	....	....	....	....	....	386	386
Czechoslovakia	....	....	....	....	....	....	....	....	6,049	575	....	....	....	....	....	6,624
Denmark	....	$602	178	....	....	2,376	$2,316	1,666	10,219	183	....	....	....	87	473	15,724
Finland	....	....	....	....	....	76	100	....	1,219	116	....	....	....	....	....	1,435
France	1,650	879	278	....	....	264	219	....	8,767	....	....	....	$9,539	1,798	5,742	28,872
Germany	....	12	....	....	....	....	....	....	....	....	....	....	....	....	485	497
Greece	....	....	....	....	....	....	....	....	7,932	97	....	....	....	....	....	8,029
Iceland and Faroe Islands	....	....	80	....	....	51	202	....	....	....	....	....	....	....	144	477
Italy	....	....	707	1	$10	....	....	....	....	....	....	....	6,414	126	1,353	8,610
Netherlands	3,656	720	....	12	39	....	....	....	2,491	305	$118	$12	1,203	....	2,749	11,293
Norway	....	3,888	105	....	....	14,084	13,109	1,604	84,114	1,669	930	113	795	30	798	107,155
Poland and Danzig	....	....	....	....	....	....	....	....	....	....	....	....	41,723	....	....	41,723
Portugal	....	40	....	....	....	....	....	....	2,338	....	....	....	126	....	....	2,504
Roumania	....	....	61	....	....	....	....	....	131	14	....	....	....	....	....	206
Spain	903	864	255	7	25	59	42	2,040	1,874	320	156	....	1,519	....	1,500	9,498
Sweden	....	....	....	112	644	473	642	286	48,024	7,101	5,109	....	348,854	859	2,223	413,742
Switzerland	....	....	....	....	....	....	....	79	2,593	31	....	....	6,568	....	....	9,271
England	346	4,446	4,945	576	1,912	3,720	3,606	....	77,986	5,794	5,006	....	6,071	6,496	68,527	185,135
Scotland	....	160	312	....	....	29,971	30,696	....	....	....	....	....	....	....	2,690	33,858
Ireland	....	....	....	....	....	....	....	....	....	....	....	....	....	....	22	22
TOTALS, EUROPE	$8,599	$11,611	$7,512	708	$2,630	$51,074	$50,932	$5,716	$253,822	$16,226	$11,319	$125	$422,812	$10,184	$95,359	$896,847
NORTH AMERICA																
Bermuda	....	$74	$72	....	....	741	$1,219	$357	$18	....	$51	$105	$87	$44	$100	$2,127
British Honduras	....	....	....	....	....	600	720	134	381	$58	....	....	63	....	....	1,356
Canada	$2,462	9,332	2,694	812	$3,396	2,209	3,367	594	242,285	26,430	3,896	2,385	19,780	12,543	149,918	479,082
Costa Rica	....	145	35	....	....	118	103	128	876	190	80	....	455	18	184	2,214
Guatemala	85	210	....	....	....	....	....	....	926	368	....	....	2,579	19	329	4,516
Honduras	94	1,173	500	....	....	359	542	544	1,692	273	....	....	1,586	319	67	6,790
Nicaragua	306	84	96	....	....	564	845	425	1,117	77	....	50	328	18	97	3,443
Panama	439	6,296	1,257	....	....	168	240	715	7,108	2,554	34	849	775	39	2,930	23,236
Salvador	....	183	....	....	....	....	....	2,185	103	....	....	....	2,328	....	7	4,806
Mexico	9,827	39,117	9,761	12	102	35,595	40,696	3,278	84,765	9,459	3,407	4,693	60,916	4,809	11,144	281,974
Miquelon, Langley, etc.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	171	171
Newfoundland and Labrador	535	1,861	....	1,092	2,357	1,085	1,124	905	608	36	....	87	1,961	11	583	10,068
Barbados	....	....	....	....	....	426	565	26	1,824	1,034	....	790	470	38	233	4,980
Jamaica	789	396	119	....	....	368	310	254	16,007	615	2,110	158	2,292	172	1,534	24,755
Trinidad and Tobago	....	34	85	....	....	....	....	....	2,810	235	815	43	899	....	385	5,306
Other British West Indies	....	52	3	....	....	425	557	66	825	255	45	404	18,011	65	13	20,296
Cuba	3,732	3,417	1,473	62	202	12,869	14,272	11,087	76,365	10,750	29,304	1,391	95,730	2,921	5,046	255,690
Virgin Islands of United States	....	....	....	1	3	2,334	3,778	10	962	293	....	92	427	....	24	5,589
Dutch West Indies	....	448	....	....	....	271	272	....	836	101	....	....	....	....	40	1,697
French West Indies	....	....	....	....	....	....	....	....	....	32	....	....	144	....	4	180
Haiti	....	8	....	....	....	....	....	40	1,150	255	....	....	54	....	54	1,561
Dominican Republic	21	741	....	72	173	1,330	1,883	54	11,275	1,339	....	393	38,317	234	755	55,185
TOTALS, NORTH AMERICA	$18,290	$63,571	$16,095	2,051	$6,233	59,462	$70,493	$20,802	$451,933	$54,354	$39,742	$11,440	$247,202	$21,250	$173,618	$1,195,023
OCEANIA																
Australia	$5,562	$4,022	$3,599	123	$401	....	....	....	$20,285	$3,375	$2,262	$237	$18,682	$925	$3,978	$63,328
New Zealand	274	....	446	72	584	96	$90	$2,164	18,730	1,025	4,814	6	880	301	3,745	33,059
Other British Oceania	....	....	262	....	....	72	103	....	1,906	394	....	....	....	....	....	2,665
French Oceania	....	14	....	....	....	577	903	15	917	82	760	60	....	....	55	2,806
Other Oceania	....	....	....	....	....	288	433	....	1,356	51	51	....	....	....	91	1,982
Philippine Islands	3,936	1,526	1,045	50	187	4,586	6,174	1,751	17,620	3,227	13,804	8,301	6,136	2,131	3,274	69,112
TOTALS, OCEANIA	$9,772	$5,562	$5,352	245	$1,172	5,619	$7,703	$3,930	$60,814	$8,154	$21,691	$8,604	$25,698	$3,357	$11,143	$172,952
SOUTH AMERICA																
Argentina	$1,146	$999	$501	....	....	6,188	$6,828	$958	$29,406	$6,278	$3,793	....	$21,576	$1,197	$5,488	$78,170
Bolivia	....	224	....	....	....	....	....	....	....	....	....	....	127	....	....	351
Brazil	8,318	2,108	1,690	24	$112	613	714	1,888	6,150	209	755	....	22,924	850	3,290	49,008
Chile	7,664	3,424	387	....	....	....	....	....	1,608	37	....	....	35,904	1,191	2,671	52,886
Colombia	....	321	724	....	....	1,030	1,476	....	3,761	430	114	$789	3,665	1,985	1,495	14,760
Ecuador	....	282	....	....	....	....	....	....	328	....	....	....	....	....	....	610
British Guiana	....	....	85	1	5	24	25	....	190	....	....	....	423	....	5	733
Dutch Guiana	....	370	....	....	....	....	....	....	....	....	....	....	....	....	....	370
Peru	1,461	2,291	330	175	790	396	430	....	6,718	667	....	....	4,862	255	1,497	19,301
Uruguay	....	....	370	....	....	12,993	11,135	150	16,710	401	522	....	10,649	64	1,873	41,874
Venezuela	485	411	127	....	....	....	....	80	5,324	572	....	....	2,498	96	1,098	10,691
TOTALS, SOUTH AMERICA	$19,074	$10,430	$4,214	200	$907	21,244	$20,608	$3,076	$70,195	$8,594	$5,184	$789	$102,628	$5,638	$17,417	$268,754

EXPORTED TO—	Belting Value	Hose Value	Packing Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Soles and Heels Value	Automobile Tires: Casings Value	Automobile Tires: Inner Tubes Value	Automobile Tires: Solid Tires Value	Automobile Tires: All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
ASIA																
Aden	......	......	......	......	......	......	......	......	$150	......	......	......	......	......	......	$150
China	$694	$250	$360	4	$9	135	$101	......	4,408	$301	$527	......	$42,274	$704	$6,061	55,689
Kwangtung, leased territory	......	......	......	......	......	......	......	......	......	......	......	......	......	......	20	20
Chosen	......	35	76	......	......	......	......	......	......	......	......	......	......	......	......	111
British India	5,358	1,002	263	......	......	1,128	2,565	$100	6,996	121	7,174	......	5,739	1,322	1,172	31,812
Straits Settlements	......	396	......	......	......	......	......	......	9,525	2,470	4,589	$492	......	135	81	17,688
Other British East Indies	......	......	......	......	......	......	......	......	......	......	......	......	......	40	......	40
Dutch East Indies	25,133	1,683	1,564	......	......	35	25	......	58,762	2,928	18,477	......	......	1,147	2,485	112,204
French Indo China	......	......	......	......	......	......	......	......	......	......	......	......	61	......	......	61
Hongkong	......	......	......	......	......	72	112	......	305	18	......	3,707	11	250	331	4,734
Japan	......	2,329	......	6,328	14,676	7,812	6,986	805	3,355	......	94	......	440	49	14,198	42,932
Siam	......	......	......	......	......	120	124	......	316	......	......	......	......	84	......	524
Turkey in Asia	......	......	......	......	......	......	......	......	3,592	487	......	......	......	......	......	4,079
TOTALS, ASIA	$31,185	$5,695	$2,263	6,332	$14,685	9,302	$9,913	$905	$87,409	$6,325	$30,861	$4,199	$48,525	$3,731	$24,348	$270,044
AFRICA																
British West Africa	......	......	......	......	......	......	......	......	$4,924	$596	......	......	......	......	$68	$5,588
British South Africa	$25,419	$16,744	$1,971	468	$1,293	866	$757	$1,135	3,585	......	......	......	$13,538	$1,137	5,320	70,899
British East Africa	......	......	......	......	......	......	......	......	3,000	921	......	......	......	......	......	3,921
French Africa	......	......	30	......	......	......	......	......	307	12	......	......	......	......	......	349
Liberia	......	......	......	......	......	......	......	......	......	......	......	......	88	......	......	88
Portuguese Africa	......	......	431	......	......	......	......	......	174	......	......	......	......	......	163	768
Egypt	180	54	......	......	......	......	......	......	5,717	61	......	......	......	......	......	6,012
TOTALS, AFRICA	$25,599	$16,798	$2,432	468	$1,293	866	$757	$1,135	$17,707	$1,590	......	......	$13,626	$1,137	$5,551	$87,625
GRAND TOTALS	$112,519	$113,667	$37,868	10,004	$26,920	147,567	$160,406	$35,564	$941,880	$95,243	$108,797	$25,157	$860,491	$45,297	$327,436	$2,891,245

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORY OF THE UNITED STATES

	Belting, Hose, and Packing Value	Boots and Shoes Pairs	Boots and Shoes Value	Tires: Automobile Value	Tires: All Others Value	Insulated Wire and Cables Value	Drugists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
Hawaii	$7,529	......	......	$54,980	$1,040	......	......	$8,856	$72,405
Porto Rico	5,151	......	......	71,813	3,541	......	......	19,155	99,660
TOTALS	$12,680	......	......	$126,793	$4,581	......	......	$28,011	$172,065

Compiled by the Bureau of Foreign Commerce, Department of Commerce, Washington, D. C.

OFFICIAL INDIA RUBBER STATISTICS FOR THE UNITED STATES

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	May 1920 Pounds	May 1920 Value	May 1921 Pounds	May 1921 Value
UNMANUFACTURED—*free*				
India rubber				
From France	229,198	$50,430	......	......
Netherlands	370,737	163,888	494,415	$95,660
Portugal	89,391	22,766	10,761	1,038
United Kingdom	9,017,369	4,067,994	1,320,499	205,692
Canada	3,070	1,751	226,357	102,555
Central America	19,901	7,842	......	......
Mexico	200,289	53,595	......	......
Brazil	3,216,017	824,988	3,718,340	394,466
Peru	114,308	33,794	8,541	939
Other South Am.	94,654	42,380	454	104
British E. Indies	22,843,746	11,137,937	14,596,314	2,626,236
Dutch E. Indies	7,195,829	3,177,985	3,515,157	645,231
Other countries	705,393	203,200	......	......
Totals	44,099,902	$19,788,550	23,890,838	$4,071,921
Balata	19,127	9,033	76,506	45,679
Guayule	206,946	42,043	75,020	15,004
Jelutong (Pontianak)	684,878	137,554	70,336	3,097
Gutta percha	246,589	48,446	165,200	28,170
Rubber scrap	1,081,244	78,757	252,311	7,531
Totals, unmanufactured	46,338,686	$20,104,383	24,530,211	$4,171,402
Chicle ......*dutiable*	673,977	$434,554	556,658	$293,626
India rubber and gutta percha ......*dutiable*	......	85,417	......	77,853
India rubber substitutes, *dutiable*	......	......	242	30

EXPORTS OF DOMESTIC MERCHANDISE

	May 1920 Pounds	May 1920 Value	May 1921 Pounds	May 1921 Value
MANUFACTURED—				
India rubber				
Scrap and old	1,254,641	$119,018	537,450	$22,678
Reclaimed	757,178	125,814	206,123	25,772
Belting[1]	......	256,076	......	112,519
Hose[1]	......	297,255	......	113,667
Packing[1]	......	150,001	......	37,868
Boots[1] ......*pairs*	22,572	74,597	10,004	26,920
Shoes[1] ......*pairs*	756,613	659,581	147,567	160,406
Soles and heels[1]	......	89,578	......	35,564
Tires				
Casings[1]	......	4,630,072	......	941,880
Inner tubes[1]	......	512,132	......	95,243
Solid tires[1]	......	403,979	......	108,797
All other tires[1]	......	63,996	......	25,157
Druggists' rubber sundries[1]	......	284,981	......	45,297
Other rubber manufactures[1]	......	806,036	......	327,436
Suspenders and garters	......	489,285	......	45,816
Totals, manufactured	......	$8,962,401	......	$2,125,020
Fountain pens....*number*	42,107	$35,133	3,474	$1,985
Insulated wire and cables	......	791,303	......	860,491

EXPORTS OF FOREIGN MERCHANDISE

	May 1920 Pounds	May 1920 Value	May 1921 Pounds	May 1921 Value
UNMANUFACTURED—				
India rubber	550,755	$239,368	930,283	$206,139
Balata	202,100	121,460	19,637	7,305
Jelutong (Pontianak)	92,940	18,478	42,000	5,231
Gutta percha	1	2	......	......
Rubber scrap	......	......	6,720	672
Totals, unmanufactured	845,796	$379,308	998,640	$219,347
MANUFACTURED—				
Gutta percha and india rubber	......	$149	......	$2,919
India rubber substitutes	125	30	......	......
Totals, manufactured	......	$179	......	$2,919
Chicle	......	......	50,200	$22,590

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES

	May 1920 Pounds	May 1920 Value	May 1921 Pounds	May 1921 Value
MANUFACTURED—				
To Alaska				
Belting, hose, and packing	......	$25,431	......	$6,752
Boots and shoes..*pairs*	504	1,588	4,715	15,053
Other rubber goods	......	3,856	......	3,310
Totals	......	$30,875	......	$25,115
To Hawaii				
Belting, hose, and packing	......	$18,873	......	$7,529
Automobile tires	......	92,078	......	54,980
Other tires	......	14,516	......	1,040
Other rubber goods	......	19,235	......	17,717
Totals	......	$144,702	......	$81,266
To Porto Rico				
Belting, hose, and packing	......	$10,119	......	$5,151
Automobile tires	......	89,751	......	71,813
Other tires	......	9,509	......	3,541
Other rubber goods	......	20,933	......	25,122
Totals	......	$130,312	......	$105,627

[1] Details of exports of domestic merchandise by countries during May, 1921, appear on this and the preceding page.

CUSTOM HOUSE STATISTICS

NEW YORK

IMPORTS

	June 1920 Pounds	June 1920 Value	June 1921 Pounds	June 1921 Value
Unmanufactured—*free*				
Crude rubber				
From Belgium	75,335	$29,674	49,595	$1,075
France	275,975	80,334	....	....
Netherlands	1,928,772	904,276	941,378	174,884
Portugal	598,664	123,667	....	....
Spain	165	41	....	....
England	5,408,155	2,354,919	1,357,917	211,549
Canada	777	389	....	....
Costa Rica	1,613	639	....	....
Guatemala	902	226	....	....
Nicaragua	12,366	3,389	....	....
Panama	450	135	....	....
Mexico	20,357	13,025	....	....
Trinidad	83	33	....	....
Bolivia	4,132	2,193	....	....
Brazil	2,264,845	631,506	2,215,989	242,286
Colombia	82,875	24,136	366,712	41,315
Ecuador	23,082	6,656	42,524	5,552
Dutch Guiana	12,048	8,189	....	....
Peru	....	....	22,594	2,431
Venezuela	2,861	1,743	....	....
China	100,800	40,344	50,957	11,624
British India	391,826	182,582	487,050	63,656
Straits Settlements	14,348,557	6,509,587	21,910,519	3,887,366
British East Indies	4,367,387	2,096,661	2,377,632	293,920
Dutch East Indies	5,778,264	2,644,246	3,616,981	665,050
Australia	900	465	....	....
Philippine Islands	42,959	14,250	39,558	5,000
Totals	35,744,150	$15,673,305	33,479,406	$5,605,708
Balata	141,683	88,261	124,832	72,661
Jelutong (Pontianak)	1,202,096	203,113	249,236	11,541
Gutta percha	645,880	120,551	196,231	25,156
Totals	37,733,809	$16,085,230	34,049,705	$5,715,066
Rubber scrap and reclaimed	669,182	36,883	149,925	2,167
Totals, unmanufactured	38,402,991	$16,122,113	34,199,630	$5,717,233
Manufactures of rubber and gutta percha	....	$104,856	....	$49,693
Rubber substitutes	24	25	....	....
Chicle ....*dutiable*	201,321	110,715	132,021	65,295

EXPORTS

	June 1920 Pounds	June 1920 Value	June 1921 Pounds	June 1921 Value
Manufactured				
Automobile and other tires	....	$2,302,386	....	$640,719
Inner tubes	....	228,805	....	34,578
Belting, hose, and packing	....	341,243	....	113,775
Rubber boots and shoes.*pairs*	375,065	393,559	44,678	57,355
Soles and heels	....	47,999	....	20,911
Druggists' sundries	....	86,110	....	30,812
Other rubber manufactures	....	453,726	....	233,687
Totals, manufactured	....	$3,853,828	....	$1,131,837
Insulated wire	....	$423,154	....	$561,546
Unmanufactured—*free*				
Rubber scrap and reclaimed	321,663	$39,235	263,333	$19,574

FOREIGN EXPORTS

	June 1920 Pounds	June 1920 Value	June 1921 Pounds	June 1921 Value
Crude rubber	....	....	3,154	$501
Balata	....	....	4,396	2,506
Rubber scrap and reclaimed	....	....	224,283	31,400

MASSACHUSETTS

IMPORTS

	June 1920 Pounds	June 1920 Value	June 1921 Pounds	June 1921 Value
Unmanufactured—*free*				
Crude rubber				
From England	252,220	$79,132	....	....
British East Indies	108,540	35,835	251,190	$20,399
Straits Settlements	....	....	78,400	10,766
Totals	360,760	$114,967	329,590	$31,165
Gutta percha	....	....	21,000	4,407
Rubber scrap and reclaimed	28,592	2,110	....	....
Totals, unmanufactured	389,352	$117,077	350,590	$35,572
Rubber manufactures.*dutiable*	....	$6,498	....	$2,139

EXPORTS

	June 1920 Pounds	June 1920 Value	June 1921 Pounds	June 1921 Value
Manufactured				
Automobile and other tires	....	$2,603	....	$10,775
Inner tubes	....	253	....	827
Belting, hose, and packing	....	7,810	....	1,673
Rubber boots and shoes.*pairs*	327,820	298,526	6,713	12,216
Soles and heels	....	3,676	....	4,087
Druggists' sundries	....	7,546	....	2,065
Other rubber manufactures	....	38,828	....	19,492
Totals, manufactured	....	$359,242	....	$51,135
Insulated wire	....	$113,339	....	$1,405
Rubber scrap and reclaimed	149,435	13,538	....	....

BUFFALO

IMPORTS

	June 1920 Pounds	June 1920 Value	June 1921 Pounds	June 1921 Value
Rubber scrap and reclaimed	82,763	$3,206	107,649	$2,414
Rubber manufactures.*dutiable*	....	2,410	....	19,487
Rubber substitutes...*dutiable*	....	2	....	....

EXPORTS

	June 1920 Pounds	June 1920 Value	June 1921 Pounds	June 1921 Value
Manufactured				
Automobile and other tires	....	$177,117	....	$20,590
Inner tubes	....	93,885	....	1,137
Belting, hose, and packing	....	21,487	....	9,973
Rubber boots and shoes.*pairs*	2,618	9,061	1,019	2,225
Soles and heels	....	2,870	....	85
Druggists' sundries	....	10,989	....	4,630
Other rubber manufactures	....	131,729	....	58,940
Totals, manufactured	....	$447,138	....	$97,580
Insulated wire	....	$5,087	....	$5,908
Rubber scrap and reclaimed	431,166	61,434	43,875	5,654

FOREIGN EXPORTS

	June 1920 Pounds	June 1920 Value	June 1921 Pounds	June 1921 Value
Crude rubber	878,741	$91,915	469,964	$93,869
Jelutong (Pontianak)	52,847	9,912	....	....
Guayule	50	43	....	....
Rubber scrap and reclaimed	781	234	....	....
Chicle	2,895	1,013	....	....

PHILADELPHIA

IMPORTS

	June 1920 Pounds	June 1920 Value	June 1921 Pounds	June 1921 Value
Rubber scrap and reclaimed	1,000	$150	....	....
Rubber manufactures.*dutiable*	....	....	....	$222

EXPORTS

	June 1920 Pounds	June 1920 Value	June 1921 Pounds	June 1921 Value
Manufactured				
Automobile and other tires	....	$52,305	....	$5,139
Inner tubes	....	2,390	....	1,208
Belting, hose, and packing	....	45,096	....	170
Soles and heels	....	3,683	....	....
Druggists' sundries	....	2,058	....	....
Other rubber manufactures	....	7,190	....	387
Totals, manufactured	....	$112,723	....	$6,904

FOREIGN EXPORTS

	June 1920 Pounds	June 1920 Value	June 1921 Pounds	June 1921 Value
Rubber manufactures	....	$1,046	....	....

NEW ORLEANS

IMPORTS

	June 1920 Pounds	June 1920 Value	June 1921 Pounds	June 1921 Value
Chicle ....*dutiable*	3,267	$2,641	....	....

EXPORTS

	June 1920 Pounds	June 1920 Value	June 1921 Pounds	June 1921 Value
Manufactured				
Automobile and other tires	....	$50,413	....	$14,804
Inner tubes	....	16,690	....	3,888
Belting, hose, and packing	....	8,712	....	23,324
Rubber boots and shoes.*pairs*	23,529	26,062	5,488	9,787
Soles and heels	....	1,088	....	311
Druggists' sundries	....	84	....	650
Other rubber manufactures	....	6,624	....	1,038
Totals, manufactured	....	$109,673	....	$53,802
Insulated wire	....	$10,992	....	$2,003

OHIO

IMPORTS

	June 1920 Pounds	June 1920 Value	June 1921 Pounds	June 1921 Value
Unmanufactured—*free*				
Crude rubber				
From Straits Settlements	1,116,526	$606,298	....	....
Dutch East Indies	77,690	39,446	....	....
Totals	1,194,216	$645,744	....	....
Rubber scrap and reclaimed	57,401	7,626	....	....
Totals unmanufactured	1,251,617	$653,370	....	....
Chicle ....*dutiable*	5,610	$3,832	....	....
Rubber manufactures.*dutiable*	....	1,458	....	$341

EXPORTS

	June 1920 Pounds	June 1920 Value	June 1921 Pounds	June 1921 Value
MANUFACTURED				
Belting, hose, and packing..	....	....	....	$46
Other rubber manufactures..	....	....	....	51
Totals, manufactured...	....	....	....	$97

SAN FRANCISCO

IMPORTS

	June 1920 Pounds	June 1920 Value	June 1921 Pounds	June 1921 Value
UNMANUFACTURED—*free*				
Crude rubber				
From Straits Settlements..	1,650,023	$791,134	179,225	$23,812
Hongkong	204	80	....	....
Dutch East Indies..	....	....	27,988	4,746
Totals	1,650,227	$791,214	207,213	$28,558
Rubber scrap and reclaimed.	....	....	118	10
Totals, unmanufactured.	1,650,227	$791,214	207,331	$28,568
Rubber manufactures.*dutiable*	....	$622	....	$1,153

EXPORTS

	June 1920 Pounds	June 1920 Value	June 1921 Pounds	June 1921 Value
MANUFACTURED				
Automobile and other tires..	....	$332,582	....	$62,866
Inner tubes	....	65,064	....	2,026
Belting, hose, and packing...	....	128,394	....	20,904
Rubber boots and shoes.*pairs*	9,495	9,208	3,602	4,099
Soles and heels............	....	6,568	....	....
Druggists' sundries.........	....	1,752	....	1,973
Other rubber manufactures..	....	15,003	....	7,923
Totals, manufactured...	....	$558,571	....	$99,791
Insulated wire	....	$14,424	....	$1,979
Rubber scrap and reclaimed.	74,067	2,667	....	....

WASHINGTON

IMPORTS

	June 1920 Pounds	June 1920 Value	June 1921 Pounds	June 1921 Value
UNMANUFACTURED—*free*				
Crude rubber				
From Canada	307,004	$318,422	....	....
British India	154,140	161,840	....	....
Straits Settlements..	1,119,661	580,705	....	....
Hongkong	160	64	....	....
Japan	....	....	118,720	$14,795
Totals	1,580,965	$1,061,031	118,720	$14,795
Rubber scrap and reclaimed.	144,000	24,697	....	....
Totals, unmanufactured.	1,724,965	$1,085,728	118,720	$14,795
Rubber manufactures.*dutiable*	....	$46	....	$675

EXPORTS

	June 1920 Pounds	June 1920 Value	June 1921 Pounds	June 1921 Value
MANUFACTURED				
Automobile and other tires..	....	$151,453	....	$17,685
Inner tubes	....	18,446	....	955
Belting, hose, and packing..	....	5,313	....	5,079
Rubber boots and shoes.*pairs*	757	3,404	512	1,242
Soles and heels.............	....	4,286	....	....
Druggists' sundries	....	561	....	83
Other rubber manufactures.	....	2,337	....	1,649
Totals, manufactured...	....	$185,800	....	$26,693
Insulated wire	....	$2,337	....	$469
Rubber scrap and reclaimed..	63,044	2,571	127,230	2,596

CHICAGO

IMPORTS

	June 1920 Pounds	June 1920 Value	June 1921 Pounds	June 1921 Value
Rubber manufactures.*dutiable*	....	$13,325	....	$3,535
Chicle ....*dutiable*	1,189,312	776,872	535,130	300,017

MICHIGAN

IMPORTS

	June 1920 Pounds	June 1920 Value	June 1921 Pounds	June 1921 Value
Rubber scrap and reclaimed.	5,000	$100	....	....
Rubber manufactures.*dutiable*	....	7,840	....	$177

EXPORTS

	June 1920 Pounds	June 1920 Value	June 1921 Pounds	June 1921 Value
MANUFACTURED				
Automobile and other tires..	....	$36,855	....	$2,424
Inner tubes	....	6,475	....	1,361
Belting, hose, and packing..	....	3,110	....	1,341
Rubber boots and shoes.*pairs*	3,924	13,397	810	2,780
Soles and heels.............	....	54	....	....
Druggists' sundries	....	436	....	456
Other rubber manufactures..	....	15,091	....	5,861
Totals, manufactured...	....	$75,418	....	$14,223
Insulated wire	....	$3,779	....	$974
Rubber scrap and reclaimed.	42,433	1,123	....	....

IMPORTS OF CRUDE RUBBER INTO THE UNITED STATES BY CUSTOMS DISTRICTS

CUSTOMS DISTRICTS	July, 1921 Pounds	July, 1921 Value
Buffalo	30,624	$3,369
New York	26,811,807	4,079,870
Maryland	280,000	37,108
San Diego	35,581	16,719
Los Angeles	489,862	77,393
Totals	27,647,874	$4,214,459

RUBBER STATISTICS FOR THE DOMINION OF CANADA

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	May 1920 Pounds	May 1920 Value	May 1921 Pounds	May 1921 Value
UNMANUFACTURED—*free:*				
Rubber, gutta percha, etc.:				
From United Kingdom.....	647,441	$358,376	200	$90
United States	584,654	248,669	764,990	132,854
Belgium	12,023	6,302	....	....
Belgian Congo	33,400	17,434	....	....
Brazil	129,506	64,146	....	....
British East Indies—				
India	33,493	16,760	11,220	2,215
Straits Settlements.	508,740	265,161	604,393	130,967
France	54,313	26,576	....	....
Total	2,003,570	$1,003,424	1,380,803	$266,126
Balata	51	74	....	....
Rubber, recovered	358,705	65,593	144,990	16,311
Rubber, powdered, and rubber or gutta percha scrap......	313,936	22,524	104,952	2,522
Rubber substitutes	107,001	14,917	28,183	7,234
Totals, unmanufactured..	2,783,263	$1,106,532	1,658,928	$292,193
PARTLY MANUFACTURED—				
Hard rubber sheets and rods.	7,733	$5,127	598	$641
Hard rubber tubes...........	....	4,365	....	2,589
Rubber thread, not covered...	3,017	4,491	2,909	3,380
Totals, partly manufactured	10,750	$13,983	3,507	$6,610
MANUFACTURED—				
Belting	....	$17,405	....	$3,853
Hose	....	12,914	....	5,102
Packing	....	5,704	....	3,663
Boots and shoes.............	....	19,494	....	5,598
Clothing, including water-proofed	....	19,463	....	10,359
Gloves	....	1,237	....	1,285
Hot-water bottles	....	2,913	....	273
Tires, solid	....	37,505	....	7,881
Tires, pneumatic	....	116,839	....	122,371
Inner tubes	....	13,034	....	9,586
Elastic, round or flat........	....	49,366	....	22,514
Mats and matting...........	....	137	....	1,652
Cement	....	5,784	....	2,324
Other rubber manufactures...	....	171,532	....	113,309
Totals, manufactured...	....	$473,327	....	$309,770
Totals, rubber imports.	2,794,013	$1,593,842	1,662,435	$608,573
Insulated wire and cables—				
Wire and cables covered with cotton, linen, silk, rubber, etc.	....	$21,824	....	$10,251
Copper wire and cables, covered as above...........	....	17,690	....	17,331
Chicle	34,088	17,536	50,600	22,748
Fillets	....	573	....	1,533
Webbing	....	57,980	....	20,959
Fountain pens	....	3,627	....	1,679

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS

	May 1920 Produce of Canada Value	May 1920 Reexports of Foreign Goods Value	May 1921 Produce of Canada Value	May 1921 Reexports of Foreign Goods Value
UNMANUFACTURED—				
Crude and waste rubber.....	$22,738	....	$9,334	$95,072
MANUFACTURED				
Belting	$7,195	....	$379	....
Hose	9,377	....	38,225	....
Boots and shoes.............	66,455	$115	36,328	53
Clothing, including water-proofed	4,282	509	8,916	549
Tires, pneumatic	587,475	....	266,592	....
Tires	1,987	7,064	4,360	12,629
Other manufactures	30,802	348	19,174	1,602
Totals, manufactured..	$707,573	$8,036	$373,974	$14,833
Totals, rubber exports.	$730,311	$8,036	$383,308	$109,905

UNITED KINGDOM RUBBER STATISTICS

IMPORTS

	June			
	1920		1921	
	Pounds	Value	Pounds	Value
Unmanufactured—				
Crude rubber				
From—				
Straits Settlements.....	5,559,800	£609,286	3,457,100	£142,841
Federated Malay States	6,293,700	708,308	2,618,500	121,228
British India..........	1,703,600	191,797	497,400	21,060
Ceylon and dependencies	2,597,500	283,437	1,524,500	64,817
Other Dutch possessions in Indian Seas......	1,084,900	122,756	1,647,300	78,110
Dutch East Indies (except other Dutch possessions in Indian Seas)	2,571,600	289,365	3,005,500	135,433
Other countries in East Indies and Pacific, not elsewhere specified..	234,000	26,223	184,000	8,948
Brazil	2,025,000	195,242	232,300	10,550
Peru	160,000	15,200	......	......
South and Central America (except Brazil and Peru)	47,900	5,011	600	18
West Africa				
French West Africa.	3,400	230	4,400	131
Gold Coast..........	15,900	1,726	800	27
Other parts of West Africa	163,200	24,989	......	......
East Africa, including Madagascar	94,700	9,547	......	......
Other countries.......	293,500	25,632	18,406	846
Totals	22,848,700	£2,508,749	13,190,800	£584,009
Waste and reclaimed rubber	907,100	14,343	15,700	570
Totals, unmanufactured	23,755,800	£2,523,092	13,206,500	£584,579
Gutta percha and balata..	1,482,000	£333,677	268,700	£53,912
Rubber substitutes......	58,200	2,040	......	......
Manufactured—				
Boots and shoes..*doz. pairs*	47,584	£99,607	6,200	£7,573
Waterproof clothing.....	......	611	......	1,431
Insulated wire	......	182	......	1,953
Tires and tubes..........	......	500,220	......	228,801
Other rubber manufactures	......	47,726	......	43,369

EXPORTS

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Unmanufactured—				
Waste and reclaimed rubber	1,338,600	£35,063	243,200	£5,524
Rubber substitutes.......	168,100	9,225	24,600	545
Totals	1,506,700	£44,288	267,800	£6,069
Manufactured—				
Boots and shoes.*doz. pairs*	7,655	£17,194	2,826	£6,4?8
Waterproof clothing.....	......	216,359	......	60,303
Insulated wire..........	......	140,762	......	77,631
Submarine cables........	......	416,853	......	63,333
Tires and tubes.........	......	500,220	......	228,801
Other rubber manufactures	......	441,224	......	150,471

EXPORTS—COLONIAL AND FOREIGN

	1920 Pounds	1920 Value	1921 Pounds	1921 Value
Unmanufactured—				
Crude rubber				
To Russia	10,300	£1,000	2,200	£93
Sweden, Norway and Denmark	413,900	39,375	113,900	5,119
Germany	1,078,900	102,999	1,241,000	36,744
Belgium	516,000	63,104	407,100	12,309
France	2,842,900	310,716	419,200	15,792
Spain	45,400	4,744	12,600	567
Italy	370,500	38,834	110,100	3,0?7
Austria-Hungary ...	10,800	1,328	56,500	1,521
Other European countries	607,200	59,766	590,000	18,402
United States......	5,021,600	574,185	1,083,600	40,044
Canada	1,478,400	167,076	38,100	1,645
Other countries.....	286,300	32,375	13,500	640
Totals, rubber.....	12,682,200	£1,395,502	4,087,800	£135,953
Waste and reclaimed rubber	17,900	£1,190	......	......
Gutta percha and balata..	109,900	19,270	28,600	£3,730
Rubber substitutes.......	6,900	160	2,300	45
Manufactured—				
Boots and shoes..*doz. pairs*	793	£4,636	1	£5
Tires and tubes.........	......	40,376	......	29,951
Other rubber manufactures	......	2,006	......	4,028

RUBBER STATISTICS FOR THE NETHERLANDS

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	Eleven Months Ended November			
	1919		1920	
	Kilos[1]	Gilders[2]	Kilos	Gilders
Unmanufactured—				
Wild rubber				
From Great Britain........	73,460		28,373	
French Congo.......	149,186		......	
Brazil	141,255		139,036	
United States.......	5,212	1,104,018	31,040	691,926
Belgian Congo......	91,923		73,457	
Other countries......	104,997		87,334	
Totals	566,033	1,104,018	359,240	691,926
Plantation rubber—				
From Great Britain........	1,114,921		196,870	
Netherlands E. Indies	3,222,256		9,949,122	
Indian Empire......	442,308	11,419,110	30,929	23,047,685
Other countries......	66,979		204,629	
Totals	4,846,464	11,419,110	10,381,550	23,047,685
Rubber scrap...............	1,109,562	394,691	300,762	75,675
Reclaimed rubber..........	5,948	9,994	38,475	55,870
Hard rubber................	1,602	7,156	2,651	11,824
Jelutong (Pontianak)	......	......	42,206	20,675
Balata	25,479	117,858	94,002	476,265
Gutta percha and gutta percha waste	8,040	20,212	2,575	5,904
Totals unmanufactured..	6,563,128	13,073,039	11,221,461	24,385,824
Manufactured—				
Automobile tires and tubes:				
From Germany	321		4,576	
Belgium	27,771		63,003	
Great Britain.......	308,805	4,943,780	188,332	6,936,045
France	96,198		94,917	
United States........	339,245		707,636	
Other countries......	779	......	28,997	......
Motorcycles tires and tubes:				
From Germany	163		1,089	
Belgium	421		16,325	
Great Britain........	59,419		36,615	
France	8,189	580,138	6,073	405,829
United States.......	29,897		14,997	
Other countries......	1,885		3,062	
Bicycle tires and tubes:				
From Germany	1,955		81,924	
Belgium	27,588		107,295	
Great Britain	647,611		316,775	
France	192,069	5,517,951	185,699	3,739,304
United States........	11,960		4,626	
Other countries......	37,887		59,925	
Solid tires and cushion tires:				
From Great Britain........	117,397		237,934	
United States........	8,627	250,336	56,689	636,531
Other countries......	1,123		25,311	
Rubbered goods	385,780	1,679,405	361,767	1,850,690
Manufactures of gutta percha.	48,034	276,541	114,354	481,376
Rubbered clothing for men and boys	95,718	1,007,282	226,742	2,628,648
Rubbered clothing for women and girls	34,762	447,146	78,754	1,008,023
Rubbered collars, cuffs, etc...	2,669	24,725	434	3,918
Boots and shoes............	......	......	211,371	638,775
Insulated wire and cables....	7,428,369	6,883,922	23,594,120	21,524,932
Hard rubber goods..........	6,016	17,359	12,473	90,452
Other rubber goods..........	406,485	1,336,642	856,274	2,802,700
Totals manufactured ..	......	22,965,227	......	42,747,223
Total imports	......	36,038,266	......	67,133,047

EXPORTS OF CRUDE AND MANUFACTURED RUBBER

	1919 Kilos	1919 Gilders	1920 Kilos	1920 Gilders
Unmanufactured—				
Wild rubber:				
To Germany	59,694		434,365	
Austria	......	146,254	89,013	1,105,747
Other countries	7		51,682	
Totals	59,701	146,254	575,060	1,105,747
Plantation rubber:				
To Germany	1,274,339		3,130,954	
United States..........	1,090,246	6,826,330	2,088,556	12,663,066
Other countries	112,822		449,666	
Totals	2,477,407	6,826,330	5,669,176	12,663,066
Scrap	119,116	56,067	146,971	58,2??
Hard rubber	496	3,064	353	2,515
Jelutong (Pontianak)	......	......	21,390	14,100
Balata	54,047	271,580	110,801	576,865
Gutta percha and gutta percha waste	29,729	25,800	12,632	88,918
Totals, unmanufactured..	2,740,496	7,329,095	6,536,383	14,509,504
Manufactured—				
Automobile tires and tubes:				
To Germany	57,722		12,605	
Sweden	3,159		7,734	
Norway	1,205		4,238	
Switzerland	......		9,247	
Belgium	2,561	726,823	3,074	571,760
Dutch East Indies......	240		12,346	
Great Britain	1,425		13,812	
France	......		8,411	
Other countries	710		13,673	
Motorcycle tires and tubes:				
To Sweden	115		1,237	
Great Britain	10	4,437	1,190	29,792
United States	......		1,632	
Other countries	373		1,537	
Bicycle tires and tubes:				
To Great Britain	118		19,855	
Dutch East Indies......	1,219		20,284	
Sweden	1,540		39,669	
Switzerland	5,735	113,129	19,235	752,067
Germany	8,836		34,135	
Belgium	12		16,597	
Other countries	591		9,800	
Solid tires and cushion tires:				
To Germany	3,775		1,396	
Great Britain	149	19,045	2,412	16,270
Other countries	1,410		2,882	
Rubbered goods	10,586	38,759	13,969	64,250

	Eleven Months Ended November			
	1919		1920	
	Kilos[1]	Gilders[2]	Kilos	Gilders
Manufactured—				
Manufactures of gutta percha	263	2,611	4,960	41,760
Rubbered clothing for men and boys	3,167	33,300	22,768	264,678
Rubbered clothing for women and girls	1,486	23,604	12,754	145,993
Boots and shoes	......	......	2,445	5,290
Insulated wire and cables	564,009	1,806,671	829,739	2,350,101
Hard rubber goods	52,432	54,983	850	5,510
Other rubber goods	33,800	185,260	37,352	152,568
Totals, manufactured	......	3,008,622	......	4,500,039
Total exports	......	10,337,717	......	18,909,543

[1]One kilo equals 2.2 pounds.
[2]One gilder equals $0.40 (normal).

RUBBER STATISTICS FOR ITALY

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	Two Months Ended February			
	1920		1921	
	Quintals[1]	Lire[2]	Quintals	Lire
Unmanufactured—				
Crude rubber and gutta percha—raw and reclaimed:				
From Great Britain	28		112	
Netherlands	.....		1,815	
French Asiatic Colonies	898		....	
Indian and Ceylon	674		428	
Dutch East Indies	.....	3,897,850	548	7,980,000
Straits Settlements	923		4,965	
French African Colonies	381		....	
Belgian Congo	142		....	
Brazil	942		299	
Other countries	115		233	
Totals	4,103	3,897,850	8,400	7,980,000
Rubber scrap	11	1,650	....	....
Totals unmanufactured	4,114	3,899,500	8,400	7,980,000
Manufactured—				
India rubber and gutta percha—				
Threads	17	49,300	75	217,500
Sheets, including hard rubber	10	18,100	3	5,700
Tubes	8	11,200	104	145,200
Belting	177	292,050	67	110,550
Rubber-coated fabrics in pieces	49	101,800	91	197,000
Boots and shoes ... *pairs*	19,730	394,600	110	2,200
Elastic webbing	12	40,800	50	170,000
Clothing and articles for travel	25	100,000	20	80,000
Tires and tubes:				
From Belgium	148		....	
France	50		1,060	
Great Britain	633	2,886,800	591	4,771,200
United States	200		8	
Other countries	....		45	
Other rubber goods	1,179	2,204,700	996	1,884,500
Totals, manufactured	.....	6,099,250	....	7,583,850
Totals imports	.....	9,998,850	....	15,563,850

EXPORTS OF CRUDE AND MANUFACTURED RUBBER

	Two Months Ended February			
	1920		1921	
	Quintals[1]	Lire[2]	Quintals	Lire
Unmanufactured—				
India rubber and gutta percha—raw and reclaimed:				
To Austria	300		....	
France	.....		2,352	
Spain	.....	395,000	253	1,327,500
United States	490		....	
Other countries	.....		50	
Totals	790	395,000	2,655	1,327,500
Waste	655	131,000	488	97,600
Totals, unmanufactured	1,445	526,000	3,143	1,425,100
Manufactured—				
India rubber and gutta percha—				
Threads	76	245,600	38	117,800
Sheets, including hard rubber	59	89,200	34	58,600
Tubes	166	220,250	249	316,250
Belting	.....	....	7	14,700
Rubber-coated fabrics in pieces	27	81,000	29	87,000
Boots and shoes ... *pairs*	445	8,900	......	....
Other	1	1,500	....	....
Elastic webbing	180	684,000	141	535,800
Clothing and articles for travel	63	315,000	11	55,000
Tires and tubes:				
To Austria	108		282	
Belgium	110		431	
Czecho-Slovakia	278		41	
Denmark	148		....	
France	157		7	
Great Britain	1,616		2,366	
Netherlands	96		46	
Rumania	186		442	
Spain	76	14,075,000	95	13,700,000
Switzerland	116		15	
India and Ceylon	689		396	
Dutch East Indies	447		636	
Straits Settlements	192		7	
Australia	170		....	
Argentina	428		393	
Brazil	445		9	
Other countries	368		314	
Other rubber goods	1,529	2,814,200	2,844	5,266,600
Totals, manufactured	.....	18,534,650	....	20,151,750
Total exports	....	19,060,650	....	21,576,850

[1]One quintal equals 220.46 pounds.
[2]One lira equals $0.193 (normal).

THE MARKET FOR RUBBER SCRAP

NEW YORK

The situation remains depressed and must so continue while abnormal industrial conditions prevail. The demand for scrap by domestic reclaimers is very limited. Bids for mixed tires from dealers run about 75 cents a 100 pounds. Other descriptions of scrap are practically at a standstill. There is no export movement and no foreign inquiry.

QUOTATIONS FOR CARLOAD LOTS DELIVERED

August 25, 1921

Prices subject to change without notice

BOOTS AND SHOES			
Boots and shoes	*lb.*	$0.03¼ @	.03½
Trimmed arctics	*lb.*	.02½ @	
Untrimmed arctics	*lb.*	*.02 @	
HARD RUBBER			
Battery jars, black compound	*lb.*	*.07½ @	
No. 1, bright fracture	*lb.*	*.12 @	.15
INNER TUBES			
No. 1	*lb.*	.05½ @	
Compounded	*lb.*	.03¾ @	
Red	*lb.*	.03½ @	
MECHANICALS			
Black scrap, mixed, No. 1	*lb.*	*.02¼ @	.03
No. 2	*lb.*	*.01½ @	.02
Heels	*lb.*	*.02½ @	.03
Horse-shoe pads	*lb.*	*.02½ @	.03
Hose, air brake	*lb.*	*.01 @	.01½
fire, cotton lined	*lb.*	*.01 @	
garden	*lb.*	.07 @	
Matting	*lb.*	*.01 @	
Red packing	*lb.*	*.04½ @	.05
Red scrap, No. 1	*lb.*	*.07 @	.08
No. 2	*lb.*	*.05½ @	.06
White scrap, No. 1	*lb.*	*.07 @	.07½
No. 2	*lb.*	*.06 @	.06½
TIRES			
Pneumatic—			
Auto peelings	*lb.*	*.02 @	.02¼
Bicycle	*lb.*	*.01½ @	.02
Standard white auto	*lb*	*.02¼ @	.02¾
Mixed auto	*lb.*	*.01 @	.01½
Stripped, unguaranteed	*lb*	*.01 @	.01½
White, G. & G., M. & W., and U. S.	*lb.*	*.02¾ @	
Solid—			
Carriage	*lb.*	*.02¼ @	.02¾
Iron	*lb.*	@	
Truck, clean	*lb.*	*.01½ @	.02

*Nominal.

THE MARKET FOR COTTON AND OTHER FABRICS

NEW YORK

Prospects of the smallest crop in years is the unfavorable outlook for American cotton at the present time. This feature, together with increased foreign buying, has given strength to the market and prices have advanced. On August 1, spot middling upland was quoted at 12.90 cents as compared with 40 cents a year ago. On August 23, quotations on this grade were 13.75 cents, a gain of 85 points since the first of the month.

Egyptian Cotton. The market for Sakellarides and uppers was rather weak early in the month but later developed firmness. Business has been done in the latter grade around 16 to 17 cents, c. i. f., Boston.

Practically all medium and low-grade uppers have been sold and the stock in Alexandria is chiefly composed of better grades.

There are some spot uppers in this country but holders are very firm in their idea of price. Sakellarides, on the other hand, has been neglected excepting the higher grades. There is a large stock of Sakel cotton in this country, and also in Alexandria, composed almost entirely of medium-grade cotton. Medium-grade Sakel can be bought around 23 cents c. i. f., Boston, ex-duty, but top grades are at a premium of 10 to 15 cents, which is out of proportion and indicates the scarcity of very high-grade cotton carrying good staple. There has been a great deal of talk about the so-called short-staple Sakel, but some of these lots were found to be either Pillion cotton or a very poor quality of Sakel such as is sometimes grown in upper Egypt or on poor land in other districts. The last crop produced a great deal of poor-staple cotton and according to reports the present crop is expected to show somewhat the same out-turn.

Sea Island Cotton. The latest report from the Sea Island district indicates a crop of possibly four to five thousand bales this season. It is believed that extra choice could be purchased at 40 cents.

Arizona Cotton. The Arizona market has been strengthened somewhat by the proposed export of a fair quantity of the carry-over of the last crop. It is believed, however, that No. 2 grade can be bought in fair quantity at 28 to 29 cents. There has been no change from estimates of 30,000 bales for the present crop, but with the carry-over there should be nearly 75,000 bales available for spinners this season. Altogether it would look as though extra staples were in abundant supply while medium staples such as 1-3/16 to 1¼-inch cotton might be hard to buy within the next six to twelve months.

Mechanical Ducks and Drills. The demand is broadening for these fabrics. The market has been strong and active. Prices have advanced in accordance with the new range of cotton values.

Raincoat Fabrics. Business has improved considerably since last month when only two or three fabrics were in demand, while present inquiries cover an extended line. Small quantity buying and repeated orders seem to be the general rule. Price revision is downward.

Sheetings The market on sheetings, particularly the light weight, is very firm and advancing and deliveries within sixty days are hard to obtain. The mills being comfortably sold for 60 days are unwilling to contract beyond that time unless at an advance in present prices. A good fall business is expected.

Tire Fabrics. There has been no change in the tire fabric situation, which continues to be unsettled. Buying has been for immediate requirements and prices are governed by the needs of the buyer and the willingness of the holder to sell.

NEW YORK QUOTATIONS

August 25, 1921

Prices subject to change without notice

BURLAPS				
32—7-ounce	100 *yards*		@	
32—8-ounce			@	
40—7½-ounce		$3.50	@	3.55
40—8-ounce		3.55	@	3.60
40—10-ounce		4.40	@	4.45
40—10½-ounce		4.45	@	4.50
45—7½-ounce			@	
45—8-ounce			@	
45—10-ounce			@	
DRILLS				
38-inch 2.00-yard	*yard*	.16	@	
40-inch 3.47-yard		.10	@	
52-inch 1.90-yard		.18	@	
52-inch 1.95-yard		.17½	@	
60-inch 1.52-yard		.22½	@	
DUCK				
CARRIAGE CLOTH				
38-inch 2.00-yard enameling duck	*yard*	.16	@	
30-inch 1.74-yard		.18	@	
72-inch 16.66-ounce		.35	@	
72-inch 17.21-ounce		.36½	@	
MECHANICAL				
Hose	*pound*	.30	@	
Belting		.30	@	
HOLLANDS, 40-INCH				
DEAD FINISH				
Piece		.20	@	
Cut		.25	@	
FLAT FINISH				
Piece		.16½	@	
Cut		.18½	@	
LONSDALE				
White, piece		.48	@	
cut		.60	@	
Colors, piece		.51	@	
cut		.64	@	
Green and blue, piece		.56	@	
cut		.70	@	
NAINSOOKS				
White		.18	@	.21½
Flesh		.22	@	
RAINCOAT FABRICS				
COTTON				
Bombazine 64 x 60	*yard*	.10¾	@	
60 x 48		.09⅞	@	
Cashmeres, cotton and wool, 36-inch, tan		.60	@	
Twills 64 x 72		.10	@	.12
60 x 102		.14	@	
Twill, mercerized, 36-inch, blue and black		.26½	@	
tan and olive		.24	@	
Tweed		.40	@	1.00
printed		.18	@	
Plaids 60 x 48		.10⅛	@	
56 x 44		.09½	@	
Repp		.24	@	
Prints 60 x 48		.12	@	
64 x 60		.13	@	

IMPORTED WOOLEN FABRICS SPECIALLY PREPARED FOR RUBBERIZING—PLAIN AND FANCIES

63-inch, 3¼ to 7½ ounces	yard		@	
36-inch, 2¾ to 5 ounces			@	

IMPORTED PLAID LINING (UNION AND COTTON)

63-inch, 3½ to 7 ounces	yard		@	
36 inch, 2 to 4 ounces			@	

SHEETINGS, 40-INCH

48 x 48, 2.50-yard		$0.10¼	@	
48 x 48, 2.85-yard		.09½	@	
64 x 68, 3.15-yard		.10¾	@	
56 x 60, 3.60-yard		.09½	@	
48 x 44, 3.75-yard		.08	@	

SILKS

Canton, 38-inch	yard	.27½	@	
Schappe, 36-inch		.45	@	

STOCKINETTES

SINGLE THREAD

3½ Peeler, carded	pound		@	
4½ Peeler, carded			@	
6½ Peeler, combed			@	

DOUBLE THREAD

Zero Peeler, carded	pound		@	
3½ Peeler, carded			@	
6½ Peeler, combed			@	

TIRE FABRICS

BUILDING

17¼-ounce Sakellarides, combed	pound	.90	@	
17¼-ounce Egyptian, combed		.70	@	
17¼-ounce Egyptian, carded		.65	@	
17¼-ounce Peelers, combed		.70	@	
17¼-ounce Peelers, carded		.52	@	

CORD

15-ounce Egyptian	pound	.76	@	

BICYCLE

8-ounce American	pound		@	
10-ounce American			@	

CHAFER

9¼-ounce Sea Island	pound		@	
9¼-ounce Egyptian, carded		.80	@	
9¼-ounce Peeler, carded		.67	@	

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS

NEW YORK

In most lines of pigments and compounding ingredients a tendency to steady increase in demand has been noted during the past month. The chief price changes were reductions of ½ and ¾-cent a pound on lead oxides. The effect of these reductions in stimulating demand on the part of consumers will not react on production for at least a month.

ANILINE OIL. There is an excessive supply of this material and the call is purely routine. Prices range from 18 to 26 cents a pound.

BARYTES. Business in this material during most of August has been steady but sub-normal, some improvement being noted in the latter part of the month. There is little barytes of foreign origin on the market.

BENZOL. The demand on the short supply continues abnormal. Foreign business is large but shipments are hampered owing to lack of transport facilities. The short supply will not be remedied until the steel industry renews operation of coke making from which benzol is a by-product.

BLANC FIXE. The market is quiet and business light.

CADMIUM SULPHIDE. Remains steady at $1.20 a pound.

CARBON BISULPHIDE. Supplies are abundant and prices range from 6 to 7½ cents a pound.

CARBON TETRACHLORIDE. There has been a well-sustained demand and ample stocks. Prices have held firm at 10½ to 12 cents a pound.

CHINA CLAY. Liberal imports arrived early in the month. There is now a good stock in the market and a fair call.

DRY COLORS. Activity has not been marked. The end of price reductions has been reached and the outlook is reported as encouraging.

GAS BLACK. The tire manufacturing demand continues to improve with the steadily increasing output of tires.

HEXAMETHYLENE TETRAMINE. Prices have dropped well below the dollar mark. Plenty of stock is available at 83 to 85 cents a pound with inquiries limited. Latterly supplies were reported at 80 cents.

LITHARGE. There has been no marked increase of interest among consumers since the price reduction became effective. The drop in price was ¾ cents below the rate ruling for several months previously. The price now fixed is 7½ to 7¾ cents.

LITHOPONE. The demand holds steady and of good volume. Price 6 to 6½ cents a pound in bags. One of the largest producers has doubled its capacity within recent weeks owing to the extending use of lithopone for outside painting as well as for tires.

SOLVENT NAPHTHA. Routine business is reported with prices rather weak.

SUBLIMED LEAD. In this line the reduction in price was set at ½-cent a pound. Some increase of demand followed; and more will follow as the mechanical rubber goods industry gathers headway in the expected revival of business.

SULPHUR. Demand is reported rather sluggish and prices unchanged.

TALC. The call for domestic and foreign grades is steady and prices unchanged.

WHITING. Consumption fair, and supplies ample to take care of any business that may reasonably be expected.

ZINC OXIDE. There is a steadily increasing demand from the tire manufacturers, which, it is anticipated, will continue for some time as the factories regain normal production.

NEW YORK QUOTATIONS

August 23, 1921

Prices subject to change without notice

ACCELERATORS, ORGANIC

Accelerene (f. o. b. English port)	lb.	13s.	@	
Accelemal (bbl.)	lb.	$0.60	@	
Adco	lb.	.75	@	
Aldehyde ammonia crystals	lb.	.95	@	1.00
Aniline oil (drums extra)	lb.	.20	@	
Excellerex	lb.		@	
Formaldehyde aniline	lb.	.55	@	.60
Hexamethylene tetramine	lb.	.85	@	.90
Lead oleate (400 lb. bbls. factory)	lb.	.20	@	
N. C. C.	lb.		@	
No. 999	lb.	.14	@	
Paradin	lb.	.59	@	
Paraphenylene diamine	lb.		@	
Thiocarbanilide	lb.		@	
Vulcocene	lb.		@	
X L O	lb.	2.00	@	

ACCELERATORS, INORGANIC

Lead, dry red	lb.	.10	@	
sublimed blue	lb.	.07¼	@	.07½
sublimed white	lb.	.07¼	@	
white, basic carbonate	lb.	.07½	@	.08
Lime, flour	lb.	.02½	@	
Litharge, domestic	lb.	.07½	@	.07¾
imported	lb.	.17	@	
sublimed	lb.		@	
Magnesium, carbonate, light	lb.	.07½	@	.10
calcined light	lb.	.27	@	.30
extra light	lb.	.50	@	
medium light	lb.	.25	@	
calcined heavy (bbl.)	lb.	.06	@	.07

ACIDS

Acetic 28 per cent	lb.	.02½	@	
glacial, 99 per cent	lb.	.11½	@	
Cresylic (97% straw color, drums)	gal.	.80	@	
(95% dark, drums)	gal.	.75	@	
Muriatic, 20 degrees	lb.	.02	@	
Nitric, 36 degrees	lb.	.05¾	@	
Sulphuric, 66 degrees	lb.	.01½	@	

ALKALIES

Caustic soda	lb.	.03¾	@	.04
Soda ash, 58%	cwt.	1.90	@	2.25

COLORS

Black

Bone, powdered	lb.	.06½	@	.08½
Carbon black (sacks, factory)	lb.	.10½	@	.20
pressed	lb.		@	

COLORS—Continued

Dipped goods	lb.	$1.00	@	
Drop	lb.	.07	@	.16
Ivory black	lb.	.15	@	.45
Lampblack	lb.	.15	@	
Micronex	lb.	.12	@	.15
Oil soluble aniline	lb.	.95	@	
Rubber black	lb.	.10	@	.16
Rubber makers' non-flying black	lb.	.40	@	

Blue

Cobalt	lb.	.25	@	.30
Dipped goods	lb.	1.00	@	
Prussian	lb.	.50	@	
Rubber makers' blue	lb.	3.50	@	
Ultramarine	lb.	.16	@	.35

Brown

Iron oxide	lb.	.04	@	.06
Sienna, Italian, raw and burnt	lb.	.06½	@	.12½
Sienna, Italian, raw (tan color)	lb.	.07	@	.15
Umber, Turkey, raw and burnt	lb.	.05½	@	.06½
Vandyke	lb.	.05	@	.08

Green

Chrome, light	lb.	.32	@	.34
medium	lb.	.34	@	.39
dark	lb.	.43	@	.47
commercial	lb.	.12	@	
tile	lb.	.15	@	
Guignet	lb.	1.50	@	
Dipped goods	lb.	1.00	@	
Oxide of chromium	lb.	.55	@	
Rubber makers' green	lb.	3.50	@	

Red

Antimony, crimson	lb.	.40	@	.51
crimson, E. 15/17% (bbls.)	lb.	.48	@	
crimson, F.	lb.	.35	@	
crimson, R. M. P.	lb.	.55	@	
Antimony, golden	lb.	.21	@	.27
golden, R. M. F.	lb.	.25	@	
golden 1	lb.	.30	@	
golden 2	lb.	.25	@	
golden, E. 15/17% (bbls.)	lb.	.25	@	
7-A	lb.	.42	@	
vermilion	lb.	.50	@	
red sulphuret	lb.	.25	@	
Arsenic, red sulphide	lb.	.12	@	
Dipped goods, red	lb.	1.00	@	
purple	lb.	1.00	@	
orange	lb.	1.00	@	
Indian	lb.	.12	@	
Iron oxide, reduced grades	lb.	.03	@	.13
pure bright	lb.	.14	@	
Maroon oxide	lb.	.12	@	
Oil soluble aniline, red	lb.	1.75	@	2.00
orange	lb.	1.50	@	
Oximony	lb.	.16	@	
Para toner	lb.	1.40	@	
Red excelsior	lb.		@	
Rubber-makers' red (four shades)	lb.	3.50	@	
purple	lb.	2.50	@	
Spanish natural	lb.	.04½	@	.05
Toluidine toner	lb.	2.75	@	3.25
Venetian	lb.	.02½	@	.05
Vermilion, American	lb.	.25	@	.30
permanent	lb.	.30	@	
English quicksilver	lb.	.90	@	1.00

White

Albalith	lb.	.06	@	.06½
Aluminum bronze	lb.	.60	@	.65
Lithopone, Beckton white	lb.	.06	@	.06½
Lithopone, domestic (factory)	lb.	.06	@	.06½
Ponolith (carloads, factory)	lb.		@	
Rubber-makers' white	lb.		@	
		C.L.	@	L.C.L.
Zinc oxide, American Horse Head (factory)	lb.	.08¾	@	.09¾
Special	lb.	.08	@	.08½
XX red	lb.	.07½	@	.08
French process, Florence brand factory:				
White seal	lb.	.11	@	.11¼
Green seal	lb.	.09¾	@	.10¼
Red seal	lb.	.08¾	@	.09¼
White seal	lb.	.11	@	11¼
Azo (factory):				
ZZZ (lead free)	lb.	.07½	@	.08
ZZ (under 5% leaded)	lb.	.07¼	@	.07¾
Z (8-10% leaded)	lb.	.07	@	.07½

Yellow

Arsenic, yellow sulphide	lb.	.70	@	
Cadmium, sulphide	lb.	1.10	@	1.35
Chrome, light and medium	lb.	.21	@	
C. P.	lb.	.21	@	
Dipped goods	lb.	1.00	@	
Ochre, domestic	lb.	.02½	@	.03½
imported	lb.	.04	@	.04½
Oil soluble aniline	lb.	1.60	@	
Rubber makers' yellow	lb.	3.50	@	
Zinc chromate	lb.	.35	@	

COMPOUNDING INGREDIENTS

Aluminum flake (carloads)	ton	25.00	@	35.00
hydrate, light	lb.	.22	@	.25
Ammonium carbonate (lump)	lb.	.07½	@	.10
Asbestine	ton	20.00	@	25.00
Barium, carbonate precipitated	ton	85.00	@	
dust	ton	100.00	@	
Barytes, pure white (carloads)	ton	23.90	@	
off color (carloads)	ton	20.00	@	
uniform floated (carloads)	ton	23.90	@	
Basofor	lb.	$0.04½	@	
Beta-naphthol	lb.	.33	@	
Blanc fixe	lb.	.04	@	
Bone ash	lb.		@	
Carrara filler (factory)	ton	20.00	@	
Chalk, precipitated, extra light (f. o. b. factory)	lb.	.03½	@	.04¼
heavy (f. o. b. factory)	lb.	.02½	@	.03¼
China, clay, Dixie	ton	22.00	@	35.00
Blue Ridge	ton	22.00	@	35.00
domestic	ton	7.50	@	9.00
imported	ton	16.00	@	24.00
Cotton linters, clean mill run (factory)	lb.	.02½	@	
Diatomite	lb.	.03	@	.04
Fossil flour (powdered)	ton	60.00	@	
(bolted)	ton	65.00	@	
Glue, high grade	lb.	.25	@	.35
medium	lb.	.17	@	.24
low grade	lb.	.10½	@	.16
Graphite, flake (400-pounds bbl.)	lb.	.10	@	
amorphous	lb.	.05	@	
Ground glass FF. (bbls.)	lb.		@	
Infusorial earth (powdered)	ton	60.00	@	
(bolted)	ton	65.00	@	
Liquid rubber	lb.	.15	@	
Mica, powdered	lb.	.15	@	
Phenanthrene	lb.		@	
Pumice stone, powdered (bbl.)	lb.	.03	@	.08
Rotten stone, powdered	lb.	.02½	@	.04½
Rubber paste	lb.		@	
Silica, aluminum	ton	25.00	@	30.00
gold bond	ton	35.00	@	
silver bond	ton	25.00	@	
Soap bark, powdered	lb.	.23	@	
Soapstone, powdered-gray (carloads)	ton	12.00	@	
Starch, powdered corn (bags)	cwt.	2.33	@	
(bbls.)	cwt.	2.61	@	
Talc, powdered soapstone	ton	20.00	@	
Terra blanche	ton	25.00	@	28.00
Tripoli flour, air-floated, cream or rose (factory)	ton	25.00	@	
white (factory)	ton	27.00	@	
Tyre-lith	ton	90.00	@	
Whiting, Alba	cwt.	15.00	@	18.00
Columbia	cwt.		@	
commercial	cwt.	1.10	@	1.20
Danish	ton	20.00	@	
English cliffstone	cwt.	1.70	@	1.90
gilders	cwt.	1.20	@	1.35
Paris, white, American	ton	35.00	@	
Quaker	ton	13.00	@	15.00
Superfine	ton	15.00	@	17.00
Wood pulp, imported	ton		@	
XXX	ton	35.00	@	
X	ton	30.00	@	
Wood flour	ton	35.00	@	40.00

MINERAL RUBBER

Elateron (c. l. factory)	ton		@	
(l. c. l. factory)	ton		@	
Gilsonite	ton	70.00	@	
Genasco (c. l. factory)	ton	50.00	@	
(l. c. l. factory)	ton	52.00	@	
Hard hydrocarbon	ton	35.00	@	45.00
Soft hydrocarbon	ton	35.00	@	40.00
320 M. P. hydrocarbon (c. l. factory)	ton	50.00	@	55.00
(l. c. l. factory)	ton	57.50	@	
300/310 M. P. hydrocarbon (c. l. factory)	ton	40.00	@	
(l. c. l. factory)	ton	45.00	@	
M. R. X.	ton		@	
Pioneer, M. R. (c. l. factory)	ton	46.00	@	
(l. c. l. factory)	ton	48.00	@	
Raven M. R.	ton		@	
Robertson, M. R. pulverized (c. l. factory)	ton		@	
M. R. pulverized (l. c. l. factory)	ton		@	
M. R. (c. l. factory)	ton	52.50	@	
M. R. (l. c. l. factory)	ton	55.00	@	
Rubrax (factory)	ton	50.00	@	
States "A" (c. l. factory)	ton	45.00	@	
No. 1 (c. l. factory)	ton	40.00	@	
Synpro, granulated, M. R. (factory)	ton	69.50	@	

OILS

Avoilas compound (bbl.)	lb.	.14	@	
(kegs)	lb.	.18	@	
Castor, No. 1, U. S. P.	lb.	.11¼	@	
No. 3, U. S. P.	lb.	.10½	@	
Corn	lb.	.10	@	
refined	lb.		@	
Cotton	lb.	.09	@	
Glycerine (98 per cent)	lb.	.14½	@	.15
Halowax	gal.	.25	@	.27
Linseed, raw	gal.	.80	@	
Linseed compound	gal.		@	
Palmoline	lb.		@	
Palm niger	lb.	.07	@	
Peanut	lb.	.10	@	
Petrolatum, standard	lb.	.04	@	.08
Petrolatum, sticky	lb.	.08	@	.10
Pine, steam distilled	gal.	1.30	@	
Rapeseed, refined	lb.	.12½	@	
blown	lb.	.13½	@	
Rosin	gal.	.41	@	
Synpro	gal.	.35	@	.60
Soya bean	lb.	.08¾	@	
Tar	gal.	.35	@	

RESINS AND PITCHES

Cantella gum	*lb.*	$0.50 @	
Cumar resin, hard	*lb.*	.09 @	.13
soft	*lb.*	.09 @	.13
Tar, retort	*bbl.*	11.75 @	12.25
kiln	*bbl.*	11.50 @	
pine retort	*bbl.*	14.00 @	
Pitch, Burgundy	*lb.*	.05 @	.05½
coal tar	*ton*	20.00 @	
pine tar	*lb.*	.03½ @	
ponto	*lb.*	.10 @	
Rosin, K (bbl.)	*280 lbs.*	5.85 @	
strained (bbls.)	*280 lbs.*	5.35 @	
Shellac, fine orange	*lb.*	.90 @	

SOLVENTS

Acetone (98.99 per cent drums [6.62 lbs. per gal.])	*lb.*	.12½ @	.13½
Benzol (90%, drums [7.21 lbs. per gal.])	*gal.*	.28 @	.31
pure (drums)	*gal.*	.30 @	.33
Carbon bisulphide (drums [10.81 lbs. per gal.])	*lb.*	.06¾ @	.07½
tetrachloride (drums [13.28 lbs. per gal.])	*lb.*	.11½ @	.12
Paracymene (factory)	*gal.*	5.00 @	
Motor gasoline (steel bbls.)	*gal.*	.24 @	
73@76 degrees (steel bbls.)	*gal.*	@	
68@70 degrees (steel bbls.)	*gal.*	@	
Naphtha, V. M. & P. (steel bbls.)	*gal.*	.23 @	
solvent (drums extra)	*gal.*	.29 @	
Toluol, pure (7.21 lbs. per gal.)	*gal.*	.28 @	.34
Turpentine, spirits	*gal.*	.62½ @	
wood	*gal.*	.59½ @	
Xylol, pure (7.21 lbs. per gal.)	*gal.*	.40 @	.43
commercial	*gal.*	.28 @	.35

SUBSTITUTES

Black	*lb.*	$0.08 @	.14
White	*lb.*	.09 @	.16
Brown	*lb.*	.11 @	.15
Brown factice	*lb.*	.07 @	.15
Rubber factice	*lb.*	.03¾ @	
White factice	*lb.*	.08½ @	.17
Paragol, soft and medium	*cwt.*	6.81 @	
hard	*cwt.*	6.81 @	

VULCANIZING INGREDIENTS

Lead, black hyposulphite (black hypo)	*lb.*	.40 @	
Orange mineral, domestic	*lb.*	.11¾ @	.13½
Sulphur chloride (jugs)	*lb.*	.20 @	
(drums)	*lb.*	.08 @	
Sulphur, flour, Brooklyn brand (carloads)	*cwt.*	@	
Brooklyn brand (less carload)	*cwt.*	@	
Bergenport brand (bbls.)	*cwt.*	2.55 @	
(bags)	*cwt.*	2.30 @	
superfine (carloads, factory)	*cwt.*	@	

(See also Colors—Antimony.)

WAXES

Wax, beeswax, white, commercial	*lb.*	.55 @	
ceresine, white	*lb.*	.14 @	
carnauba	*lb.*	.16 @	
Montan	*lb.*	.07 @	
ozokerite, black	*lb.*	.30 @	
green	*lb.*	.30 @	
paraffin	*lb.*	.03½ @	.08
sweet wax	*lb.*	.12 @	

OCEAN RATES FROM NEW YORK ON TIRES, TUBES, MECHANICAL GOODS, CLOTHING, FOOTWEAR AND DRUGGISTS' SUNDRIES[1]

(Same rates apply from other Atlantic ports where aervice is available.)

AFRICA

Country and Port	Rates: Cu. Ft.	Rates: 100 lbs.
Africa, East Coast—		
Beira	..	*$26.00
Plus landing charges $0.30 per ton.		
Kilendini	..	*30.40
Delagoa Bay Lourence Marques	..	*25.40
Mauritius	..	*31.00
North Coast—		
All ports	..	*22.00
Egypt—		
Alexandria	..	*22.00
South Coast—		
Algoa Bay	..	*23.60
Capetown	..	*23.00
East London	..	*24.20
Port Natal	..	*24.80
West Coast—		
Accra-Lagos Secondi Buruttu	..	*30.00
Dakar Frectown	..	*28.00
Boma Matadi	..	*32.00

ASIA

Country and Port	Cu. Ft.	100 lbs.
China—		
Hongkong Shanghai	..	*23.00
India—		
All direct ports	..	*21.00
Madras Rangoon	..	*23.00
Japan—		
All direct ports	..	*23.00
Java—		
All ports	..	21.00
Manchuria—		
Dalny	..	*24.00
Philippines—		
Manila	..	*23.06
Straits Settlements—		
Singapore Penang	..	*21.00
Syria—		
Beyrout	..	*24.00

CENTRAL AMERICA

Country and Port	Cu. Ft.	100 lbs.
Costa Rica—		
Port Limon	$.64	1.31
Mexico—		
Tampico	.52½	1.05
Plus 2½c. per 100 lbs. bar dues.		
Vera Cruz Puerto Mexico	.52½	1.05
Panama—		
Colon	.32	.64
Plus $1 per ton transfer charge.		
Panama	.37	.74
Plus $1 per ton transfer charge.		
Salvador—		
La Libertad	.79	1.42

[1]Compiled by Austin Baldwin & Co., Inc., foreign freight contractors, 44 Whitehall st., New York, N. Y.

EUROPE

Country and Port	Cu. Ft.	100 lbs.
Belgium—		
Antwerp	.40	.75
British Isles—		
All ports	.45	.85
Except rubber belting	.50	1.00
Canary Islands—		
Las Palmas	..	*25.00
Denmark—		
Copenhagen	.55	1.00
Esthonia—		
Reval	.75	1.50
Finland—		
Helsingfors	.75	1.50
France—		
All Atlantic ports	.40	.75
Marseilles	..	*20.00
Germany—		
Hamburg Bremen	.45	.82½
Danzig	.50	.90
Greece—		
All ports	..	*22.00
Holland—		
Rotterdam	.40	.75
Amsterdam	.40	.75
Italy—		
Direct ports	.50	1.00
Fiume Trieste Venice	..	*26.00
Norway—		
All ports	.55	1.00
Portugal—		
Lisbon	..	*20.00
Oporto	..	*25.00
Rumania—		
All ports	..	*25.00
Spain—		
All ports	..	*20.00
Gibraltar	.65	1.20
Sweden—		
Malmö Stockholm	.65	1.25
Gothenburg	.55	1.00

SOUTH AMERICA

Country and Port	Cu. Ft.	100 lbs.
Argentina—		
Buenos Aires	..	*20.00
Rosario	..	*27.50
Brazil—		
Rio de Janeiro	..	*22.50
Santos	..	*20.00
Bahia	..	*24.00
Pernambuco	..	*23.50
Chili—		
All ports	.74	1.32
Colombia—		
Cartagena Puerto Colombia Santa Marta	.51	1.12
Plus government charges.		
Buenaventura—		
(via direct steamer)	1.03	1.84
(via transshipment)	.98	1.75
Ecuador—		
Guayaquil—		
(via direct steamer)	.74	1.32
(via transshipment)	.70	1.25
Peru—		
Callao Mollendo	.74	1.32
Uruguay—		
Montevideo	..	*20.00
Venezuela—		
La Guayra	.40	.65
Plus 4c per 100 kilos landing charge, plus 40% surcharge.		
New Zealand—		
All ports	..	*30.00

WEST INDIES

Country and Port	Cu. Ft.	100 lbs.
Bermuda—		
Hamilton	.37	.75
Grenada St. Croix St. Thomas St. Kitts	.50	1.00
Port of Spain	.40	.75
Cuba—		
Havana	.47	.94
Plus 30c per 100 lbs. Cuban wharfage and handling charges.		
Santiago	.59	1.18
Cienfuegos	.61	1.21
Curaçao—		
Curacao	.30	.65
Plus 40% surcharge.		
Jamaica—		
Kingston	.42	.84
Porto Rico—		
All ports	.31	.75
San Juan landing charge 1c per ft., or 2½c per 100 lbs additional.		
Santo Domingo—		
Santo Domingo	.51	.91

*Rate figured on ton of 40 cubic feet or 2,240 lbs.

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